SESSIONAL PAPERS.

Volume XXXVIII. Part IV.

Second Session of Eleventh Legislature

OF THE

PROVINCE OF ONTARIO.

SESSION 1906.

TORONTO:
PRINTED AND PUBLISHED BY L. K. CAMERON
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1906

LIST OF SESSIONAL PAPERS.

ARRANGED ALPHABETICALLY.

TITLE.	No.	REMARKS.
Accounts, Public	1	*Printed.*
Agricultural College, Report	14	"
Agricultural and Experimental Union, Report	15	"
Archives, Report	41	"
Asylums, Report	38	"
Asylums, Perquisites of Officials	58	*Printed for distribution to Members only.*
Ballot Papers, fac similes	63	*Not printed.*
Bee-Keepers' Association, Report	20	*Printed.*
Births, Deaths and Marriages, Report	9	"
Brockville License Commissioners, Correspondence	6	*Not printed.*
Canadian Improvement Company, Agreement	80	*Printed.*
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" Woodware Contract	73	"
Children, Neglected, Report	43	"
Colonial Investment Company, Assets	78	*Not printed.*
Colonization, Report	32	*Printed.*
Crown Lands, Report	3	"
" Sales since 1867	54	*Not printed.*
Dairymen's Association, Report	22	*Printed.*
Division Courts, Report	33	"
Education, Report of Minister	12	*Printed.*
" Orders in Council	51	*Not printed.*
" Teachers' Certificates	67	"
" Books on authorized list	76	"
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Electric Power Commission, Report	49	"
Entomological Society, Report	19	"
Equitable Loan Company	78	*Not printed.*
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Factories, Report	8	*Printed.*
Fairs and Exhibitions, Report	26	"
Farmers' Institutes, Report	25	"
Fisheries, Report	31	"
" Thames River	70	*Not printed.*
Fruit, Report	24	*Printed.*

TITLE.	No.	REMARKS.
Public Institutions, Perquisites to Officials of	58	*Printed for distribution to Members only.*
Public Works, Report	7	*Printed.*
Queen Victoria Niagara Falls Park, Report	6	*Printed.*
Registrar-General, Report	9	*Printed.*
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School of Practical Science, Calendar, 1906-7	60	*Printed for distribution only.*
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No. 1. Public Accounts of the Province for the year 1905. Presented to the Legislature, February 27th, 1906. *Printed.*

No. 2. Estimates for the service of the Province until the Estimates of the year are finally passed. Presented to the Legislature 22nd February, 1906. *Not Printed.* Estimates for the year 1906. Presented to the Legislature 5th March, 1906. *Printed.* Estimates (Supplementary) for the year 1906. Presented to the Legislature, 9th May, 1906. *Printed.*

No. 3. Report of the Minister of Lands, Forests and Mines for the year 1905. Presented to the Legislature 11th April, 1906. *Printed.*

No. 4. Report of the Vegetable Growers' Association for the year 1905. Presented to the Legislature, 7th May, 1906. *Printed.*

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No. 5. Report of the Bureau of Mines for the year 1905. Presented to the Legislature, 24th April, 1906. *Printed.*

No. 6. Report of the Commissioners of the Queen Victoria Niagara Falls Park, for the year 1905. Presented to the Legislature, 27th February, 1906. *Printed.*

No. 7. Report of the Minister of Public Works for the year 1905. Presented to the Legislature, 4th April, 1906. *Printed.*

No. 8. Report of the Inspectors of Factories for the year 1905. Presented to the Legislature, 7th May, 1906. *Printed.*

No. 9. Report relating to the Registration of Births, Marriages and Deaths for the year 1904. Presented to the Legislature, 20th February, 1906. *Printed.*

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No. 10. Report of the Inspector of Insurance for the year 1905. Presented to the Legislature, 19th March, 1906. *Printed.*

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No. 38. Report upon the Lunatic and Idiot Asylums of the Province, for the year ending 30th September, 1905. Presented to the Legislature, 21st February, 1906. *Printed.*

No. 39. Report upon the Prisons and Reformatories of the Province, for the year ending 30th September, 1905. Presented to the Legislature, 21st February, 1906. *Printed.*

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No. 40. Report upon the Hospitals and Charities of the Province, for the year ending 30th September, 1905. Presented to the Legislature, 21st February, 1906. *Printed.*

No. 41. Report upon the Archives of the Province, for the year 1905. Presented to the Legislature, 30th April, 1906. *Printed.*

No. 42. Report of the Royal Commission on the University of Toronto. Presented to the Legislature, 6th April, 1906. *Printed.*

No. 43. Report of Work relating to Neglected and Dependent Children of Ontario, for the year 1905. Presented to the Legislature, 20th April, 1906. *Printed.*

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No. 44. Report upon the Inspection of Liquor Licenses, for the year 1905. Presented to the Legislature, 20th February, 1906. *Printed.*

No. 45. Report of the Provincial Municipal Auditor, for the year 1905. Presented to the Legislature, 7th May, 1906. *Printed.*

No. 46. Supplementary Return from the Record of the several Elections in the Electoral Divisions of East Nipissing, Kingston and North Toronto, since the General Elections on January 25th, 1905, shewing: (1) The number of Votes Polled for each Candidate in the Electoral District in which there was a contest; (2) The majority whereby each successful Candidate was returned; (3) The total number of votes polled in each District; (4) The number of votes remaining unpolled; (5) The number of names on the Voters' Lists in each District; (6) The population of each District as shewn by the last Census. Presented to the Legislature, 2nd April, 1906. Printed.

No. 47. Report upon the state of the Library. Presented to the Legislature, 22nd March, 1906. *Not printed.*

No. 48. Report of the Temiskaming and Northern Ontario Railway Commission, for the year 1905. Presented to the Legislature, 1st March, 1906. *Printed.*

No. 49. Report of the Hydro-Electric Power Commission of the Province. Presented to the Legislature, 11th April, 1906. *Printed.*

No. 50. Copy of Order in Council approving of certain Regulations under Section 22 of the Succession Duties Act. Presented to the Legislature, 19th February, 1906. *Not printed.*

No. 51. Copies of Orders in Council under the provision of Section 9, Chapter 38, 1 Edward VII., *re* Education. Presented to the Legislature, 20th February, 1906. *Not printed.*

No. 52. Return, in part, to an Order of the House of the eleventh day of May, 1905, for a Return of, 1. Copies of all correspondence, documents, memoranda, instructions and circulars in connection with the appointment of license commissioners and inspectors for the present year, or in connection with their administration of their offices. 2. The names of all license inspectors who were dismissed, or have resigned during the present year and the reasons for their dismissals, or resignations, with the names of those appointed in their places. Presented to the Legislature, 20th February, 1906. Mr. *McDougal. Not printed.*

No. 53. Return to an Order of the House of the second day of May, 1905, for a Return shewing:—1. The original endowment or grants to King's College, Toronto, in (*a*) Lands. (*b*) Money. 2. The amount derived from sale of land by King's College, or University College, Toronto, and statement of lands still owned by University College. 3. Statement shewing subsequent Legislative endowments, or grants, to University College or Toronto University in lands, or money. 4. (*a*) The property or funds at present held by, or in trust, for the University of Toronto, or University College, or any of the affiliated Colleges. (*b*) The present annual revenue from such property or funds. 5. Statement of expenditures, annually, on buildings and equipment, salaries and maintenance of Toronto University or University College for the last ten years. 6. The annual amount at present required for salaries and expenses of maintenance. 7. Statement of all legislative grants, or expenditures, for University purposes at any city in Ontario, other than Toronto. Presented to the Legislature, 20th Februray, 1906. Mr. *Calder. Not printed.*

No. 54. Return to an Order of the House of the third day of May, 1905, for a Return shewing, by Counties, the amounts due the Province on acount of unpaid balances, due on sales of Crown Lands, from Confederation down to December 31st, 1904. Presented to the Legislature, 20th February, 1906. Mr. *Smith (Sault Ste. Marie.) Not printed.*

No. 55. Return to an Address to His Honour the Lieutenant-Governor, of the eighteenth day of May, 1905, praying that he will cause to be laid before the House a Return of copies of all Orders-in-Council, documents, correspondence and memoranda regarding the withdrawal of lots in the townships of McClure, Herchel, Dungannon, Mount Eagle, Mayo, Limerick, Cardiff, Farraday and Chandos, from sale or location, or other disposition, for a period of twenty-five years. Presented to the Legislature, 28th February, 1906. Mr. *Smyth. Not printed.*

No. 56. Copies of Orders-in-Council under ss. 2 of section 84 of the Surrogate Courts Act. Presented to the Legislature, 2nd March, 1906. *Not printed.*

No. 57. Copy of Order-in-Council authorizing the payment of surplus Surrogate fees to His Honour Judge Jamieson, Junior Judge of Wellington. Presented to the Legislature, 6th March, 1906. *Not printed.*

No. 58. Return to an Order of the House of the first day of March, 1906, for a Return shewing, 1. The names of all officers, attendants, or other officials of the Asylums, Prisons and other Public Institutions of the Province, under the Department of the Provincial Secretary, receiving perquisites, allowances or payments of any nature whatever, whether in cash, goods or supplies, beyond the amount voted for their salaries in the Estimates. 2. The nature and amount of such perquisites, allowances or payments received by such officer or other official. Presented to the Legislature, 6th March, 1906. Mr. *Dunlop. Printed for distribution to Members only.*

No. 59. Return to an order of the House of the twenty-seventh day of February, 1906, for a Return shewing—1. How many persons, in Ontario, were commissioned to issue Marriage Licenses on the 7th day of February, 1905. 2. How many of such persons have had their authority revoked since such date. 3. How many persons have been commissioned to issue Marriage Licenses, in Ontario, between the 7th day of February, 1905, and the 7th day of February, 1906. Presented to the Legislature, 7th March, 1906. Mr. *Ross. Not printed.*

No. 60. Calendar of the Ontario School of Practical Science for the year 1906-7. Presented to the Legislature, 16th March, 1906. *Printed for distribution only.*

No. 61. Return to an Order of the House of the fourteenth day of March, 1906, for a Return of Copies of all correspondence, papers and documents between the Attorney-General, or other Member of the Government, and A. M. Panton and others, in the year 1903, in any way relating to the action at law brought by Mr. Scully, against Mr. Peters for malicious prosecution. Presented to the Legislature, 20th March, 1906. Mr. *Torrance. Not printed.*

No. 62. Return to an Order of the House of the eleventh day of May, 1905, for a Return shewing the amount received in each of the last five years for Market Fees in Cities and Towns situated in Counties in which Toll Roads exist, or have existed during the past five years. And shewing as well what reductions, if any have been made in the respective market fees by Towns and Cities situated in Counties in which Toll Roads have been abolished during the past five years. Presented to the Legislature, 22nd March, 1906. Mr. *Thompson (Wentworth.) Not printed.*

No. 63. Return to an Order of the House of the twenty-first day of March, 1906; That the Clerk of the House, *ex-officio*, Clerk of the Crown in Chancery, do lay upon the Table of the House, fac-similes of the Ballot papers furnished to the Returning Officers and Deputy Returning Officers, and used in the recent Bye Elections in the City of Kingston and in the North Riding of the City of Toronto. Presented to the Legislature, 23rd March, 1906. Mr. *Pense*. *Not printed.*

No. 64. Return to an Address to His Honour the Lieutenant-Governor of the sixteenth day of March, 1906, praying that he will cause to be laid before the House a Return of copies of all correspondence with the Government, or any member thereof, together with a copy of any Orders in Council, in the matter of granting Certificates to the Home Guard acting during the Fenian Raid in the year 1866. Presented to the Legislature, 27th March, 1906. Mr. *Smyth*. *Not printed.*

No. 65. Copy of an Agreement between the Province and William Bernard Converse, of Montreal, conditioned for the manufacture of rope and cord at the Central Prison. Presented to the Legislature, 11th April, 1906. *Printed.*

No. 66. Copies of Orders in Council under the provisions of R.S.O., 1897, Chapter 36, Section 8, *in re* Mining Divisions. Presented to the Legislature, 28th March, 1906. *Printed for distribution only.*

No. 67. Return to an Order of the House of the sixteenth day of March, 1906, for a Return shewing the number of:—1. Part II. Junior Leaving and Junior Teacher's Certificates. 2. Part I. Senior Leaving and Part I. Senior Teacher's Certificates, and 3. Part II. Senior Leaving and Part II. Senior Teacher's Certificates, obtained at each of the following centres, at the examinations of 190-'01-'02-'03-'04 and '05, *viz.*—Barrie, Belleville, Berlin, Brantford, Chatham, Cobourg, Collingwood, Galt, Guelph, Hamilton, Kingston, Lindsay, London, Morrisbug, Ottawa, Owen Sound, Perth, Peterborough, Renfrew, Sarnia, Stratford, Toronto (Harbord Street), Toronto (Jamieson Avenue), Toronto (Jarvis Street), Harriston, Meaford, Mount Forest, Orangeville and Port Hope. Presented to the Legislature, 28th March, 1906. Mr. *MacKay*. *Not printed.*

No. 68. Copies of correspondence in the matter of the sale of $6,000,000 six months' Treasury Bills, at a rate of discount not exceeding four *per cent*,. and to the subsequent issue of Government Bonds or Stock. Presented to the Legislature, 29th March, 1906. *Printed.*

No. 69. Return to an Order of the House of the twenty-third day of March, 1906, for a Return of copies of all correspondence between the Chairman of the Board of License Commissioners of the Town of Brockville; the License Inspector, or any citizen of the Town and the Government, or any Member thereof, or the

License Department, with reference to the enforcement or non-enforcement of the Liquor License Act, or to the granting, or withholding, of Licenses to the Imperial Hotel, or to Samuel Johnston. Presented to the Legislature, 3rd April, 1906. Mr. *Graham*. *Not printed.*

No. 70. Return to an Order of the House of the twenty-third day of March, 1906, for a Return shewing the number of fishing licenses granted on the River Thames, east of the City of Chatham, during the years 1904, 1905 and 1906; the Revenue received each year, and whether the fish were sold in Canada or the United States, and whether the fish were taken with nets, and if so, of what description. Presented to the Legislature, 3rd April, 1906. Mr. *Ross*. *Not printed.*

No. 71. Return to an Address of His Honour the Lieutenant-Governor, of the ninth day of March, 1906, praying that he will cause to be laid before the House a Return of copies of all papers and correspondence regarding the settlement of the Indian claim of Northern Ontario, known as Treaty No. 9, together with a copy of the Treaty as finally agreed upon. Presented to the Legislature, 6th April, 1906. Mr. *Ross*. *Not printed.*

No. 72. Return to an Address to His Honour the Lieutenant-Governor, of the twenty-third day of March, 1906, praying that he will cause to be laid before the House copies of all Orders in Council; papers and correspondence in any way relating to the cancellation of the license of timber berth, Block D., Pigeon River, held by J. Murphy, which stands in the Public Accounts, 1905, page 319, as a charge of $18,787,10. Presented to the Legislature, 10th March, 1906. Mr. *McDougal*. *Not printed.*

No. 73. Copy of an Agreement between the Province and Ellen Charlotte Scott, of Toronto, trading under the name of Taylor, Scott & Co'y, respecting the manufacture of wooden ware at the Central Prison. Presented to the Legislature, 18th April, 1906. *Printed.*

No. 74. Return to an Order of the House, of the sixth day of April instant, for a Return of copies of all correspondence between the License Inspector of North Renfrew, or any member of the Board of License Commissioners, or af any citizen of Pembroke, and the License Department, or any Member of the Government, with reference to the granting of a liquor license at Petewawa. Presented to the Legislature, 12th April, 1906. Mr. *Graham*. *Not printed.*

No. 75. Report of the Land Titles Office for the years 1903, 1904 and 1905. Presented to the Legislature, 27th April, 1906. *Not printed.*

No. 76. Return to an Order of the House of the fourth day of April, 1906, for a Return giving a complete list of all books on the authorized list for public and high schools, with dates of authorization; names of authors; positions occupied by them; with the Royalties, or other considerations, paid to them, respecting such books and the selling price thereof, and how prices are arranged. Presented to the Legislature, 1st May, 1906. Mr. *Craig. Printed.*

No. 77. Statement of distribution of Revised and Sessional Statutes, from 31st December, 1904, to 31st December, 1905. Presented to the Legislature, 1st May, 1906, *Not printed.*

No. 78. Return to an Order of the House of the twenty-third day of April, 1906, for a Return shewing: 1. On what terms the assets of the Equitable Loan Company were taken over by the Colonial Investment and Loan Company and what percentage was paid in stock of Colonial Company to holders of terminating stock in Equitable Loan Company. 2. The names and addresses of Directors and officials of the Colonial Investment and Loan Company. 3. The names and addresses of the Directors and officials of Imperial Trusts Company. Presented to the Legislature, 7th May, 1906. Mr. *Jamieson. Not printed.*

No. 79. Return to an Order of the House, of the first day of May, 1906, for a Return of copies of all correspondence between the Municipal Council of the City of St. Thomas, or any official thereof and any other person or persons, proposing to the Government, or any official thereof, to have a special audit of the books of the Municipality of St. Thomas. Presented to the Legislature, 7th May, 1906, Mr. *Macdiarmid. Not printed.*

No. 80. Copy of Agreement, Deed of Trust and Guaranty, made by and between His Majesty the King and the Canadian Improvement Company and others. Presented to the Legislature, 9th May, 1906. *Printed.*

REPORT

OF THE

Minister of Education

Province of Ontario

FOR THE YEAR

1905

PART I.

(WITH THE STATISTICS OF 1904)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
Printed and Published by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1906

WARWICK BRO'S & RUTTER, Limited, Printers,
Toronto.

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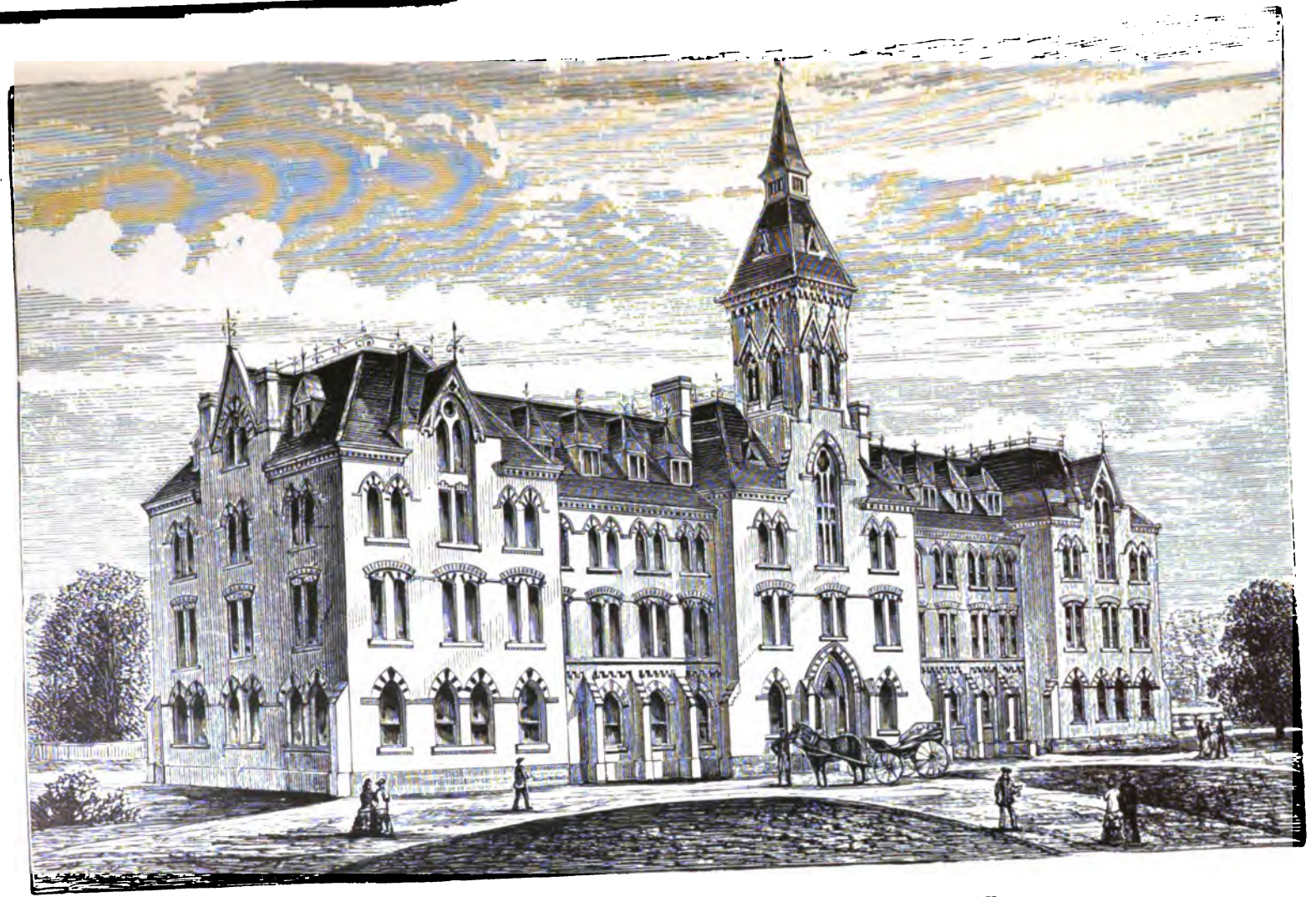

ONTARIO INSTITUTION FOR THE DEAF AND DUMB, BELLEVILLE.

Institution for the Blind, Brantford.

Bowling Lawn, O. I. B., Brantford.

MAUD STABBACH, A.T.C.M.,
Graduated at O.I.B., 1902.

ALMEDA HART, A.T.C.M.,
Graduated at O.I.B., 1904.

MAUD YOUNG, A.T.C.M.,
Graduated at O.I.B., 1903.

MARY WILLIAMS, A.T.C.M.,
Graduated at O.I.B., 1905.

Geraniums, O.I.B., Brantford.

Class in Bead Work, with Blind Teacher, O.I.B., Brantford.

Centre Walk, Spruce Avenue, O.I.B., Brantford.

Teachers' and Officers' Room, O.I.B., Brantford.

Teachers and Pupils, O. I. B., Brantford, 1905.

EDUCATION DEPARTMENT.

MINISTER OF EDUCATION:

HON. R. A. PYNE, M.D., LL.D., M.P.P.

DEPUTY MINISTER OF EDUCATION.

H. M. Wilkinson ..... Chief Clerk and Accountant.
A. C. Paull ..... Clerk of Records.
C. James ..... Clerk and Secretary to the Minister.
T. J. Greene ..... Assistant Clerk of Records.
E. A. Faulds ..... Clerk of Statistics.
T. F. Callaghan ..... Clerk of Correspondence.
S. A. May ..... Assistant Clerk of Correspondence.
F. Woodley ..... Assistant Accountant.
Allen Ker ..... Clerk and Stenographer.
N. Brown ..... Clerk.
Miss E. Dennis ..... Stenographer.
Miss S. B. Shields ..... Stenographer.
L. McCorkindale ..... Caretaker.

Departmental Examinations.

W. H. Jenkins, B.A. ..... Registrar.
F. N. Nudel ..... Assistant Registrar.
W. W. Jeffers ..... Clerk of Examinations.
R. J. Bryce ..... Assistant Clerk of Examinations.

Public Libraries, Etc.

T. W. H. Leavitt ..... Inspector.
Wm. Lemon ..... Clerk.

Departmental Library, Etc.

J. George Hodgins, M.A., LL.D. ..... Historiographer.
H. R. Alley ..... Librarian.
F. F. Evans ..... Assistant Librarian.

Museum.

David Boyle, Ph. B. ..... Superintendent.
W. A. Poole ..... Guardian.
W. H. C. Phillips ..... Clerk.

REPORT

OF THE

MINISTER OF EDUCATION

FOR THE YEAR 1905

PART I

WITH THE STATISTICS OF 1904

To the Honorable WM. MORTIMER CLARK, K.C.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOR:

I herewith present Part I. of the Report of the Education Department for the year 1905 with the statistics for the year 1904.

SUMMARY OF STATISTICS.

1. ELEMENTARY SCHOOLS.

a. Public Schools.

Number of Public Schools in 1904		5,758
Increase for the year	24	
Number of enrolled pupils of all ages in the Public Schools during the year		396,814
Decrease for the year	6,347	
Average daily attendance of pupils		227,165
Decrease for the year	3,565	
Percentage of average attendance to total attendance		57.25
Number of persons employed as teachers (exclusive of Kindergarten and Night School teachers) in the Public Schools: men, 1,957; women, 6,653; total		8,610
Decrease: men 105· increase, women, 155; total increase	50	
Number of teachers who attended Normal School		4,564
Decrease for the year	231	
Number of teachers with a University degree		86
Increase for the year	1	
Average annual salary for male teachers		$485
Increase for the year	$20	

Average annual salary of female teachers		$335
Increase for the year	$11	
Amount expended for Public School houses (sites and buildings)		$442,865
" " for teachers' salaries		$3,246,574
" " for all other purposes		$1,263,743
Total amount expended on Public Schools		$4,953,182
Increase for the year	$299,632	
Cost per pupil, (enrolled attendance)		$12.48
Increase for the year	$.94	

b. Roman Catholic Separate Schools.

Number of Roman Catholic Separate Schools in 1904		419
Increase for the year	7	
Number of enrolled pupils of all ages		47,807
Increase for the year	690	
Average daily attendance of pupils		29,920
Increase for the year	382	
Percentage of average attendance to total attendance		62.58
Number of teachers		944
Increase for the year	48	
Amount expended for School houses (sites and buildings)		$135,791
Amount expended for teachers' salaries		$227,136
Amount expended for all other purposes		$143,384
Total amount expended on R. C. Separate Schools		$506,311
Increase for the year	$81,992	
Cost per pupil (enrolled attendance)		$10.59
Increase for the year	$1.58	

c. Protestant Separate Schools.

Number of Protestant Separate Schools (included with Public Schools, *a*) in 1904		5
Number of enrolled pupils		319
Increase for the year	5	
Average daily attendance of pupils		192
Increase for the year	1	

d. Kindergartens.

Number of Kindergartens in 1904		129
Increase for the year	6	
Number of pupils enrolled		12,021
Increase for the year	141	
Average daily attendance of pupils		4,573
Decrease for the year	133	
Number of teachers engaged		255
Increase for the year	5	

e. Night Schools.

Number of Night Schools in 1904-5		11
Increase for the year	1	
Number of pupils enrolled		702
Increase for the year	1	

Average daily attendance of pupils		273
Increase for the year	111	
Number of teachers engaged		10
Increase for the year	2	

II. Secondary Schools.*

a. High Schools.

Number of High Schools (including 42 Collegiate Institutes) in 1904		138
Increase for the year	3	
†Number of Teachers in High Schools		661
Increase for the year	42	
Number of Pupils in High Schools		27,709
Increase for the year	1,987	
†Average Annual Salary, Principals		$1,246
Increase for the year	$26	
†Average Annual Salary, Assistants		$894
Increase for the year	$19	
†Average Annual Salary		$967
Increase for the year	$17	
†Highest Salary Paid		$3,000
Amount expended for High School teachers' salaries		$620,710
" " " " houses (sites and buildings)		$50,512
Amount expended for all other High School purposes		$205,865
Total amount expended on High Schools		$877,087
Increase for the year	$61,005	
Cost per Pupil (enrolled attendance)		$31.65
Decrease for the year	$.07	

b. Continuation Classes.

Number of Continuation Classes, 1904-5 (included in Public and Separate Schools, I, *a* and *b*), practically doing High School work: Grade A, 78; Grade B, 39; Grade C, 138; Grade D, 227; total		482
Increase for the year, Grade A, 10; Grade C, 20; Grade D, 39		
Decrease, Grade B, 6		
Total increase for the year	63	
Number of pupils in attendance		5,349
Increase for the year	751	

III. General.

Elementary and Secondary Schools.

Total population of the Province, 1904		‡2,215,854
Pupils enrolled in Elementary and Secondary Schools		485,053
Decrease for the year	3,528	

*The Curriculum of Secondary Schools includes all the subjects required for matriculation into the University.

†These statistics are based on Returns to the Department, dated January, 1905.

‡Estimated.

Average daily attendance		278,661
Decrease for the year	1,792	
Percentage of total population enrolled		21.89
Average length of school term in days		200.31
Average number of days attended by each pupil enrolled		115.07

Average cost per pupil (enrolled attendance) in all schools:

	1902	1903	1904
Sites and buildings	$0 97	$0 98	$1 30
Teachers' salaries	7 63	7 94	8 44
All other expenses	2 80	3 14	3 32
For all purposes	$11 40	$12 06	$13 06

Average cost per pupil (average attendance) in all schools:

	1902	1903	1904
Sites and buildings	$1 70	$1 70	$2 26
Teachers' salaries	13 34	13 84	14 69
All other expenses	4 89	5 47	5 79
For all purposes	$19 93	$21 01	$22 74

I. PUBLIC SCHOOLS (INCLUDING SEPARATE SCHOOLS).

These tables, 1, 2, 3 and 4, for the purpose of comparison with previous years in which the R. C. Separate Schools were included with Public Schools, include R. C. Separate Schools. In the Statistical Tables, A, B, C, D, E, (Appendix A), the Separate Schools are excluded.

1.—School Population—Attendance.

The School population of the Province, as ascertained by the assessors, is as follows:

Year.	School age.	School population.	Pupils enrolled under 5.	Pupils enrolled 5 to 21.	Pupils enrolled over 21.	Total number of enrolled pupils.	Average daily attendance.	Percentage of average attendance to total number attending school.
1867	5—16	447,726	.....	a380,511	b21,132	401,643	163,974	40.82
1872	5—16	495,756	.....	a433,664	b20,998	454,662	188,701	41.50
1877	5—16	494,804	1,430	488,553	877	490,860	217,184	44.25
1882	5—16	483,817	1,352	469,751	409	471,512	214,176	45.42
1887	5—21	611,212	1,569	491,242	401	493,212	245,152	49.71
1892	5—21	595,238	1,636	483,643	391	485,670	253,830	52.26
1897	5—21	590,055	1,385	481,120	272	482,777	273,544	56.66
1902	5—21	584,512	1,001	452,977	110	454,088	261,480	57.58
1903	5—21	577,383	917	449,255	106	450,278	260,268	57.80
1904	5—21	576,537	790	443,729	102	444,621	257,085	57.82

a 5—16. b Other ages than 5 to 16. Note.—Kindergarten and Night School pupils are not included in above table.

The decrease in the enrolled attendance in 1904 was partly offset by the increased attendance noticed in the R. C. Separate Schools, and in the High Schools and Collegiate Institutes. While there was a decrease of 6,347 in the Public Schools alone, the decrease in all the Schools was only 3,528.

As in former years, there was an increase in 1904 in the urban school attendance, consequently the decrease in the rural schools was greater than the total decrease shown in the preceding table. This decline of attendance in the rural schools is, no doubt, owing principally to the movement, now in progress for many years, of our farming population to North Western Canada and to the cities and towns of our own Province. The following table will illustrate this to a certain extent:

Year.	Attendance in Rural Schools.	Attendance in Urban Schools.
1903	260,617 or 57.88% of total	189,661 or 42.12% of total
1904	253,133 or 56.93% of total	191,488 or 43.07% of total

2.—Classification of Pupils.

Year.	1st Reader—Parts I and II.	2nd Reader.	3rd Reader.	4th Reader.	5th or High School Reader.	Writing.	Arithmetic.	Drawing.	Geography.	History.	Music.	Grammar and Composition.	Temperance and Hygiene.
1897	79,365	98,184	83,211	68,896	71,987	231,784	241,501	5,456	272,173	61,787	47,618	147,412	.....
1902	160,828	100,245	96,481	67,440	29,668	322,688	327,218	57,582	327,139	109,639	110,083	282,156	.....
1903	153,639	108,678	135,824	72,871	19,857	396,006	402,248	153,036	375,951	116,865	168,942	220,977	.....
1904	165,834	106,229	117,352	71,740	10,357	398,401	419,557	176,432	280,517	150,989	158,694	209,184	33,926
1905	192,361	100,533	108,096	81,984	10,238	466,389	469,445	395,097	316,791	194,754	203,567	270,856	71,525
1892	187,947	96,074	99,345	88,934	13,370	465,516	470,813	435,239	334,947	253,956	220,941	294,331	171,594
1897	181,375	91,330	99,682	89,314	21,076	465,525	471,869	448,444	342,189	284,025	238,915	316,787	215,343
1902	176,503	85,732	90,630	83,738	17,485	445,316	449,573	434,030	318,755	269,954	268,356	296,172	194,459
1903	173,309	86,582	90,065	83,981	16,341	443,711	446,168	432,270	314,318	272,657	264,181	292,513	195,506
1904	169,981	85,229	90,111	83,104	16,196	439,040	440,314	426,612	323,101	287,165	266,992	305,829	215,421

The following table classifies the pupils in the various Readers in 1904, as to rural and urban schools.

	First Reader Part I.	First Reader Part II.	Second Reader.	Third Reader.	Fourth Reader.	Fifth or High School Reader.	Totals.
Rural Schools	60,784	36,941	47,930	50,297	47,289	9,892	253,133
Urban Schools (cities, towns and incorporated villages)	44,456	27,800	37,299	39,814	35,815	6,304	191,488

3.—Teachers' Certificates and Salaries.

Teachers' Certificates.

Year.	Public school teachers.	Male.	Female.	1st class.	2nd class.	3rd class.	Other certificates, including old County Board, etc.	Number of teachers who attended Normal School.
1867	4,890	2,849	2,041	1,899	2,454	386	151	666
1872	5,476	2,626	2,850	1,337	1,477	2,084	578	828
1877	6,468	3,020	3,448	250	1,304	3,926	988	1,084
1882	6,857	3,062	3,795	246	2,169	3,471	971	1.873
1887	7,594	2,718	4,876	252	2,553	3,865	924	2,434
1892	8,480	2,770	5,710	261	3,047	4,299	873	3,038
1897	9,128	2,784	6,344	343	3,386	4,465	934	3,643
1902	9,367	2,294	7.073	608	4,296	3,432	1,031	4,774
1903	9,456	2,160	7,296	610	4,451	3,250	1,145	4,967
1904	9,554	2,075	7,479	635	4,192	3,396	1,331	4,728

NOTE.—Kindergarten and Night School teachers are not included in above table.

The above table shows a steady decline of the percentage of men in the teaching profession since 1867, when they were in the majority, or were 58.26 per cent. of the whole number. In 1897 they had become reduced to 30.5 per cent. and in 1904 they formed only 21.72 per cent. of the whole.

Improvement is noticed in the increase of the number of teachers with First Class certificates. The decrease in the number of Second Class and the increase in the Third and other Class in 1904 were due partly to the lengthening of the Normal School term in 1903, and partly because many Second Class teachers secured better positions in the North West.

Eighty-six Public School-teachers held University degrees in Arts, an increase of one over the preceding year 1903.

The following table classifies the teachers and certificates as to rural and urban schools, in 1904.

	Public School Teachers,			Certificates.			
	Total.	Male.	Female.	1st Class.	2nd Class.	3rd Class.	Other Class.
Rural Schools.....	5,974	1,469	4,505	152	1,944	3,107	771
Urban (cities, towns and incorporated villages)..	3,580	606	2,974	483	2,248	289	560

Teachers' Salaries.

Year.	Highest salary paid.	Average salary, male teacher, province.	Average salary, female teacher, province.	Average salary, male teacher, counties, etc.	Average salary, female teacher, counties, etc.	Average salary, male teacher, cities.	Average salary, female teacher, cities.	Average salary, male teacher, towns.	Average salary, female teacher, towns.
	$	$	$	$	$	$	$	$	$
1867	1,350	346	226	261	189	532	243	464	240
1872	1,000	360	228	305	213	628	245	507	216
1877	1,100	398	264	379	251	735	307	583	269
1882	1,100	415	269	385	248	742	331	576	273
1887	1,450	425	292	398	271	832	382	619	289
1892	1,500	421	297	383	269	894	402	648	298
1897	1,500	391	294	347	254	892	425	621	306
1902	1,600	436	313	372	271	935	479	667	317
1903	1,600	465	324	387	283	951	491	678	327
1904	1,600	485	335	402	295	953	498	705	341

The average salaries for teachers in 1904 in incorporated villages, included in Counties etc. above, were $564 for men and $305 for women. In rural schools they were $385 and $294, and in all urban schools, $756 and $406 respectively.

The salaries were higher in both rural and urban schools in 1904 than in any previous year since 1867, although when the high cost of living of late years, as compared with that of twenty years ago, is considered, the salaries then were higher, so far as the purchasing power of the dollar is concerned, than those paid last year.

See pages 14 and 15 of this Report for salaries in the various Counties and Districts.

4.— Receipts and Expenditure.

Year.	Receipts.				Expenditure.					
	Legislative grants.	Municipal School grants and assessments.	Clergy Reserve funds, balances and other sources.	Total receipts.	Teachers' salaries.	Sites and building school houses.	Libraries, maps, apparatus, prizes, etc.	Rent, repairs, fuel and other expenses.	Total expenditure.	Cost per pupil.
	$	$	$	$	$	$	$	$	$	$ c.
1867	187,153	1,151,583	331,599	1,670,335	1,093,517	149,195	31,354	199,123	1,473,189	3 67
1872	225,318	1,763,492	541,460	2,530 270	1,371,594	456,043	47,799	331,928	2,207,364	4 85
1877	251,962	2,422,432	730,687	3,405,081	2,038,099	477,393	47,539	510,458	3,073,489	6 26
1882	265,738	2,447,214	757,038	3,469,990	2,144,449	341,918	15,583	525,025	3,026,975	6 42
1887	268,722	3,084,352	978,283	4,331,357	2,458,540	544,520	27,509	711,535	3,742,104	7 59
1892	283,791	3,300,512	1,227,596	4,811,899	2,752,629	427,321	40,003	833,965	4,053,918	8 40
1897	366,538	3,361,562	1,260,055	4,988.155	2,886,061	391,689	60,585	877,335	4,015 670	8 73
1902	383,666	3,959,912	1,422,924	5,766,502	3,198,132	432,753	86,728	1,107,552	4,825,160	10 62
1903	390,156	4,263,393	1,406,957	6,061,006	3,309 993	428,817	74,486	1,264,573	5,077,869	11 27
1904	405,362	4,464,227	1,600,982	6,470,571	3,473,710	578,656	87,997	1,319,130	5,459,493	12 27

An increase in the government and municipal grants and in the expenditure of the Public and Separate Schools is noticed above. The latter item in connection with the decreased attendance has increased the cost per pupil from $11.27 in 1903 to $12.27 in 1904.

Average cost per pupil (enrolled attendance.)

	1902.	1903.	1904.
Sites and buildings	$ 95	$ 95	$ 1 30
Teachers' salaries	7 04	7 35	7 81
All other expenses	2 63	2 97	3 16
For all purposes	$10 62	$11 27	$12 27

Average cost per pupil (average attendance.).

	1902.	1903.	1904.
Sites and buildings	$ 1 65	$ 1 65	$ 2 25
Teachers' salaries	12 23	12 72	13 51
All other expenses	4 57	5 14	5 47
For all purposes	$18 45	$19 51	$21 23

The cost per pupil (enrolled attendance) for 1904 in the Public Schools alone will be found on pages 24 and 25 of this report, and for the R.C. Separate Schools on pages 28 and 29.

II.—ROMAN CATHOLIC SEPARATE SCHOOLS.

Year.	Schools—Expenditure—Teachers.				Number of pupils attending—Number in the various branches of instruction.							
	Schools open.	Total receipts.	Total expenditure.	Teachers.	Pupils.	Reading.	Writing.	Arithmetic.	Geography.	Grammar.	Drawing.	Temperance and Hygiene.
		$	$									
1867	161	48,628	42,719	210	18,924	18,924	10,749	10,559	8,666	5,688	.....	.....
1872	171	68,810	61,817	254	21,406	21,406	13,699	12,189	8,011	7,908	.....	.....
1877	185	120,266	114,806	334	24,952	24,952	17,932	17,961	13,154	11,174	.....	.....
1882	190	166,739	154,340	390	26,148	26,148	21,052	21,524	13,900	11,695	7,548	2,033
1887	229	229,848	211,293	491	30,373	30,373	27,824	28,501	19,608	18,678	21,818	8,578
1892	312	326,034	289,838	662	37,466	37,466	35,565	25,936	26,299	22,755	32,682	11,056
1897	340	335,324	302,169	752	41,620	41,620	39,724	40,165	27,471	26,071	36,462	18,127
1902	391	485,503	435,441	870	45,964	45,964	45,964	45,964	29,788	27,409	41,952	14,687
1903	412	472,395	424,319	896	47,117	47,117	41,117	47,117	30,212	28,609	43,658	20,559
1904	419	559,635	506,311	944	47,807	47,807	47,807	47,807	32,483	31,382	43,866	23,716

III.—PROTESTANT SEPARATE SCHOOLS.

The complete list of Protestant Separate Schools is as follows:

No. 9 Cambridge, No. 6 Plantaganet North, No. 1 N. Tilbury, L'Orignal, and Penetanguishene.

They were atttended by 319 pupils. The whole amount expended for their maintenance was $3,918.77. One teacher held a First Class, four teachers held a Second Class, two a Third Class and one a Temporary Certificate.

IV.—COLLEGIATE INSTITUTES AND HIGH SCHOOLS.

The following statistics respecting Collegiate Institutes and High Schools will be found suggestive:

1. Receipts, Expenditure, Attendance, etc.

Year.	Schools open.	Teachers.	Receipts.			Expenditure.			Pupils.	Percentage of average attendance to total attendance.	Cost per pupil.
			Amount of fees.	Legislative grant.	Total receipts.	Paid for teachers' salaries.	Paid for sites and building school houses.	Total expenditure.			
			$	$	$	$	$	$			$
1867.....	103	159	15,605	54,562	139,579	94,820	*19,190	124,181	5,696	55	21 80
1872.....	104	239	20,270	79,543	223,269	141,812	*31,360	210,005	7,968	56	26 36
1877.....	104	280	20,753	78,762	357,521	211,607	*51,417	343,710	9,229	56	37 24
1882.....	104	332	29,270	84,304	373,150	253,864	*19,361	343,720	12,348	53	27 56
1887.....	112	398	56,198	91,977	529,323	327,452	*73,061	495,612	17,459	59	28 38
1892.....	128	522	97,273	100,000	793,812	472,029	*91,108	696,114	22,837	60	30 48
1897.....	130	579	110,859	101,250	767,487	532,837	*46,627	715,976	24,390	61	29 35
1902.....	134	593	105,801	112,650	832,853	547,402	44,246	769,680	24,472	58.97	31 45
1903.....	135	619	111,028	118,773	876,737	571,559	48,723	816,082	25,722	59.55	31 72
1904.....	138	661	116,758	120,799	960,867	620,710	50,512	877,087	27,709	60.38	31 65

*Expenses for repairs, etc., included.

The above table shows an increase in the enrolled attendance of 1987 over 1903.

While the attendance at our Public Schools is decreasing that of our secondary schools is increasing year by year, showing that an increased percentage of our school population is taking advantage of those schools. About six per cent. of the total school attendance was enrolled in the Collegiate Institutes and High Schools in 1904. About 20 per cent. of those who reach the Fourth Reader in the Public and Separate schools extend their course to the Continuation Classes, High Schools and Collegiate Institutes.

Average cost per pupil (enrolled attendance) per year:

	1902.	1903.	1904.
Sites and buildings	$1 81	$1 89	$1 82
Teachers' salaries	22 37	22 22	22 40
All other expenses	7 27	7 61	7 43
For all purposes	$31 45	$31 72	$31 65

Average cost per pupil (average attendance) per year:

	1902.	1903.	1904.
Sites and buildings	$ 3 07	$ 3 18	$ 3 02
Teachers' salaries	37 93	37 31	37 10
All other purposes	12 34	12 78	12 30
For all purposes	$53 34	$53 27	$52 42

2.—Classification of Pupils, etc.

Year.	English.					Mathematics.				Science.		
	English Grammar.	English Composition.	Poetical Literature.	History.	Geography.	Arithmetic and Mensuration.	Algebra.	Geometry.	Trigonometry.	Physics.	Chemistry.	Botany.
1867	5,467	4,091	.....	4,634	5,264	5,526	2,841	1,847	141	1,876	840	.....
1872	7,884	7,278	.....	7,513	7,715	7,834	6,033	2,592	174	1,921	1,151	.....
1877	8,819	8,772	.....	9,106	9,158	9,227	8,678	8,113	359	2,168	2,547	.....
1882	12,275	12,189	.....	12,220	12,106	12,261	11,742	11,148	397	2,880	2,522	.....
1887	17,086	17,171	16,649	17,010	16,962	16,939	16,904	14,839	1,017	5,265	3,411	4,640
1892	22,530	22,525	22,468	22,328	22,118	21,869	22,229	17,791	1,154	6,601	3.710	6,189
1897	19,591	24,195	24,176	18,318	13,747	19,798	24,105	16,788	1,652	11,002	5,489	12,892
1902	21,576	24,241	23,768	23,559	14,500	21,594	22,953	16,881	1.662	12,758	5,860	9,051
1903	23,069	25,375	24,885	24,426	15,290	23,246	23,840	17,873	1,618	14,240	6.214	9,442
1904	25,019	27,298	*27,070	27,709	18,493	25,249	25,143	20,519	1,759	17,837	9,038	11,463

* English Literature.

2. Classification of Pupils, etc.—*Continued.*

Year.	Languages.				Drawing (Art).	Bookkeeping.	Left for mercantile life.	Left for agriculture.	Who joined a learned profession.	Number of schools charging fees.	Number of free schools.
	Latin.	Greek.	French.	German.							
1867	5,171	802	2,164	.....	676	1,283	.....	.....	.....	67	3
1872	3,860	900	2,828	341	2,176	3,127	486	300	213	28	7
1877	4,955	871	3,091	442	2,755	3,621	555	328	564	35	6
1882	4,591	815	5,363	962	3,441	5,642	881	646	751	37	6
1887	5,409	997	6,180	1,350	14,295	14,064	1,141	882	791	58	5
1892	9,006	1,070	10,398	2,796	16,980	16,700	1,111	1,006	398	77	5
1897	16,873	1,421	13,761	5,169	12,252	11,647	1,368	1,153	409	87	4
1902	18,884	631	13,595	3,280	10,721	11,334	1,573	743	705	82	5
1903	18,831	602	14,522	3,229	11,619	12,264	1,805	844	684	81	5
1904	19,409	637	16,039	3,274	11,596	13,334	1,834	811	739	82	5

The following table will be of interest regarding the occupation of parents of High School pupils, and will show the classes of our population receiving most advantages from those institutions.

Agricultural	8,516
Commercial	7,645
Mechanical	7,099
Professional	2,604
Other callings	1,845

The statistics in detail of the various Collegiate Institutes and High Schools in the Province will be found on pages 34 to 57 of this Report.

V. DEPARTMENTAL EXAMINATIONS, ETC.

1. Table shewing the Number of Teachers-in-Training at County Model Schools, Normal College, Provincial Normal Schools, etc., 1877-1904.

Year.	County Model Schools.			Normal College.			Normal and Model Schools, etc.					
	No. of schools.	No. of teachers in training.	No. that passed final examination.	No. of teachers.	No. of students admitted.	Receipts from fees of Normal College.	No. of Normal School teachers.	No. of Normal School students admitted.	No. of Model School and Kindergarten teachers.	No. of Model School and Kindergarten pupils.	Receipts from fees of Normal School, Model School and Kindergarten pupils.	Expenditure, Normal and Model Schools.
						$ c.					$ c.	$ c.
1877.....	50	1,146	1,124	....	....	.....	13	257	8	643	7,900 22	25,780 88
1882.....	46	882	837	....	....	.....	16	260	15	799	13,783 50	44,888 02
1887.....	55	1,491	1,376	....	....	.....	13	441	18	763	16,427 00	40,188 66
1892.....	59	1,283	1,225	10	96	1,630 00	12	428	22	842	19,016 00	45,724 12
1897.....	60	1,645	1,384	12	180	4,374 00	13	407	23	832	18,797 59	46,390 91
1902.....	54	1,171	1,138	15	132	2,405 00	16	619	31	958	20,735 00	56,672 98
1903.....	55	1,148	1,123	17	127	2,110 00	*25	586	36	1,067	19,866 00	61,678 08
1904.....	57	1,122	1,097	17	166	2,775 00	*25	304	36	982	20,212 00	64,999 19

* Including those engaged in both a Normal and a Model School.

2. Entrance Examinations, 1877-1905.

	No. of candidates examined.	No. of candidates who passed.
1877	7,383	3,836
1882	9,607	4,371
1887	16,248	9,364
1892	16,409	8,427
1897	16,384	10,502
1902	18,087	13,300
1903	19,058	13,003
1904	19,774	14,632
1905	20,295	13,431

3. Non professional Teachers and Matriculation Examinations, 1905.

	District Certificate.	Part II, Junior Teachers.	Junior Matriculation, including Scholarship.	Part I, Senior Teachers.	Part II, Senior Teachers.	Commercial Specialist.
No. candidates	280	2,773	2,195	685	433	12
No. who passed	124	1,482	*	405	275	7
No. of appeals	3	267	43	32	24	.....
No. sustained	.....	39	5	2	10	.....

NOTE—(a) The Part I. Junior Leaving examination was abolished in 1902.
(b) In Junior Matriculation column above, 127 scholarship candidates are included.
(c) The Commercial Diploma Part II. was abolished in 1904.
*Owing to changes in matriculations the number who passed is not known.

VI. TEACHERS' INSTITUTES.

This table presents the work of the Teachers' Institutes for twenty-eight years:

Year.	No. of Teachers' Institutes.	No. of Members.	No. of Teachers in the Province.	Receipts.				Expenditure.	
				Amount received from Government grants.	Amount received from municipal grants.	Amount received from members' fees.	Total amount received.	Amount paid for libraries.	Total amount paid.
				$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1877	42	1,181	6,468	1,412 50	100 00	299 75	2,769 44	.....	1,127 63
1882	62	4,395	6,857	2,900 00	300 00	1,088 84	9,394 28	453 02	5,355 33
1887	66	6,781	7,594	1,800 00	1,879 45	730 66	10,405 95	1,234 08	4,975 50
1892	69	8,142	8,480	1,950 00	2,105 00	875 76	12,043 54	1,472 41	6,127 46
1897	73	7,627	9,128	2,425 00	2,017 45	901 15	12,446 20	1,479 88	6,598 84
1902	77	8,515	9,367	2,515 00	1,877 50	1,171 80	13,171 26	1,437 18	7,188 45
1903	80	8,783	9,456	2,450 00	1,834 00	1,296 85	12,521 50	1,095 55	6,736 63
1904	79	8,979	9,554	2,575 00	2,134 45	1,328 45	13,342 11	1,050 22	7,229 06

See pages 62 to 64 for details for 1904.

The Teachers' Institutes are doing excellent work, and at a trifling expenditure. In the United States it is not unusual for Teachers' Associations to be held for a week or longer. The work attempted is, however, somewhat like what is done in our County Model Schools.

VII. Public Libraries, Etc:

The following extract is from the Inspector's Report:

1. *Public Libraries.*

Abstract showing the Counties and Districts in which Public Libraries are established:—Addington (6), Algoma (13), Brant (7), Bruce (25), Carleton (10), Dufferin (10), Dundas (9), Durham (4), Elgin (11), Essex (9), Frontenac (7), Glengarry (3), Grenville (11), Grey (22), Haliburton (2), Haldimand (11), Halton (5), Hastings (9), Huron (18), Kent (12), Lambton (15), Lanark (13), Leeds (8), Lennox (2), Lincoln (9), Manitoulin Island (4), Middlesex (14), Muskoka (6), Nipissing (6), Norfolk (6), Northumberland (8), Ontario (12, Oxford (14), Parry Sound (12), Peel (14), Perth (8), Peterborough (5), Prescott (2), Prince Edward (2), Rainy River (2), Renfrew (9), Russell (2), Stormont (8), Simcoe (19), Victoria (12), Waterloo (14), Welland (9), Wellington (18), Wentworth (9), York (25).

Abstract showing the Progress of Public Libraries from 1883 to 31st December, 1904:

Year.	Libraries reporting.	Number of members.	Number of evening classes.	Number of pupils.	Number of reading rooms.	Number of newspapers and periodicals.	Number of volumes in libraries.	Number of volumes issued.	Total receipts.	Total assets.
									$ c.	$ c.
1883 (April)	93	13,672	28	1,758	59	1,540	154,093	251,920	59,716 00	225,190 00
1888 "	167	32,016	41	1,102	104	3,041	311,048	744,466	103,843 68	403,573 75
1898 "	255	84,088	41	1,117	156	4,745	510,326	1,415,867	160,556 26	685,412 17
1898 "	347	111,208	2	79	200	5,834	789,082	2,358,140	188,783 21	870,167 54
1899 "	364	121,397	2	35	200	5,839	862,047	2,547,131	193,421 20	935,975 81
1899 (Dec.)	371	129,713	2	47	188	5,773	918,022	2,042,904	178,642 87	966,667 38
1900 "	389	147,208	2	35	186	5,971	989,050	2,534,711	210,635 49	1,024,300 14
1901 "	415	155,361	1	19	194	6,062	1,066,117	2,668,364	225,796 29	1,080,601 71
1902	446	172,792	..	....	191	6,044	1,140,392	2,738,590	246,315 29	1,151,877 04
1903	428	173,940	..	....	186	5,982	1,164,573	2,534,228	240,941 13	1,269,605 22
1904	397	179,485	..	....	180	5,956	1,153,778	2,507,233	219,760 77	1,394,462 51

397 Public Libraries (133 Free, 264 Not Free) reported for the year ending 31st December, 1904.

88 Public Libraries did not report for the year ending 31st December, 1904.

6 Libraries, which have not yet reported, were established in the year 1905.

For particulars see Inspector's Report, pages 131-153.

2. *Literary and Scientific Institutions, etc.*

For Literary and Scientific Institutions, and Historical Societies, see Inspector's Report, pages 153-161.

GENERAL REMARKS.

I.

As in previous years, a very large portion of this Report is devoted to statistics. These will no doubt be useful for many purposes, and when properly interpreted may serve as a general basis for administrative and executive action in certain directions. It should not be supposed, however, that educational progress can be wholly expressed in statistical tables. The spirit which pervades the schoolroom, the ideals which the schoolmaster seeks to hold before his pupils, the attitude of the community towards the work of the school, all elude the grasp of the statistician. Yet to know these things, and to endeavor to remove what is faulty, and to improve what is good, is one of the really important tasks of those concerned in the administration of educational affairs.

One of the most serious obstacles to effective educational progress and reform, is the apathy of the general public. This indifference, I may almost say neglect, is not peculiar to any one province or state. It seems to be almost universal. Here and there, some one more than usually gifted and forceful, catches the ear of the public, and enlists public interest, with a great resultant gain to education locally. The spasm soon passes, however, and the old languor returns. To arouse public interest, to direct it wisely, and above all to be able to sustain an intelligent and enthusiastic interest in our schools and all that pertains to them, requires strong leadership backed by firm and unwearying executive direction and assistance, and the harmonious and sustained co-operation of all those directly concerned in the management and control of our educational machinery. The public school inspector, the high school principal, our teachers, trustees and the press, can all contribute to the educational awakening which is necessary to progress. It is but a platitude to say that the stability of a state depends upon the intelligence and moral fibre of its people. Yet it seems necessary to repeat it, until parents become impressed with the obligation which that truth imposes upon them.

The development of any educational system is the work of years. Modifications require to be made from time to time to meet changing conditions and aspirations. The system which would fairly meet the requirements of pioneer life and primitive conditions must be adjusted to conform with the increasing complexity of social and industrial life. Thus increasing complexity rather than simplification of educational ordinances seems to accompany the progress of commercial, industrial and social specialization. A marked instance of this is to be seen in the case of Germany. An examination of the occupations of the German people reveals the most extensive variety and specialization to be found in any civilized state. Coincident with this multiplicity of pursuits are the provisions for the education of the people who are to engage in them. Nowhere else do we find so great a variety of special schools for the training of the people for their particular vocations. All this leads to complexity in the organization and administration of the educational machinery, and in no other state is the educational organism so complicated.

The changes above referred to, take place it is true, slowly, and the accompanying adjustments in the educational systems are never violent. It is further true, that if any nation is to lead, and not merely to follow, in industrial, intellectual and social progress, it must have men upon the watch towers who are skilful in discerning the trend and character of the advances to be made, and so be able to direct the youth of the land to prepare

themselves for the proximate future. Educational adjustments are, therefore, required not only to meet present conditions, but also those which the growing boy or girl must face on arriving at the age when formal school work is over, and the serious obligations of life are entered upon.

All educational systems must be largely indigenous. A system which works admirably and produces excellent results in one country, would probably be a failure if transplanted in another. Each country must face and solve its own educational problems. Yet many valuable suggestions may be obtained from those states in which the conditions do not vary greatly from our own. To appraise these and make the necessary modifications, is largely the work of the expert. In a subsequent portion of this report will be found a number of extracts from various educational reports, and these are commended to the consideration of those interested in the matters to which they refer.

During the past year, my attention has been directed to a number of changes which are considered desirable in our own provincial system. Many valuable suggestions have been made, all of which will be carefully considered. A number of matters, which have engaged the attention of my department during the year just closed are referred to under separate headings.

II. The Public School Curriculum.

Reference was made in my last Report to the revised courses of study which went into operation in August, 1904. A year's experience is too limited to properly estimate the value of the changes introduced, or what modifications, if any, are desirable. It may be found that some teachers have been too enthusiastic in dealing with the newer phases of school work and have given these a prominence out of proportion to their importance in a well considered and balanced course, while other teachers may have been too conservative in this respect. The *via media* is generally the safer way and the one which leads most surely to the desired goal.

Discussions in the public press, in educational journals and reports and in the conventions and associations of teachers all point to a growing interest in the question as to what constitutes the best programme of studies for the Public Schools. To some extent there has been a feeling of unrest and dissatisfaction with the courses which have hitherto been prescribed for pupils of the elementary grades. This feeling has been manifested not only in our own Province but in many of the neighbouring States and on the Continent.

Several quite distinct causes have been assigned for this dissatisfaction. In the opinion of not a few people the public school courses are thought to be overloaded with subjects; that the amount of time spent on what are considered "essentials" is insufficient to secure the desired results. Those who give the above reason believe that all that our public schools should attempt is to train boys and girls to write neatly and legibly, to calculate rapidly and accurately, and to read with expression and intelligence. They would cut out all so-called "frills" and practically limit the course to the three R's. Many others, while in the main agreeing with those who would materially reduce the number of studies, are nevertheless anxious to secure a somewhat wider outlook, and would include other branches than those just mentioned. The problem seems still further from solution when the opinions of many educationists of the first rank are sought. Many of these hold that a study of child mind and nature reveals so many interests and aptitudes, that a very limited curriculum results in dwarfing the child's intellectual and emotional development, and that any course of study designed for the elementary

grades should have more rather than fewer centres of interest. In this connection it may not be inappropriate to quote at some length the opinion of Superintendent Maxwell, the head of the educational system in the City of New York. It may be interesting, further, to note that when a vote was recently taken in that city as to the abolition or retention of the "Fads and Frills," the parents by a large majority voted for their retention.

Superintendent Maxwell says:

"During the last quarter of a century a great movement for the reform of the elementary curriculum has been gathering strength. The most prominent characteristics of this movement would seem to have been the development of the imagination and the higher emotions through literature and art and music; the training of the body and the executive powers of the mind through physical training; and the introduction of the child to the sources of material wealth, through the direct study of nature and of processes of manufacture. At first the movement seems to have been founded on psychological bases. To-day the tendency is to seek a sociological foundation—to adjust the child to his environment of men and of nature.

"At various times during the past ten or fifteen years, and particularly during the last year, reactionary voices have been loudly raised against the New Education, and in favor of the old. Reactionary tendencies in education arise from three chief sources:

"1. The demagogic contentions of selfish politicians who see that it costs more money to teach the new subjects of the curriculum than the old, and that thus a large proportion of the public revenue is diverted from the field of political spoils. These are the men who have invented the term "Fads and frills" to designate art, manual training, music and nature study. It must be theirs to learn that it will require something more than a stupid alliteration to stem the tide of these irresistible forces that are making the modern school the faithful counterpart of the modern world and an adequate preparation for its activities. The saving common-sense of the common people, when deliberately appealed to, will always come to the rescue of the schools.

"2. The reactionary tendency is due in part to an extremely conservative element that still exists among the teaching force. For the most part, teachers who are still extremely conservative were themselves brought up chiefly on the dry husks of a formal curriculum. They find it difficult to learn and to teach the new subjects. They dislike to be bothered by the assistance of special teachers. Accustomed to mass work both in learning and in teaching, they regret the introduction into the schoolroom of arts which demand attention to individual pupils.

"3. The reactionary tendency has its roots even among the more progressive teachers in a vague feeling of disappointment and regret that manual training, correlation, and nature study have probably not accomplished all that their enthusiastic advocates promised ten to twenty years ago. Public education has become a much more difficult thing than it was half a century ago."

The following extracts are also worthy of careful perusal. They come from men who, like Superintendent Maxwell, have made a life-long study of elementary education.

Respecting the aims of the Public Schools, and the Curriculum that should be followed, Mr. A. B. Blodgett, Superintendent of Schools for Syracuse, N. Y., makes the following remarks:

"The best that the public schools can do for the young is to make children acquainted with books, and processes, teach them how to use and study books; and place in their hands the right tools for future needs. First

among these must always be counted strength, accuracy and facility in fundamentals, the studies of the grammar schools. This much is made mandatory through the compulsory attendance and the labor laws. At this point must enter the directing hand of the parent as to whether the child shall continue in school, or take up work; and just here there is danger that parents may make the mistake of forcing the wrong tools into the hands of their children. A boy who would excel in mechanics, may not care for books. The girl who loves literary work, should not be driven to study music or art; neither should the musician or artist be expected to make a successful teacher. There are many misfits along these lines, and each boy and girl should have a chance to use the tools which he or she can handle to the best advantage.

"For this reason the school curriculum should contain such features as will enable the pupils to discover their inclinations toward this or that avenue of endeavor, but the work should be kept within reasonable and conservative limits. We have such features in our course of study, but it is impossible in the limited time given to school life, to reach the degree of proficiency which many people through close application in one special line, year after year, thoughtlessly demand shall be the product of the public schools."

"I often think that the old objection that 'a boy should not be educated above his probable station in life' is as selfish and absurd as it is cruel and wicked. For why, if worldly position and wealth are denied to the many, should intellectual wealth be also denied? The poor man has at least nowadays opportunities to enjoy intellectual pleasures at museums, art and picture galleries, and free libraries, if he is trained to appreciate and understand them; so I hold that we ought so to educate and train our charges that they shall be able to indulge their leisure hours in such enjoyments and intellectual pursuits as are open to the so-called better classes. Thus then, in addition to a sound training in the mere tools of a rational existence—the three R's as they are popularly called—should be added instruction in music (vocal and instrumental). drawing and painting, some elementary science, some technical training in carpentering or other branch of trade, and some political economy."—*Vine*.

A second reason given for the dissatisfaction already referred to is not that the curricula are too broad, but that they are unsuitable in character for the present day complexities of social life. The teacher's aim is to utilize subjects for the general development and discipline of the mind, while the parent seems to require that the pupil should be trained in those branches which have a direct application to his future requirements in earning a livelihood. The cultural aim of the teacher, and the industrial or utilitarian aim of the parent, thus stand in somewhat sharp contrast. The resulting compromise does not appear to have been a happy or satisfactory one. Possibly a different compromise might result in securing a fair measure of harmony.

The suggestion that above the very junior grades of the public schools there might reasonably be a differentiation in the courses prescribed for urban and for rural schools is quite pertinent and worthy of serious consideration. It is a fact, that notwithstanding the movement citywards of a considerable percentage of rural boys and girls, the great mass of the rural population remains associated with country life. Should the education which prepares each of these classes for the duties peculiar to each, be wholly the same? This question is already occupying the serious consideration of thoughtful men and women whether they are teachers, sociologists or the plain public. Mr. Howard J. Rogers very forcibly and clearly presents, in the following

extract, some of the many difficulties which perplex those concerned in the administration of educational affairs.

"Almost every innovation or change of policy, in whatever country, has for its object the more thorough training of the youth for his future trade or occupation. The line of cleavage between the training of the many and the training of the few, or between industrial training and cultural training, is becoming more and more distinct, and what Belgium has long taken as the dictum of its own educational policy, may with equal correctness be applied to Europe in general.

"The history of education in the United States for the last century has shown it to be eminently practical, and peculiarly responsive to public demand. Its close relation and responsibility to the people preclude its taking any other form. It is not a thing apart from the public and for the benefit of a few as in the day of Egyptian priesthood, but rather is the instrument of the people in shaping the destiny of the country. Given then, the trend of the development of this country and there follows as its corollary the tendency of its education. The twentieth century will be the scene of a struggle for commercial and industrial supremacy. The United States has entered this world conflict with all its energy, and the successes it has already gained have startled its competitors. The kind of education, therefore, of value to these changed conditions, and best likely to train our citizens for their future work, will be the kind of education to which our schools will perforce adapt themselves. These modifications fall naturally into three divisions: education for commerce, education for trades and other industries, and education for agriculture. Our educational leaders must solve the problem of how to adapt sufficient training in these lines to meet the demands of the age, and not destroy at the same time the balance which has been maintained in our curriculums with the more clearly cultural subjects, the broad and liberal training in which has been the source of our past strength and present power. This must not be sacrificed in the adjustment which must inevitably come, for to do so would be to remove the corner stone of the edifice.

"I choose this term (Education for the Industries) because the term industrial training is invariably associated in the public mind with manual training, which is not all of what is meant. Education which trains for the work of the world, whether it be the arts, the trades, agriculture, mining, or commerce, is the subject which is engrossing more of public attention than any other in the educational field. The business and commercial world is asking in all seriousness if we cannot send out young men and women somewhat better fitted for business conditions. There is no question about the training of those who are to enter the professional and technical fields, but for the workers in the varied industries there is doubt. Social life in this country has grown from simple needs to the complexity of the highest modern civilization with all the entailed obligations. Our education has grown and expanded with it. When the applications of steam and electricity from 1830 to 1860 revolutionized the entire social structure, our education changed its form to meet the demands upon it. A revolution in industrial methods is going on to-day almost as marked, and our educational machinery must be remodeled sufficiently to meet it. Stripped of all verbiage our country is getting too large, and our needs too complex to train all children just alike. But the traditions and spirit of our country will not for a moment sanction the establishment, as in Europe, of two systems of instruction—one industrial and one cultural; one for working classes and one for governing classes. Our solution of the problem is forced to be a combination force; the same for all

children in earlier years, with all which that implies of hope and opportunity, containing enough manual training to benefit all, and an option in the higher years to afford the special training desired for the work of life. How to adjust our machinery to the demands and the conditions, the kind and the extent of schools to be instituted to meet the requirements are our greatest problem to-day."—Howard J. Rogers, (First Assistant State Superintendent of New York).

The following remarks from Mr. E. L. Kemp, M. A., and from Miss Wilhelmina Seegmiller, Director of Art Instruction in the Public Schools of Indianapolis, add little that is new to Mr. Rogers' clear presentation, but serve to show how general the discussion of this problem has become.

E. L. Kemp, A. M.

Growth of Public Elementary Education.

"It was characteristic of the social systems of the olden time to sacrifice the individual to the organization. The more ignorant and helpless the man was, the more completely he was suppressed and the more ruthlessly his claims to a man's rights were trampled upon. The tendency in the advanced civilizations of to-day is to sacrifice the organization for the individual, to use the machinery of government to lift up the man, increase his opportunities, and otherwise promote his interests. In nothing else has this tendency been so clearly manifest as in the general effort to put a good education within the reach of all, nearly or quite at the public expense. In nothing else did the civilization of the nineteenth century prove itself more beneficent, and the beneficence has already been justified by the results. The increased interest and participation of the masses of the people in the general life of the world, their increased productiveness, dignity, and comfort not only warrant what is now done, but also constitute a sufficient and urgent claim for broader and more generous effort in the future."

Miss Seegmiller.

"Since the congregation of the masses of people into great urban centres, children are deprived of sharing in the industrial occupations which on a time were necessary to the existence of the home.

"Spinning and weaving, felling trees, tending stock, chopping wood, carrying water, were occupations which tended to the development of sterling qualities.

"When the 'No admittance' signs are prominent above the portals of the great centres of industrial activity to-day, there is little opportunity for children to enter into a sympathetic understanding of the present industrial forces.

"When the home no longer provides opportunity for industrial occupations and the centres of industrial activity are practically closed, it behooves the school for social, educational, and industrial reasons, to make provision for bringing children into sympathy with the great industrial forces which move the world and to provide opportunity for a measure of creative work in the fashioning of materials into forms of use and beauty.

"The school recognizes the need, and educators who have at heart the highest development of the three royal H's, the Head, the Heart, and the Hand, are earnestly endeavoring to provide for it.

"Gathering together from widely scattered parts of the great continent we have varying experiences.

"Some base their creed upon race development, and from an historical study of the part industry has played in the upbuilding and maintaining of social life are furnishing stimulus for interest that children may re-live the experiences of the ages and the development in the manner of the race.

"East and west and north and south there are special schools provided with every possible equipment. To those who are unhampered by difficulties we look for help in the establishment of ideals.

"There is the problem of the great cities where work must of necessity be carried on under restrictions.

"Among problems of interest are these:

"(1) What types of industrial work and materials are suited to primary schools?

"(2) Is it best for girls to work with boys in the shops and for boys to cook?

"(3) What can be done in inter-relating manual work with art study, games, music, history, literature?

"(4) What is being done in gardening?

"(5) With what freedon can children work along constructive lines?

"(6) To what extent may manual work be used as seat occupation in grade schools?

"As manual work will demand much of our future educational endeavor these questions are of special import."

III. The Public School Teacher.

However perfect and efficiently administered an educational system may be, and however carefully a school curriculum may be designed, adequate results will not follow unless the teaching force is thoroughly efficient. One may go even further and say that the teacher can make and unmake any educational system, and can bend to successful service a curriculum that is admittedly inferior. It is unfair, however, to this large body of men and women to environ them by conditions which hinder them in any degree from accomplishing the best service of which they are capable. Assuming however that all the necessary mechanical adjustments have been made, how can an efficient corps of teachers be provided for any state? Primarily, I venture to think, by exalting the teacher's office, and consequently the teacher's social position and influence. It is not to be expected that desirable and capable men and women will be attracted to a vocation, in which at best there is much that is wearisome and exacting, unless there are strong compensating advantages. The obligation and opportunity to create these rest primarily and largely with parents. When it is remembered that these men and women must prepare themselves for their duties by a long course of scholastic and professional training, and are finally rewarded often by less than a common laborer's wage, and occupy a social position far below that to which their knowledge and the importance of their work merit, it is small wonder that the profession is being gradually depleted, and that little permanence is found.

So far as this Province is concerned, the present situation is not reassuring. The proportion of male teachers is rapidly decreasing, while the male recruits are so few that they may almost be disregarded. One public school inspector reports that he finds it increasingly difficult to get women teachers to take charge of rural schools, because of the isolation and other unfavorable conditions surrounding such positions. They will accept less remuneration in an urban school!

From nearly every county, complaint is made that the supply of qualified teachers is inadequate. Inspectors are struggling to keep their schools open, and to this end the number of applications for temporary certificates or "permits" has been steadily increasing. These must be given, often, to the merest tyros. What shall be done? Shall the standards of qualifications of our teachers be reduced? I do not believe such a proposal would meet the approval of the least progressive board of trustees in this Province. At most, such an expedient should only be a temporary one. The situation calls for vigorous and united action by parents, school officials and all concerned in school administration.

Reverting to the teacher's qualifications and the importance of his work, the following remarks of that eminent French statesman, M. Guizot, may be recalled. Although uttered many years ago (in introducing educational legislation) to the French Chamber of Deputies, they are prudent and weighty words, and true to-day as they were true then, and will be true as long as the necessity for school masters exists.

"All the provisions hitherto described would be of none effect if we took no pains to procure for the public school thus constituted an able master, and worthy of the high vocation of instructing the people. It cannot be too often repeated that it is the master that makes the school. And, indeed, what a well-assorted union of qualities is required to constitute a good schoolmaster! A good schoolmaster ought to be a man who knows much more than he is called upon to teach, that he may teach with intelligence and with taste; who is to live in a humble sphere, and yet have a noble and elevated mind, that he may preserve that dignity of sentiment and of deportment, without which he will never obtain the respect and confidence of families; who possesses a rare mixture of gentleness and firmness, * * * * the obsequious servant of none—a man not ignorant of his rights, but thinking much more of his duties; showing to all a good example, and serving to all as a counsellor; not given to change his condition, but satisfied with his situation, because it gives him the power of doing good, and who has made up his mind to live and die in the service of primary instruction, which to him is the service of God and his fellow-creatures. To rear masters approaching to such a model is a difficult task; yet we must succeed in it, *or else we have done nothing for elementary instruction.*"

In most continental countries the schoolmaster is more highly esteemed, his position more secure, and his future more assured than in either the United States or Canada. Some of these compensating advantages are referred to in a report prepared for the English Education Department, from which a short extract is given.

From Report of Alex. Morgan on the Training and Status of Primary and Secondary Teachers in Switzerland. (Dec., 1899).

"This report will have shown that while teachers in Switzerland receive moderate compensation, they enjoy many compensating advantages. A safe pension to a large extent relieves them from the gnawing anxiety regarding age and illness. They have comparative security of tenure, with the right of appeal to the central authority, and this, too, in one of the most democratic countries of the present day. Education is in Switzerland considered one of the chief duties of the State, and teachers are esteemed as public officials discharging an important function in the nation. Through their school chapters and school synods they have a voice in the school legislation of their country. Each chapter appoints a member of the School Committee of the

district, and the synod nominates two of the seven members of the Education Council of the canton, and thus the teachers have a share too in the administration of their country."

IV. Public School Inspectors.

The duties of these officers bring them into intimate relation with the many agencies concerned in the successful operation of the school. Upon them rests a large measure of responsibility, not only in seeing that the school regulations are observed, but in guiding and inspiring the teaching force, and in creating and sustaining popular interest and sympathy in the work and aims of the schools.

In addressing by circular the Inspectors of New York State, Mr. C. R. Skinner, late State Superintendent, points out with admirable precision, the duties and opportunities of these important officers, and calls upon them to give more than perfunctory service, and to become real educational leaders.

Mr. Skinner says:—"The importance of the work you have to do cannot be too greatly emphasized. You are determining, influencing and passing upon standards of work, of systems and of conditions in all of the departments of the Public Schools throughout the State. The possibilities before you to help, aid and encourage to better conditions and to advance ideals are practically unlimited. It is therefore a work of the utmost responsibility, and you must spare no pains to keep yourself up to the times in all matters pertaining to it. You must devote what time you can to reading the best that there is bearing upon the work, and must miss no opportunity to converse with those who have had wide and successful experience and earned distinction because of their work as teachers. All connected with the Public Schools must be made to feel that you are there to help, not to criticise; to build up, not to tear down; to encourage, not to find fault. Criticism will be needed and must be given, but it should be of the right kind, and should be given in the right manner and spirit. It should always be constructive, not destructive."

None of the above remarks are made in a censorious spirit. The many difficulties which the Inspectors are called upon to meet, and the many limitations which hinder the best service are recognized. Here, as elsewhere, however, there must be strenuous endeavor, and a faith, hope and enthusiasm, which will prevent them from becoming weary in well doing.

It is a matter for serious consideration by county councillors whether the number of schools assigned to each Inspector should not be considerably reduced. A county inspector, who has the maximum number (120) permitted by the present statutes can give but little time, nor more than a day of each school year, in assisting, directing and overseeing the work of each school. For only one day out of over 200 in each school year is the teacher under the immediate directing supervision of the inspector. He must, indeed, be a forceful man if he can awaken enthusiasms, which will survive the other 199 days. Then, too, the frequent change of teachers is a constant source of discouragement and weakness. Against these and other difficulties, the inspector must certainly contend, and his reward should be commensurate with his endeavor and his ability.

V. The Rural School Problem.

In nearly every State of the Union to the south of us, and not less in Ontario than in many of these States, the "rural school problem" is engaging the serious attention of parents, teachers and legislatures.

Irregular and small attendance, insufficient equipment, inadequate inspection, the preponderance of the lowest grade of teachers, a curriculum not hitherto happily adjusted, and lack of provision for advanced instruction, all combine to make these schools as a class, far inferior to those in urban centres.

In rural schools only 50 per cent. of the enrolled pupils are in daily attendance; in town schools the percentage is 66, and in city schools 72 per cent. Thus it will be seen that in the first named schools there is a waste of nearly one-half of the educational energy.

A well settled Ontario township of average size will have from twelve to sixteen or eighteen school sections, each with its small school, its teacher and its school equipment. A neighboring village will have as large a school population with but half the number of teachers, and speaking generally, the work of the urban school is superior to that of the rural schools. Of course there are exceptions but these are few. In the township schools twelve to eighteen separate buildings are to be erected and maintained while in the village school there is usually but one. Here again there is relative waste.

In very few rural schools is work beyond the Entrance standard carried on, while nearly every village of any size has its continuation class or its High School. Is not the rural population entitled to as advanced instruction as the urban population? The urban boy or girl of brilliant promise, but whose parents may be in very humble circumstances, has at his door the opportunity for advancement, but to the rural boy or girl similarly placed, and with similar gifts, the path is barred. Of course urban life has been enriched by many a rural boy or girl whom no adverse circumstances could daunt, but what of those who are left behind? Those who believe that education is a benefit which should be diffused and not restricted, and who does not? can find no justification for the continuance of conditions which give to one class of the community benefits from which others are excluded.

Illinois, Ohio, Iowa, Pennsylvania, Massachusetts, and many other States are wrestling with this problem. They claim to have solved it, at least partially, by the "consolidation" of small weak rural schools into one strong central school. In many of the states named the plan is now past the experimental stage, and except in a very few instances there is no disposition to return to the old order of things. Owing to the necessity, under this plan, of conveying pupils to the central school, the cost is somewhat greater than under the present plan of retaining the local school; but if the people of this Province wish to advance they must be prepared to deal more generously with the schools.

At present in Ontario there is but one consolidated school—The Macdonald Consolidated Rural School near Guelph. The following report from the Principal of this school, Mr. J. W. Hotson, M. A., will give some idea of its working.

"It is one of the chief aims in the Macdonald Consolidated School at Guelph—and it should be of all rural education—to engender such an interest and love for country life that the boys and girls will not be lured away by the attractions of the city.

"I have great faith in the rural school, in its power to mould and build up a national character; but new educational methods must be used in order to secure the best results. In order to compete with our rivals in the world's markets—in order to equalize the advantages of country and city life,—in order to make our country life attractice enough to keep our bright boys and girls on the farm, and thus maintain an intelligent, prosperous, progressive, and contented rural people,—we must give immediate and effective attention

to the needs of the rural school. A consolidated school makes it possible to so modify the curriculum that the development of the child is the ultimate aim and not the cramming of the mind with mere facts.

"In the Consolidated School at Guelph, the New Regulations of the Department are followed quite closely, but the teachers put their own interpretation on them. They are reminded:

"First, that they are dealing solely with rural children;

"Second, that the majority of these children are going to spend their lives on the farm.

"Keeping these two facts in mind an effort is made to adapt the education to the special needs of the rural people.

"In this undertaking there has been quite a marked degree of success. The parents are becoming more and more interested in the work of the school and show their appreciation of the work done by frequent visits and kind words of encouragement to the teachers. In connection with the school there is quite a strong organization, called The Association of Parents and Teachers, the object of which is to bring into closer relation the home and the school so that the parents and teachers may intelligently co-operate in the education of the children.

"There have been many visitors at the Consolidated School the past year, and they invariably expressed themselves as being well pleased with it. Principal French, Director of Education in Lancaster, England, after his return from a visit to Canadian and American schools, says, 'I was particularly pleased to see the working of the Consolidated School at Guelph, Ontario, which I consider has solved problems at present troubling many of the educational authorities in England.'

"There are some advantages in connection with the Consolidated School at Guelph that have been quite marked.

"1. There are seldom any late pupils. The vans are always on time.

"2. The attendance is more regular. If there is one thing more than another that tends to discourage both teacher and pupils in rural schools, it is irregularity on the part of the pupils.

"3. The total attendance has increased. The accompanying table gives a comparison of the total attendance, average attendance, and percentage of attendance, during the first six months of 1904, before consolidation, and the first six months of 1905, under consolidation."

Consolidated School, Guelph, 1905.

Month.	No. on Roll.	Average	Percentage.
January	181	158.	87.84
February	176	152.65	86.73
March	177	159.65	90.19
April	164	148.77	90.71
May	195	178.29	91.43
June	192	174.87	91.07

Average percentage, 89.66.

The Same Schools before Consolidation, 1904.

Month.	No. on Roll.	Average	Percentage.
January	113	66.85	59.1
February	99	64.11	64.7
March	113	72.55	64.2

Month.	No. on Roll.	Average.	Percentage.
April	141	101.8	72.1
May	146	105.27	72.
June	144	98.27	68.1

Average percentage, 66.8.

Month.	Increase in Total Attendance.	Increase in Percentage.
January	68	60.1
February	77	77.7
March	64	54.8
April	23	16.3
May	49	33.5
June	48	33.3

Average increase in total attendance, 50 per cent.

VI. School Rooms.

There has been much improvement in the school room accommodation in the Province of Ontario during the last ten or twelve years. Anyone acquainted with the conditions of country schools a quarter of a century ago will know how little provision was made for the comfort and health of the pupils. The old-fashioned box stove placed in the centre of the room has in many places given way to a furnace placed in the basement so as to heat the room with hot air, and thus save the children from constant disturbances in bringing in wood, and keeping up the necessary fire. It is to be hoped that at least in all the older parts of the Province improved systems of warming and ventilating school houses will soon become general. It is a common tendency when the air of the school room becomes hot to raise a window, and let in the cold air from the bottom. As a consequence there is a direct draft upon the backs and shoulders of pupils sitting near the window. In very many cases ill health in later life can be traced back to carelessness in the method of ventilating and warming school rooms.

The ventilation of the room from the bottom of the window is always dangerous to the health of pupils. Fresh air is very necessary. Foul air deteriorates the blood, and lowers the tone of the whole system. The fresh air should be introduced through the top of the window, and not through the bottom. If the window is not constructed so as to be lowered from the top, it should speedily be changed. Regarding this question of ventilation, Dr. W. T. Harris, Commissioner of Education for the U. S., remarks as follows:

"I have said that all of the windows, and not some of them, should be lowered from the top. It will not do to fix one window alone and suppose that is sufficient for the purpose of ventilating a whole school room. It will do something, but what it does will not be well done. For in order to affect the air of the whole room, it will be necessary to lower the window too much, and the consequence will be the creation of a too brisk current, the formation of a cataract of air, as it were, which will flow outward from the wall into the school room so far as to stike the pupils sitting nearest that window. All of the windows should be lowered, and no more than is necessary to produce the change of air in the whole room by the descent of a thin sheet of cold air down the windows and the wall to the floor.

"This method of ventilating the rooms is not a matter of mere theory, but has been tested by me during many years' practice. Any school room that has four windows to it may be ventilated by this process in a fairly serviceable way. But it is quite important that there should be ventilating

flues at the bottom of the room opening into a large ventilating flue surrounding the smoke stacks which carry off the heat of the furnace. There is a sort of sour school room air which the school visitor remembers vividly. This school room smell cannot be removed effectually except by ventilators at the bottom of the room. The ventilation by means of the tops of the windows that I have already described gives a fair supply of fresh air to all in the room, but it is not quite adequate to remove this school room smell here spoken of. The ventilating flue at the bottom of the room opening into the smokestack is supposed to draw the air out of the bottom of the room by the draft of the heated air ascending the smokestack. By the term 'smokestack' I refer to the iron pipes within the chimney through which the smoke and gases from the fuel escape up the chimney. A space left around this smokestack and open all the way to the top of the chimney furnishes the ventilating flue which is found to do the service in school houses. When the building is not heated by furnace and the volume of air in the ventilating flues is not heated, there will not be a draft sufficient to suck out the sour and fetid air from the bottom of the school room. An open fire place in some part of the school room will answer this purpose admirably if a small fire is kept up constantly, even in summer. A kerosene lamp of small size will do wonders by causing an ascending current of air which draws out the bad air at the bottom of the room.

"In case the room is heated by a stove, the stove should be a large one, so that the door may be left open after the coal is ignited. The draft which carries the steam and gases up the chimney also draws out the bad air from the lower part of the room. In case wood is used, and an open door occasions too rapid combustion of the fuel, some other plan must be adopted. The old Franklin stove or fireplace makes the best ventilator, though a poor heater. Its heating capacity may be increased sufficiently by lengthening the pipe and carrying it around the top of the room before connecting it with the chimney.

"I should have said above that when the outdoor temperature is 80°F., or above, the windows may be raised from the bottom a foot or so, and lowered from the top as much as possible.

"There are devices of oblique boards placed at the bottom of the window, or at the top of it, which are intended to deflect the current of air upward, and thereby prevent its injurious effects on the shoulders of the pupils. I do not doubt that these devices are of some use, but in my experience I have never known them to be so good as the plan of lowering the windows from the top simply—that is, one inch in cold weather, and a foot or more in mild weather, the reason, I suppose, to be this; that the oblique board serves to prevent the inflow of air when there is no breeze stirring outside the school room. For air, when still, refuses to climb over the oblique board, just as water, or any other fluid, refuses to climb over its bank. The oblique arrangement will only work when the wind blows towards the school room.

"Of all the methods of heating the school room by direct radiation, hot water pipes extending around the room connected with means of admitting fresh air under the pipes, is the best that I have seen. The steam coil is apt to overheat and injure the quality of the air, although this may be rendered unnecessary by a more liberal supply of coils. The stove and fireplace heat the school room unevnly, but they furnish a natural means of ventilation, while the steam coil or the hot water pipes demand some auxiliary process for ventilation, a process which is sometimes neglected, however. If ventilation is not provided for, the steam or hot water heating apparatus may prove quite injurious to the health of the pupils."

While the ventilation of the school rooms is a matter of great importance to the physical welfare of the pupils, there is another element in school equipment which should not be overlooked. I refer to the element of artistic beauty as expressed in suitable school decoration and in architectural design of the school buildings. These appeal to the love of beauty so strong in young children and are surely matters of importance in any community which aspires to liberal culture.

"There is great value," says President Eliot, "in the sense of beauty. The enjoyment of it is unselfish. During the last twenty years philanthropists and educators have made wonderful progress in implanting and developing the sense of beauty in the minds of the people. This is shown in the establishment of public parks, cultivation of flowers and shrubs, and in the erection of beautiful buildings."

"To go to school in a house well designed and well decorated gives a pleasure to the pupils, which is an important part of their training. To live in a pretty cottage surrounded by a pleasing garden is a great privilege for the country bred child. The boy who has been brought up in a New England farm house, overhung by stately elms, approached through an avenue of maples or limes, and having a dooryard hedged about with lilacs, will carry that fair picture in his mind through a long exile, and in his old age revisit it with delight. When a just and kindly rich man builds a handsome place for himself and family, his lavish expenditure does no harm to the community, but, on the contrary, provides it with a beautiful and appropriate object of sympathetic contemplation."

When so many beautiful and inexpensive representations of great poets, statesmen and of historical events can now be so easily procured, there is little excuse for bare walls with all their depressing ugliness.

VII. Technical and Manual Instruction.

These important phases of educational effort form the subject of a special report which will be found in Part II. It is a mistake to suppose that these are but modern fads. Hand training has formed part of the elementary school curricula of Germany, Austria, France, the Netherlands, Norway and Sweden, and of Great Britain for many years, while in Germany the provisions for technical instruction are at once the envy and despair not only of other nations of Continental Europe but also of America. In respect of both of these departments Canada has shown a singular want of progressiveness.

The introduction of manual instruction into the schools of Ontario, a few years ago, was due to the generosity and far-sightedness of Sir William Macdonald, who has manifested such deep interest in all that concerns the intellectual development of Canadians. Since then considerable progress has been made, and I am pleased to know that many school boards throughout Ontario are manifesting a desire to know more about this work, and that its introduction in several centres is being seriously considered.

There is some tendency to confuse technical instruction, which is special and directly applicable to the arts and industries, and manual instruction, which is a general subject and valuable for reasons which sustain other subjects in a school curriculum. There is much force in the advice of an American educationist to "Put the *whole* boy to school." The constructive and artistic aptitudes of children, as well as the intellectual and emotional natures, require education.

With the increase and specialization now taking place in our manufacturing industries comes the necessity for preparing our young men and women for positions in which special knowledge and skill are required. To-day the great industries of the world are relying more and more upon the applications of scientific knowledge. From the trade schools and the technical schools and universities of Germany were sent forth a body of young men and women who have created industrial Germany and made it a formidable competitor for the world's commercial supremacy.

It is gratifying to know that our Labor Councils, Boards of Trade, and Manufacturing Associations are alive to the importance of providing means to enable our own boys and girls to fit themselves to be the equals of skilled workers to be obtained anywhere. The days of the apprentice are passing and the school and school work shop must supply their place.

VIII. Continuation Classes.

These clasess were called into existence several years ago in response to urgent representations that the ordinary public school courses were an insufficient preparation for the larger demands for intelligence, power and skill which industrial activity and competition were constantly making of labor.

The work which these classes are doing, is practically that of the lower divisions of the High Schools. As yet, there does not appear to be any differentiation in the courses of study relating directly to the life of the community in which the school exists. In this respect, they differ from many Continental Continuation Classes, whose programmes of study, while essentially liberal and cultural, yet contain the elements of some industrial or technical course relating to the predominating industry of the centre in which te school is situated. The suggestion made elsewhere, that considerable freedom might be allowed in adapting courses to local interests, would probably be found more applicable to this class of schools, than to the elementary schools.

For the academic year 1903-04, there were 419 of these schools. For 1904-05, there were 482, showing a substantial increase of 63. The number of Grade A Schools (the highest grade) was, in 1903-04, 68; in 1904-05, 78. In this grade, the work done is that of the lower and middle divisions of the High School Course. In all but name, many of them are High Schools.

Where these schools, as many of them do, confine their attention largely to the non-professional training of candidates for the teaching profession, there is some force in the suggestion to place them, for inspection purposes, under the jurisdiction of the High School Inspectors.

IX. Rural Public School Libraries.

The past year shows a gratifying increase in the number of rural schools establishing school libraries. At the end of the academic year in 1904, the number of these libraries was 773, upon which was expended the sum of $8,195.70, of which the Legislature contributed $3,656.41. At the end of the academic year in 1905, the number of libraries was 1,231, an increase of 458, or nearly 60 per cent. The amount expended in the same year was $11,641.85, of which $5,265.80 was contributed from Legislative grants. The details are given in Appendix D, page 69, of this Report.

In the County of Elgin, every rural school is now provided with a library, a result which reflects great credit upon the local Inspector, and the

intelligence and liberality of the school supporters. Among other counties in which substantial increases were made during the year are,—West Bruce, Dundas, Elgin, Frontenac, North Hastings, East Huron, East Kent, East Lambton, Lincoln, East Middlesex, Perth, Prescott and Russell, West Victoria, Wentworth, North York and Parry Sound.

In my last report a very full reference was made to the value of these libraries as subsidiary school aids, and I therefore now merely note the splendid achievement in this direction during the past year, and express the hope that each succeeding year will show at least equal advances, until we can boast a well assorted library in every school in the Province.

X. Rural School Gardens.

In the *practice* of agriculture an eminent authority states that France now leads the world. "In the last twenty-five years she has doubled the products of her farms. She encourages the minutiae of nature knowledge." France has 28,000 rural and elementary schools, each with a school garden and a "master capable of imparting a knowledge of the first principles of agriculture or horticulture." In Austria, in 1890, there were 8,000 school gardens. An Austrian school law says: "School inspectors shall see to it that in country schools school gardens shall be established for agricultural instruction in all that relates to the soil, and the teacher shall make himself skilful in such instruction." In Sweden, in 2,016 schools, 22,000 school children yearly receive instruction in agriculture and horticulture. In the United States the movement is exciting great interest and many school boards have made provisions for carrying on this work.

In Ontario, an essentially agricultural province, there are but six regularly established and conducted school gardens! Five of these are in the County of Carleton, and one in connection with the Macdonald Consolidated Rural School near Guelph. Regarding the former, Inspector Cowley writes: "Our gardens have had a very successful year and the idea has taken root in several other sections. I think we must have had small gardens during the past year at nearly forty rural schools."

The slight progress hitherto made in this Province is probably due to three main causes: (1) Lack of specially qualified teachers; (2) lack of definite knowledge of the best methods of conducting such gardens; and (3) the disbelief in the ability of a school to give any instruction worth while in matters relating to agriculture or horticulture.

Regarding the last mentioned cause it may be noted that the same objection was repeatedly urged against the attempt to teach trades and industrial occupations in the schools. It was held that the actual workshop is the only place in which the apprentice could receive proper instruction. The last forty years have disproved this contention. Technical and trade schools are springing up everywhere throughout the United States and in Great Britain, as well as in many of the countries of continental Europe and also in Japan. Our own Agricultural College at Guelph, our most famous technical and industrial school, has effectively demonstrated its usefulness to the farm. The experience of France, already referred to, proves that under proper direction the resulting gain to agriculture was intimately associated with the instruction received in rural school gardens.

At the Macdonald Institute, Guelph, special courses are given which will enable teachers to qualify themselves to properly direct this work. We may therefore hope for a considerable increase in the number of school gardens in each succeeding year.

XI. Schools for the Blind, and Deaf and Dumb.

At the beginning of 1905 the administration of the Institute for the Deaf and Dumb at Belleville, and of the Institute for the Blind at Brantford was transferred to my Department.

The annual reports of the Principals of these schools will be found elsewhere in this report, and will furnish to those interested full information concerning the year's work.

The problem of finding occupations suited to the very limited powers of those who are so heavily handicapped, will always be a difficult one. Even when such are found, and expert instructors engaged, it frequently happens, to the great discouragement of those who have so laboriously learned their trades or occupations, that their fields of labor are already occupied by those upon whom nature has not laid so great physical disabilities. Modern industry seems to know no sentiment of pity, and to exhibit no concern except where the annual dividend is liable to be affected. These schools could have no better friends than sympathetic employers of labor, whether corporations or individuals, who, having positions which the graduates of these schools could fill, would reserve one or more to be open to the competition of these classes of deserving students.

XII. University Report, Commission, etc.

The annual statement of the President of the University of Toronto will be found in a subsequent part of this Report. The scope of university effort is yearly widening. The marked expansion in recent years of the Provincial University is a source of gratification to all its friends, and an increasing obligation upon the resources of the Province. This obligation was generously acknowledged by the Legislature at its last session by making large grants for university purposes.

Further interest has also been manifested in its welfare by the appointment of a commission to enquire into and report upon the best method of governing and administering its affairs. It is to be hoped that as a result of the commissioners' labors, a harmonious adjustment of all interests and powers will be secured, so that this great institution may render greater and more effective service to the Province, to the welfare of which it can so largely contribute.

XIII. Educational Progress and Educational Goals.

It has been the custom to give in previous reports opinions showing the trend of educational thought. Last year several of the resolutions of the Dominion Educational Association at Winnipeg were published. The National Educational Association of the United States is one of the largest organizations of teachers and inspectors in the world. Its resolutions are always valuable. Several of its declarations made at the recent meeting of that body in 1905, are of interest to Ontario. They are as follows:

"The National Educational Association notes with approval that the qualifications demanded of teachers in the public schools, and especially in city public schools, are increasing annually, and particularly that in many localities special preparation is demanded of teachers. The idea that anyone with a fair education can teach school is gradually giving way to the correct notion that teachers must make special preparation for the vocation of teaching. The higher standard demanded of teachers must lead logically to

higher salaries for teachers, and constant efforts should be made by all persons interested in education to secure for teachers adequate compensation for their work.

"The rapid establishment of township or rural high schools is one of the most gratifying evidences of the progress of education. We believe that this movement should be encouraged until the children of rural communities enjoy the benefits of public education to an extent approximating as nearly as practicable the education furnished in urban communities.

"The association heartily approves of the efforts now being made to determine the proper place of industrial education in the public schools. We believe that the time is rapidly approaching when industrial education should be introduced into all schools and should be made to harmonize with the occupations of the community. These courses when introduced should include instruction in agriculture as well as manual training, etc. Wherever the conditions justify their establishment, schools that show the application of the branches of knowledge to practical life, should be established.

"The N. E. A. regrets the revival, in some quarters, of the idea that the common school is a place for teaching nothing but reading, spelling, writing, and ciphering, and takes this occasion to declare that the ultimate object of popular education is to teach the children how to live righteously, healthily, and happily, and that to accomplish this object it is essential that every school inculcate the love of truth, justice, purity, and beauty through the study of biography, history, ethics, natural history, music, drawing and manual arts.

"The National Educational Association wishes to record its approval of the increasing appreciation among educators of the fact that the building of character is the real aim of the schools and the ultimate reason for the expenditure of millions for their maintenance. There is in the minds of the children and youth of to-day a tendency towards a disregard for constituted authority, a lack of respect for age and superior wisdom; a weak appreciation of the demands of duty; a disposition to follow pleasure and interest rather than obligation and order. This condition demands the earnest thought and action of our leaders of opinion, and places important obligations upon school authorities.

"The National Educational Association observes with great satisfaction the tendency of cities and towns to replace large school committees or boards which have exercised through sub-committees executive functions, by small boards which determine general policies, but entrust all executive functions to salaried experts.

"Local taxation supplemented by state taxation, presents the best means for the support of the public schools, and for securing that deep interest in them which is necessary to their greatest efficiency. State aid should be granted only as supplementary to local taxation, and not as a substitute for it."

XIV. Conclusion.

In the preceding pages I have given a rapid summary of the principal matters which have engaged the attention of my Department during the past year. I regret that the general tone of my Report is not more optimistic. In many directions serious and important work is to be done. To the successful accomplishment of this I will give my best effort, which will, I feel assured, receive sympathetic and careful consideration from the people at large, as well as from the Legislature.

I cannot close this Report without reference to the loss which my Department and the cause of education in Ontario sustained in the death of the late Deputy Minister,—Mr. John Millar. During the fifteen years of zealous and prudent service which he rendered to the people of this Province, he always exhibited courtesy and patience in dealing with the public and sustained enthusiasm in the performance of his duties.

R. A. PYNE,
Minister of Education.

EDUCATION DEPARTMENT, TORONTO, January, 1906.

APPENDICES.

APPENDIX A.—*STATISTICAL TABLES.*

THE PUBLIC SCHOOLS.

I.—Table A.—School Population, Attendance, etc.

Counties, (including incorporated villages but not cities or towns) etc.	School population between 5 and 21 years of age.	Pupils under 5 years of age.	Pupils between 5 and 21 years of age.	Pupils over 21 years of age.	Total number of pupils attending school.	Boys.	Girls.	Average daily attendance of pupils.	Percentage of average to total attendance.
1 Brant	3,640	6	2,951	2	2,959	1,580	1,379	1,638	55
2 Bruce	12,985	13	10,068	5	10,086	5,275	4,811	5,450	54
3 Carleton	9,161	15	6,494	3	6,512	3,460	3,052	3,235	50
4 Dufferin	*4,971	11	4,271	7	4,289	2,252	2,037	1,902	44
5 Dundas	5,121	35	4,120	....	4,155	2,113	2,042	2,270	55
6 Durham	*5,106	13	4,241	1	4,255	2,154	2,101	2,292	54
7 Elgin	7,098	20	5,541	1	5,562	2,872	2,690	3,120	56
8 Essex	10,248	11	6,183	....	6,194	3,159	3,035	3,068	49
9 Frontenac	6,852	44	5,396	....	5,440	2,829	2,611	2,336	43
10 Glengarry	4,545	11	3,763	....	3,774	1,950	1,824	1,756	46
11 Grey	15,266	52	12,402	5	12,459	6,383	6,076	5,679	46
12 Haldimand	4,805	6	3,586	2	3,594	1,875	1,719	2,208	61
13 Haliburton, S. Nipissing, N.E. Muskoka and E. Parry Sound	4,962	45	4,093	....	4,138	2,126	2,012	1,683	41
14 Halton	4,198	....	3,158	....	3,158	1,633	1,525	1,683	53
15 Hastings	11,602	25	8,422	....	8,447	4,304	4,143	4,368	51
16 Huron	13,777	6	9,593	....	9,599	4,997	4,602	5,628	59
17 Kent	9,459	20	7,752	1	7,773	4,046	3,727	3,935	51
18 Lambton	10,747	12	8,629	2	8,643	4,499	4,144	4,910	57
19 Lanark	5,584	11	4,120	3	4,134	2,088	2,046	2,304	56
20 Leeds and Grenville	10,502	42	8,540	5	8,587	4,399	4,188	4,575	53
21 Lennox & Addington	4,674	25	3,980	1	4,006	2,069	1,937	2,134	53
22 Lincoln	*4,418	17	3,529	....	3,546	1,858	1,688	1,878	53
23 Middlesex	10,880	5	8,512	1	8,518	4,470	4,048	4,790	56
24 Norfolk	*6,265	25	5,128	2	5,155	2,624	2,531	2,623	51
25 Northumberland	6,724	10	5,417	3	5,430	2,833	2,597	3,011	55
26 Ontario	7,765	13	6,553	2	6,568	3,382	3,186	3,447	52
27 Oxford	8,498	....	6,629	1	6,630	3,430	3,200	3,819	57
28 Peel	5,004	....	3,670	....	3,670	1,998	1,672	1,868	51
29 Perth	8,198	14	5,925	2	5,941	3,150	2,791	3,518	59
30 Peterborough	6,970	7	4,665	....	4,672	2,372	2,300	2,220	47
31 Prescott and Russell	12,267	33	4,946	2	4,981	2,545	2,436	2,412	48
32 Prince Edward	2,966	9	2,582	1	2,592	1,338	1,254	1,316	50
33 Renfrew	11,941	50	7,300	2	7,352	3,782	3,570	3,230	43
34 Simcoe & W. Muskoka	17,009	40	14,971	7	15,018	7,802	7,216	6,950	46
35 Stormont	4,845	16	3,737	....	3,753	1,924	1,829	1,973	52
36 Victoria & S.E. Muskoka	7,877	26	6,258	1	6,285	3,245	3,040	2,900	46
37 Waterloo	7,526	8	5,366	1	5,375	2,914	2,461	3,364	62
38 Welland	5,700	13	4,821	....	4,834	2,500	2,334	2,377	49
39 Wellington	10,649	15	7,558	3	7,576	4,056	3,520	4,191	55
40 Wentworth	5,251	....	4,617	....	4,617	2,396	2,221	2,522	54
41 York	13,930	9	11,031	1	11,041	5,930	5,111	5,734	51
42 Rainy River & Thunder Bay	2,262	....	1,776	....	1,776	897	879	768	43
43 Algoma & Manitoulin	6,713	24	5,566	4	5,594	2,858	2,736	2,525	45
44 N. Nipissing, etc.	3,861	15	3,085	3	3,103	1,573	1,530	1,384	44
45 W. Parry Sound	5,117	15	3,672	8	3,695	1,880	1,815	1,531	41
46 Moose Fort & Albany	45	....	34	....	34	17	17	22	64
Totals	346,984	787	264,651	82	265,520	137,837	127,683	136,547	52

* Estimated.

THE PUBLIC SCHOOLS.—*Continued.*

I.—Table A.—School Population, Attendance, etc.—*Continued.*

Cities.	School population between 5 and 21 years of age.	Pupils under 5 years of age.	Pupils between 5 and 21 years of age.	Pupils over 21 years of age.	Total number of pupils attending school.	Boys.	Girls.	Average daily attendance of pupils.	Percentage of average to total attendance.
1 Belleville	1,628	....	1,269	....	1,269	645	624	818	64
2 Brantford	3,852	....	2,519	....	2,519	1,302	1,217	1,876	74
3 Chatham	2,589	....	1,548	....	1,548	804	744	1,043	67
4 Guelph	*3,392	....	1,754	....	1,754	857	897	1,247	71
5 Hamilton	14,366	....	8,166	....	8,166	4,136	4,030	6,096	74
6 Kingston	5,710	....	2,414	....	2,414	1,191	1,223	1,907	79
7 London	8,934	....	5,790	1	5,791	2,896	2,895	4,056	70
8 Niagara Falls	1,791	....	1,165	....	1,165	611	554	729	63
9 Ottawa	17,455	....	5,177	....	5,177	2,652	2,525	3,526	68
10 St. Catharines	2,808	....	1,432	....	1,432	671	761	1,007	70
11 St. Thomas	2,773	....	1,961	....	1,961	967	994	1,449	74
12 Stratford	2,970	....	1,476	....	1,476	775	701	1,108	75
13 Toronto	53,663	....	30,007	4	30,011	14,951	15,060	21,716	72
14 Windsor	4,131	....	1,815	....	1,815	925	890	1,294	71
15 Woodstock	2,157	....	1,552	....	1,552	760	792	1,122	72
Totals	128,219	....	68,045	5	68,050	34,143	33,907	48,994	72
Towns.									
1 Alexandria	490	1	78	....	79	44	35	41	52
2 Alliston	573	....	457	8	465	225	240	236	51
3 Almonte	865	....	372	....	372	187	185	261	70
4 Amherstburg	*815	....	296	....	296	158	138	185	62
5 Arnprior	1,111	....	578	....	578	278	300	382	66
6 Aurora	506	....	411	....	411	206	205	245	59
7 Aylmer	497	....	407	....	407	176	231	271	66
8 Barrie	2,147	....	1,166	....	1,166	583	583	631	54
9 Berlin	2,961	....	1,539	....	1,539	780	759	1,132	74
10 Blenheim	489	....	388	....	388	191	197	301	78
11 Bothwell	231	....	211	2	213	115	98	136	64
12 Bowmanville	673	....	479	....	479	253	226	335	70
13 Bracebridge	800	....	705	....	705	340	365	405	57
14 Brampton	720	....	496	....	496	263	233	352	71
15 Brockville	2,412	....	1,258	....	1,258	598	660	932	74
16 Bruce Mines	245	....	228	....	228	114	114	138	60
17 Cache Bay	365	....	156	....	156	57	99	88	56
18 Carleton Place	1,198	....	836	....	836	423	413	599	71
19 Clinton	603	....	443	....	443	229	214	301	68
20 Cobourg	*980	....	542	....	542	277	265	354	65
21 Collingwood	1,962	....	1,398	....	1,398	716	682	963	69
22 Copper Cliff	297	....	322	....	322	156	166	217	67
23 Cornwall	*2,097	....	635	....	635	321	314	473	74
24 Deseronto	958	....	626	....	626	321	305	440	70
25 Dresden	475	....	410	....	410	192	218	262	64
26 Dundas	966	....	569	....	569	263	306	399	70
27 Dunnville	560	....	445	....	445	223	222	241	54
28 Durham	430	....	422	3	425	212	213	289	68
29 East Toronto	*1,036	....	777	....	777	395	382	475	61
30 Essex	*430	....	323	....	323	167	156	208	64
31 Forest	360	....	293	....	293	123	170	214	73
32 Fort Frances	247	....	197	....	197	90	107	100	51
33 Fort William	1,087	....	763	....	763	400	363	475	62
34 Galt	1,559	....	1,312	....	1,312	637	675	975	74

THE PUBLIC SCHOOLS.—*Continued.*

I.—Table A.—School Population, Attendance, etc.—*Continued.*

Towns.	School population between 5 and 21 years of age.	Pupils under 5 years of age.	Pupils between 5 and 21 years of age.	Pupils over 21 years of age.	Total number of pupils attending school.	Boys.	Girls.	Average daily attendance of pupils.	Percentage of average to total attendance.
35 Gananoque	971	....	749	....	749	381	368	518	69
36 Goderich	991	....	557	....	557	263	294	390	70
37 Gore Bay	*372	....	287	2	289	137	152	151	52
38 Gravenhurst	698	....	620	....	620	314	306	388	63
39 Haileybury	150	....	117	....	117	48	69	49	42
40 Harriston	403	....	326	....	326	162	164	201	62
41 Hawkesbury	1,327	....	136	....	136	78	58	83	61
42 Hespeler	614	....	499	....	499	274	225	323	65
43 Huntsville	670	....	557	....	557	279	278	335	60
44 Ingersoll	1,245	...	736	....	736	379	357	528	72
45 Kincardine	535	....	485	....	485	235	250	246	51
46 Kingsville	483	....	367	....	367	184	183	234	64
47 Leamington	580	....	445	....	445	218	227	285	64
48 Lindsay	1,844	....	1,132	....	1,132	547	585	809	71
49 Listowel	817	....	542	....	542	288	254	339	62
50 Little Current	*425	...	319	....	319	143	176	163	51
51 Massey	287	....	198	...	198	105	93	88	44
52 Mattawa	183	....	74	....	74	44	30	32	43
53 Meaford	*568	....	426	....	426	203	223	279	65
54 Midland	1,350	....	975	....	975	479	496	635	65
55 Milton	510	....	388	....	388	214	174	231	59
56 Mitchell	638	....	374	....	374	180	194	258	69
57 Mount Forest	563	....	398	...	398	218	180	281	71
58 Napanee	650	....	529	....	529	231	298	344	65
59 New Liskeard	350	....	242	..	242	117	125	133	55
60 Newmarket	671	....	416	....	416	205	211	311	75
61 Niagara	218	....	215	....	215	111	104	122	57
62 North Bay	1,227	....	585	....	585	295	290	367	63
63 North Toronto	628	...	520	....	520	246	274	314	60
64 Oakville	503	1	331	....	332	173	159	221	66
65 Orangeville	962	....	537	....	537	240	297	354	66
66 Orillia	1,522	....	950	....	950	468	482	610	64
67 Oshawa	1,641	....	805	....	805	383	422	529	66
68 Owen Sound	2,570	....	1,672	....	1,672	800	872	1,205	72
69 Palmerston	680	....	363	....	363	184	179	235	65
70 Paris	945	....	513	....	513	278	235	349	68
71 Parkhill	330	....	253	....	253	126	127	139	55
72 Parry Sound	*950	....	858	....	858	403	455	518	60
73 Pembroke	1,531	....	631	...	631	323	308	443	70
†74 Penetanguishene	831	....	634	....	634	339	295	389	61
75 Perth	1,046	....	488	....	488	250	238	355	73
76 Peterborough	3,296	....	1,890	....	1,890	944	946	1,345	71
77 Petrolea	*1,112	....	834	...	834	413	421	552	66
78 Picton	783	....	599	....	599	313	286	380	63
79 Port Arthur	1,198	....	797	....	797	394	403	488	61
80 Port Hope	1,038	....	828	...	828	403	425	566	68
81 Prescott	739	....	435	....	435	192	243	280	64
82 Preston	524	....	384	....	384	188	196	278	72
83 Rainy River	250	....	198	....	198	98	100	69	34
84 Rat Portage(Kenora)	1,100	....	849	....	849	423	426	470	55
85 Renfrew	1,040	....	440	....	440	228	212	332	75
86 Ridgetown	552	....	446	...	446	220	226	277	62
87 St. Mary's	860	....	557	....	557	293	264	391	70
88 Sandwich	521	....	163	....	163	84	79	85	52
89 Sarnia	2,670	....	1,469	....	1,469	691	778	1,041	71

THE PUBLIC SCHOOLS—*Continued.*

I.—Table A.—School Population, Attendance, etc.—*Concluded.*

Towns.	School population between 5 and 21 years of age.	Pupils under 5 years of age.	Pupils between 5 and 21 years of age.	Pupils over 21 years of age.	Total number of pupils attending school.	Boys.	Girls.	Average daily attendance of pupils.	Percentage of average to total attendance.
90 Sault Ste. Marie	1,881	..	1,297	....	1,297	655	642	849	65
91 Seaforth	588	....	269	....	269	133	136	219	81
92 Simcoe	654	....	480	....	480	243	237	294	61
93 Smith's Falls	*1.397	....	1,048	....	1,048	499	549	738	70
94 Stayner	351	....	286	....	286	161	125	178	62
95 Steelton	700	....	454	....	454	239	215	238	52
96 Strathroy	750	....	492	....	492	244	248	347	70
97 Sturgeon Falls	1,800	....	238	....	238	114	124	126	53
98 Sudbury	525	....	224	....	224	119	105	138	61
99 Thessalon	483	....	381	....	381	190	191	189	50
00 Thornbury	180	....	162	....	162	88	74	111	68
01 Thorold	564	....	367	....	367	170	197	208	57
02 Tillsonburg	689	....	433	....	433	217	216	303	70
03 Toronto Junction	2,416	....	1,453	....	1,453	730	723	957	66
04 Trenton	1,164	....	594	....	594	306	288	374	63
05 Uxbridge	462	....	320	....	320	150	170	221	69
06 Vankleek Hill	*589	1	171	....	172	90	82	114	66
07 Walkerton	774	....	425	....	425	202	223	310	73
08 Walkerville	606	....	330	....	330	161	169	245	74
09 Wallaceburg	*1,037	....	642	....	642	329	313	398	62
10 Waterloo	709	....	582	....	582	311	271	424	73
11 Welland	395	....	282	....	282	159	123	182	64
12 Whitby	650	....	387	....	387	196	191	246	64
13 Wiarton	*878	....	659	....	659	329	330	422	64
14 Wingham	785	....	574	....	574	280	314	399	69
Totals	101,334	3	63,226	15	63,244	31,437	31,807	41,624	66
Totals.									
1 Counties, etc	346,984	787	264,651	82	265,520	137,837	127,683	136,547	51
2 Cities	128,219	....	68,045	5	68,050	34,143	33,907	48,994	72
3 Towns	101,334	3	63,226	15	63,244	31,437	31,807	41,624	66
4 Grand totals, 1904	576,537	790	395,922	102	396,814	203,417	193,397	227,165	57.25
5 Grand totals, 1903	577,383	917	402,138	106	403,161	206,794	196,367	230,730	57.20
6 Increases	.....	.....	.....	.....	.....	.....	.....	.....	.05
7 Decreases	846	127	6,216	4	6,347	3,377	2,970	3,565	.....
8 Percentages	.....	.20	99.77	.03	.....	51.26	48.74	57.25	.....

*Estimated.

†Including Protestant Separate School.

‡In incorporated villages, included in Counties, etc., there were 27,479 pupils, with an average daily attendance of 17,326.

Kindergarten and Night School pupils are not included.

THE PUBLIC

II.—Table B.—Number of pupils in th

Counties (including incorporated villages, but not cities or towns), etc.	Reading.						Writing.	Arithmetic.	Drawing.
	1st Reader, Part I.	1st Reader, Part II.	2nd Reader.	3rd Reader.	4th Reader.	5th Reader.			
1 Brant	587	410	476	712	641	133	2,928	2,951	2,92
2 Bruce	2,357	1,489	1,930	2,021	1,805	484	9,706	9,819	9,57
3 Carleton	1,474	927	1,150	1,139	1,388	434	6,512	6,512	6,51
4 Dufferin	992	591	713	914	877	202	4,235	4,282	4,13
5 Dundas	874	516	1,110	726	675	254	4,107	4,134	3,96
6 Durham	703	632	954	914	865	187	4,255	4,255	4,17
7 Elgin	1,178	622	1,013	1,089	1,199	461	5,493	5,534	5,45
8 Essex	1,643	1,276	1,247	1,169	742	117	6,119	6,095	6,06
9 Frontenac	1,313	776	952	1,158	1,148	93	5,406	5,406	5,40
10 Glengarry	1,128	614	830	471	641	90	3,774	3,774	3,77
11 Grey	3,072	1,833	2,670	2,521	1,970	393	12,206	12,058	11,96
12 Haldimand	683	515	693	699	829	175	3,594	3,594	3,59
13 Haliburton, etc	1,303	661	780	772	516	106	3,978	3,953	3,69
14 Halton	693	441	498	621	763	142	3,158	3,158	3,15
15 Hastings	2,432	1,457	1,659	1,539	1,062	298	8,410	8,415	8,29
16 Huron	1,537	963	1,840	2,030	2,353	876	9,519	9,435	9,24
17 Kent	1,841	1,052	1,354	1,378	1,470	678	7,707	7,707	7,70
18 Lambton	2,120	1,458	1,480	1,662	1,472	451	8,563	8,599	8,42
19 Lanark	923	666	765	849	750	181	4,134	4,134	4,13
20 Leeds and Grenville	1,842	1,209	1,568	1,713	1,918	337	8,393	8,386	8,15
21 Lennox & Addington	912	552	731	808	839	164	4,006	4,006	4,00
22 Lincoln	805	503	584	728	869	57	3,388	3,344	3,07
23 Middlesex	1,637	1,090	1,524	1,900	1,845	522	8,518	8,518	8,55
24 Norfolk	1,157	657	1,070	945	1,120	206	5,070	5,104	5,00
25 Northumberland	1,177	712	1,160	1,128	1,082	171	5,272	5,339	5,00
26 Ontario	1,473	936	1,159	1,287	1,470	243	6,351	6,429	6,33
27 Oxford	1,304	981	1,129	1,343	1,431	442	6,483	6,574	6,11
28 Peel	731	469	654	803	846	167	3,597	3,662	3,55
29 Perth	1,049	751	1,051	1,637	1,206	247	5,805	5,912	5,55
30 Peterborough	1,163	730	877	885	912	105	4,549	4,556	4,38
31 Prescott and Russell	1,567	865	810	768	790	181	4,634	4,844	4,44
32 Prince Edward	488	291	458	454	679	222	2,585	2,586	2,55
33 Renfrew	2,099	1,247	1,390	1,284	1,061	271	6,785	7,001	6,11
34 Simcoe & W. Muskoka	3,414	2,280	2,794	2,875	2,790	865	14,712	14,863	14,44
35 Stormont	855	525	913	661	625	174	3,753	3,688	3,66
36 Victoria and S. E. Muskoka	1,405	891	1,217	1,321	1,163	288	6,131	6,133	6,06
37 Waterloo	1,090	762	1,306	1,248	760	209	5,273	5,334	5,06
38 Welland	1,116	674	881	954	977	232	4,826	4,832	4,7
39 Wellington	1,530	915	1,386	1,628	1,717	400	7,569	7,529	7,5
40 Wentworth	872	606	828	1,150	953	208	4,617	4,617	4,6
41 York	2,628	1,489	2,001	2,373	2,299	251	10,730	10,743	10,5
42 Rainy River & Thunder Bay	532	277	350	357	235	25	1,762	1,748	1,7
43 Algoma & Manitoulin	1,743	918	983	967	871	112	5,382	5,383	5,0
44 N. Nipissing, etc	1,189	601	535	511	244	23	2,694	2,783	2,7
45 W. Parry Sound	1,121	560	656	703	540	115	3,431	3,514	3,3
46 Moose Fort & Albany	12	6	6	7	2	1	34	29	
Totals	61,764	38,396	50,135	52,822	50,410	11,993	260,154	261,272	254,2

SCHOOLS.—*Continued.*

various branches of instruction.

	Geography.	Music.	Grammar and Composition.	English History.	Canadian History.	Physiology and Temperance.	Drill and Calisthenics.	Bookkeeping.	Algebra.	Geometry.	Botany.	Elementary Physics.	Agriculture.
1	2,204	1,873	2,127	968	1,389	1,302	1,843	108	117	107	139	100	292
2	6,899	4,778	6,630	2,648	4,116	4,558	5,087	391	464	447	253	277	798
3	4,474	2,823	4,481	2,143	2,522	2,177	2,532	375	406	359	343	331	906
4	2,911	2,282	2,647	1,335	1,855	1,755	2,660	187	192	187	59	148	635
5	3,364	2,444	3,131	1,070	1,383	1,549	2,466	211	241	236	169	103	1,103
6	3,015	2,260	2,561	805	1,054	1,134	1,810	141	155	149	105	47	227
7	4,530	3,573	4,036	2,219	2,871	3,162	3,680	404	420	477	703	293	1,136
8	3,840	2,761	3,436	1,002	1,953	4,998	3,266	133	106	98	55	49	733
9	3,504	2,416	3,119	1,620	2,093	1,977	3,226	77	68	59	98	8	521
10	2,408	872	2,201	764	943	936	1,625	84	84	77	63	46	147
11	9,385	6,588	8,087	3,098	5,066	7,966	7,962	439	365	341	340	149	1,604
12	3,106	1,778	2,677	1,247	1,472	1,500	2,389	184	140	114	229	95	1,302
13	2,848	1,163	1,876	854	1,107	1,005	1,704	110	95	90	18	15	118
14	2,330	1,329	2,312	1,121	1,475	1,434	2,210	140	138	138	65	55	444
15	6,028	3,842	5,256	1,660	2,991	5,175	5,773	782	286	264	311	91	697
16	7,341	4,938	6,786	3,201	4,820	3,246	4,278	773	830	823	596	279	1,791
17	5,618	4,400	5,159	2,631	3,216	3,491	2,706	642	677	670	647	141	2,293
18	5,832	4,587	5,740	2,386	3,563	3,854	5,546	368	406	371	256	226	1,076
19	2,679	1,352	2,503	1,044	1,568	1,291	2,247	125	170	165	242	98	216
20	5,969	4,268	5,847	2,941	3,724	3,430	3,897	288	311	298	174	175	1,171
21	2,856	1,485	2,518	1,230	1,595	1,650	1,827	132	139	127	21	45	614
22	2,406	1,599	2,299	1,123	1,424	1,541	942	62	63	37	107	83	474
23	6,892	6,309	6,433	3,221	4,225	5,337	5,899	509	496	487	300	198	2,348
24	3,712	3,259	3,562	1,568	2,061	1,859	2,668	202	190	180	129	113	1,059
25	3,979	1,921	3,804	1,104	1,601	1,541	2,327	244	178	168	102	37	494
26	4,379	3,192	4,312	2,259	1,911	2,523	2,585	237	209	198	89	49	525
27	4,916	3,344	4,464	1,932	2,795	2,563	2,869	345	444	389	229	251	745
28	2,751	1,400	2,343	1,533	1,728	1,284	1,788	167	167	167	2	18	123
29	4,475	4,755	4,131	1,641	2,848	1,884	4,820	226	221	212	214	222	1,191
30	3,317	1,626	2,754	1,196	1,629	1,565	1,819	106	100	96	161	105	179
31	2,641	1,542	2,796	1,032	1,475	1,436	2,551	180	162	150	195	59	613
32	2,018	1,125	1,923	1,035	1,190	1,475	1,570	225	212	164	380	50	903
33	4,040	1,197	3,793	1,525	2,124	1,545	1,819	283	266	242	43	37	460
34	9,614	8,215	8,943	4,316	6,179	5,646	10,405	962	849	816	522	473	2,485
35	2,721	1,089	2,462	1,037	1,198	1,188	1,628	162	155	249	101	57	508
36	4,447	2,933	4,105	1,606	2,200	1,827	2,441	289	269	258	155	143	423
37	3,828	3,698	3,099	772	1,775	1,226	2,686	175	163	142	142	34	400
38	3,176	2,350	3,131	1,475	2,054	1,723	2,060	242	221	209	284	232	335
39	5,307	3,784	4,906	2,235	3,180	3,038	3,774	351	364	360	312	176	1,099
40	3,342	2,420	3,171	1,389	2,093	1,269	2,343	208	214	194	255	91	1,045
41	7,985	6,405	7,680	3,509	4,262	4,463	5,920	263	233	211	235	104	758
42	1,245	833	1,082	371	670	735	694	40	34	21	8	10	61
43	2,801	1,547	2,712	1,188	1,667	1,489	1,490	105	95	92	39	78	172
44	1,434	540	1,081	385	624	530	388	42	25	25	10	7	44
45	2,260	1,122	1,892	745	1,232	1,055	1,605	104	108	106	31	12	241
46	.....	34	11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	184,827	128,051	170,019	74,184	102,921	106,332	135,825	11,823	11,248	10,770	8,931	5,410	34,509

THE PUBLIC

II.—Table B.—Number of pupils in the

Cities.	Reading.						Writing.	Arithmetic.	Drawing.
	1st Reader, Part I.	1st Reader, Part II.	2nd Reader.	3rd Reader.	4th Reader.	5th Reader.			
1 Belleville	298	223	251	236	261	.....	1,269	1,269	1,269
2 Brantford	511	346	395	726	488	53	2,519	2,519	2,519
3 Chatham	296	214	319	338	381	.....	1,548	1,548	1,548
4 Guelph	328	212	250	503	333	128	1,754	1,754	1,754
5 Hamilton	1,221	1,053	1,247	2,250	1,885	510	8,166	8,166	8,166
6 Kingston	560	295	295	629	635	.....	2,414	2,414	2,414
7 London	1,036	745	1,430	1,338	1,242	.....	5,791	5,791	5,783
8 Niagara Falls	360	138	186	232	249	.....	1,165	1,165	1,165
9 Ottawa	1,017	688	713	1,352	1,229	178	5,177	5,177	5,177
10 St. Catharines	351	195	239	370	277	.....	1,432	1,432	1,432
11 St. Thomas	519	229	354	469	390	.....	1,961	1,961	1,961
12 Stratford	280	228	234	389	345	.....	1,476	1,476	1,476
13 Toronto	5,678	3,572	6,618	6,552	6,416	1,175	30,011	30,011	27,937
14 Windsor	562	292	367	405	189	.....	1,815	1,815	1,815
15 Woodstock	395	237	262	365	293	.....	1,552	1,552	1,552
Totals	13,412	8,667	13,160	16,154	14,613	2,044	68,050	68,050	65,968
Towns.									
1 Alexandria	15	4	19	21	20	....	79	79	79
2 Alliston	56	64	76	77	63	129	465	420	420
3 Almonte	66	72	94	69	71	.....	372	372	372
4 Amherstburg	54	58	61	45	40	38	290	295	290
5 Arnprior	173	107	111	102	85	.....	578	578	578
6 Aurora	145	49	84	67	66	.....	411	411	411
7 Aylmer	64	57	83	116	87	.....	407	407	407
8 Barrie	251	150	294	226	245	.....	1,166	1,166	1,166
9 Berlin	246	242	412	391	248	.....	1,539	1,539	1,539
10 Blenheim	57	83	80	78	52	38	388	388	350
11 Bothwell	31	26	29	28	38	61	213	213	195
12 Bowmanville	97	62	95	111	114	.....	479	479	479
13 Bracebridge	208	91	141	138	58	69	695	705	695
14 Brampton	98	83	97	136	82	.....	496	496	496
15 Brockville	260	175	267	265	291	.....	1,258	1,258	1,258
16 Bruce Mines	52	19	53	31	28	45	208	228	208
17 Cache Bay	58	19	37	23	17	2	156	156	156
18 Carleton Place	223	157	167	135	154	.....	836	836	836
19 Clinton	92	62	117	104	68	.....	443	443	443
20 Cobourg	90	83	105	136	128	.....	542	542	542
21 Collingwood	399	219	195	295	290	.....	1,398	1,398	1,398
22 Copper Cliff	150	37	61	34	29	11	322	322	322
23 Cornwall	190	99	118	142	86	.....	635	635	635
24 Deseronto	217	167	109	95	38	.....	626	626	626
25 Dresden	104	85	55	52	56	58	410	410	322
26 Dundas	159	105	58	138	109	.....	569	569	569
27 Dunnville	71	72	107	79	116	.....	445	445	374
28 Durham	76	56	85	60	49	99	376	425	376
29 East Toronto	264	129	118	149	117	.....	777	777	777
30 Essex	98	75	51	62	37	.....	323	323	323
31 Forest	76	55	50	36	76	.....	293	293	293
32 Fort Frances	40	47	35	40	18	17	197	197	197

SCHOOLS.—*Continued.*

various branches of instruction.—*Continued.*

	Geography.	Music.	Grammar and Composition.	English History.	Canadian History.	Physiology and Temperance.	Drill and Calisthenics.	Bookkeeping.	Algebra.	Geometry.	Botany.	Elementary Physics.	Agriculture.
1	899	533	732	261	497	497	1,015	.....	.....	.....	.....	.....	.....
2	2,519	2,519	1,837	679	1,366	2,519	2,519	53	.....	.....	.....	230	.....
3	1,368	1,548	1,548	847	948	1,169	1,548	.....	.....	.....	.....	.....	.....
4	1,140	1,606	1,754	333	838	838	1,698	128	.....	.....	.....	.....	.....
5	6,906	8,136	6,945	3,128	4,628	5,127	8,166	510	499	371	790	286	.....
6	1,746	2,414	1,850	710	1,208	2,414	2,414	.....	.....	635	.....	.....	.....
7	5,484	5,791	5,191	790	1,846	5,630	5,526	.....	.....	.....	.....	.....	.....
8	958	.....	667	415	563	854	.....	.....	.....	.....	.....	.....	.....
9	2,759	2,418	2,759	1,407	2,759	2,759	5,177	178	178	.....	.....	.....	.....
10	1,081	.....	886	277	460	460	1,432	.....	.....	.....	.....	.....	.....
11	1,213	.....	1,213	390	859	1,961	1,961	.....	.....	.....	.....	.....	.....
12	1,003	1,185	1,012	400	522	890	1,476	.....	.....	.....	.....	.....	.....
13	28,208	27,937	29,056	5,346	8,048	23,005	9,778	3,154	2	.....	163	.....	1,103
14	1,548	1,186	1,523	210	781	1,712	1,457	.....	.....	.....	.....	.....	.....
15	920	1,552	658	293	658	920	1,552	.....	.....	.....	.....	.....	.....
	57,752	56,825	57,631	15,486	25,981	50,755	45,719	4,023	679	1,006	953	516	1,103
1	60	.....	60	20	41	41	.....	.....	.....	.....	.....	.....	.....
2	420	465	436	428	428	332	465	63	129	129	63	129	.....
3	272	60	237	71	99	71	144	.....	.....	.....	.....	.....	.....
4	194	262	286	78	123	231	207	32	37	37	32	36	.....
5	298	578	578	85	187	578	578	.....	.....	.....	.....	.....	.....
6	411	345	411	66	133	411	345	.....	.....	.....	.....	.....	.....
7	286	.....	286	87	87	87	.....	.....	.....	.....	.....	.....	.....
8	915	820	834	587	685	611	876	455	.....	.....	.....	.....	.....
9	1,051	1,539	639	176	248	248	1,539	.....	.....	.....	.....	.....	.....
10	350	220	246	90	168	168	.....	38	38	38	38	38	.....
11	163	93	182	99	99	64	154	43	61	61	43	43	.....
12	320	479	320	114	225	266	479	.....	.....	.....	.....	.....	.....
13	489	646	705	127	255	58	705	49	66	45	47	67	.....
14	315	496	496	82	218	82	496	.....	.....	.....	.....	.....	.....
15	1,258	1,258	1,258	556	556	1,258	1,258	.....	.....	.....	.....	.....	.....
16	157	124	157	73	157	28	71	38	45	32	38	11	.....
17	156	77	79	19	42	42	.....	19	2	2	.....	.....	19
18	456	836	456	154	202	154	836	.....	.....	.....	.....	.....	.....
19	351	443	284	68	172	68	443	.....	.....	.....	.....	.....	.....
20	427	157	369	128	310	298	101	.....	.....	.....	.....	.....	.....
21	1,398	944	1,398	406	509	1,398	1,398	.....	.....	.....	.....	.....	.....
22	322	322	322	40	74	74	322	11	11	11	11	11	11
23	345	635	246	86	228	246	635	.....	.....	.....	.....	.....	.....
24	242	408	409	38	133	133	626	.....	.....	.....	.....	.....	
25	281	244	281	166	166	108	.....	58	58	58	58	58	.....
26	305	569	305	109	305	569	569	.....	.....	.....	.....	.....	.....
27	302	272	302	57	173	173	302	.....	.....	.....	.....	.....	.....
28	300	277	361	99	159	254	425	50	99	99	50	99	.....
29	667	777	582	117	266	384	777	.....	.....	.....	.....	.....	.....
30	190	264	180	37	99	323	81	.....	.....	.....	.....	.....	.....
31	162	255	293	76	112	112	217	.....	.....	.....	.....	.....	.....
32	157	197	110	35	75	58	197	17	17	17	17	17	.....

THE PUBLIC

II.—Table B.—Number of pupils in the

Towns.	Reading.						Writing.	Arithmetic.	Drawing.
	1st Reader, Part I.	1st Reader, Part II.	2nd Reader.	3rd Reader.	4th Reader.	5th Reader.			
33 Fort William	213	151	147	121	131	.....	763	763	763
34 Galt	274	65	324	326	323	.....	1,312	1,312	1,312
35 Gananoque	221	96	158	135	139	.....	749	749	749
36 Goderich	85	68	115	174	115	.....	557	557	557
37 Gore Bay	58	28	61	64	36	42	289	289	289
38 Gravenhurst	266	35	127	111	81	.....	620	620	620
39 Haileybury	40	30	24	22	1	.....	117	117	117
40 Harriston	75	39	55	69	88	.....	326	326	326
41 Hawkesbury	35	15	23	36	27	.....	136	136	136
42 Hespeler	149	60	95	127	47	21	499	499	499
43 Huntsville	154	107	123	77	59	37	557	557	468
44 Ingersoll	142	67	182	167	178	.....	736	736	736
45 Kincardine	95	58	99	142	91	.....	485	485	485
46 Kingsville	107	39	68	83	56	14	367	367	367
47 Leamington	101	66	74	136	68	.....	445	445	445
48 Lindsay	252	110	269	259	242	.....	1,132	1,132	1,132
49 Listowel	124	48	70	163	137	.....	542	542	542
50 Little Current	112	41	67	40	39	20	319	319	319
51 Massey	69	35	28	38	26	2	198	198	198
52 Mattawa	15	15	15	8	17	4	61	61	60
53 Meaford	118	78	107	66	57	.....	426	426	426
54 Midland	329	120	229	154	116	27	975	975	975
55 Milton	87	65	59	42	67	68	388	388	376
56 Mitchell	72	39	54	108	101	.....	374	374	374
57 Mount Forest	75	48	96	84	95	.....	398	398	398
58 Napanee	110	93	88	107	131	.....	529	529	529
59 New Liskeard	66	42	49	61	13	11	242	242	242
60 Newmarket	72	71	141	54	78	.....	416	416	416
61 Niagara	48	20	27	39	81	.....	215	215	215
62 North Bay	240	92	103	71	79	.....	585	585	585
63 North Toronto	147	103	79	93	81	17	520	520	520
64 Oakville	64	49	79	50	90	.....	332	332	332
65 Orangeville	95	111	104	119	108	.....	537	537	537
66 Orillia	229	150	183	178	166	44	950	950	906
67 Oshawa	202	105	138	228	132	.....	805	805	805
68 Owen Sound	359	215	372	346	380	.....	1,672	1,672	1,672
69 Palmerston	103	44	59	54	62	41	355	363	355
70 Paris	107	96	80	143	87	.....	513	513	513
71 Parkhill	50	24	62	61	56	.....	253	253	253
72 Parry Sound	320	84	115	142	132	65	793	858	858
73 Pembroke	158	108	111	101	153	.....	631	631	631
74 *Penetanguishene	202	115	101	122	87	7	634	634	543
75 Perth	107	50	132	90	109	.....	488	488	488
76 Peterborough	535	268	355	357	375	.....	1,890	1,890	1,890
77 Petrolea	287	107	136	193	111	.....	834	834	834
78 Picton	180	82	99	116	122	.....	599	599	599
79 Port Arthur	236	118	137	155	151	.....	797	797	797
80 Port Hope	208	153	141	160	166	.....	828	828	828
81 Prescott	109	82	50	58	136	.....	435	435	435
82 Preston	98	62	73	89	62	.....	384	384	384

* Including Protestant Separate School.

SCHOOLS.—*Continued.*

various branches of instruction.—*Continued.*

	Geography.	Music.	Grammar and Composition.	English History.	Canadian History.	Physiology and Temperance.	Drill and Calisthenics.	Bookkeeping.	Algebra.	Geometry.	Botany.	Elementary Physics.	Agriculture.
33	715	763	715	252	284	252	763	.....	.....	.....	131	52	.....
34	1,312	1,312	1,312	378	619	1,312	1,312	.....	.....	.....	.....	....	.....
35	528	389	360	139	274	360	749	.....	.....	.....	.....	....	.....
36	472	557	339	115	289	115	557	.....	.....	.....	.....	....	.....
37	168	.....	168	111	111	69	178	22	42	42	.....	18	.....
38	319	253	253	81	234	143	62	.....	.....	.....	.....	....	.....
39	63	.....	63	4	23	4	.....	.....	.....	.....	.....	....	.....
40	251	251	251	88	157	251	251	.....	.....	.....	.....	....	.....
41	86	.....	136	27	67	67	.....	.....	.....	.....	.....	....	.....
42	290	.....	195	68	195	195	.....	21	21	21	.....	....	21
43	332	557	307	62	173	284	557	37	37	37	37	....	.....
44	736	736	623	178	298	736	736	.....	.....	.....	.....	....	.....
45	332	485	332	91	199	332	485	.....	.....	.....	.....	....	.....
46	307	256	307	70	156	353	217	14	14	14	14	....	.....
47	445	277	445	68	204	445	445	.....	.....	.....	.....	....	.....
48	733	881	941	242	344	387	816	.....	.....	.....	.....	....	.....
49	370	389	334	137	264	137	542	3	.....	.....	.....	....	.....
50	207	319	207	59	132	132	319	20	20	20	20	20	.....
51	198	198	129	28	66	66	198	2	2	.....	.....	....	.....
52	31	61	15	15	15	16	59	.....	.....	.....	.....	....	.....
53	426	426	426	57	160	426	426	.....	.....	.....	.....	....	.....
54	687	975	975	265	297	465	975	27	27	27	80	....	.....
55	376	388	388	135	177	374	388	81	68	68	.....	20	48
56	263	219	209	209	209	101	374	.....	.....	.....	.....	....	.....
57	323	398	275	95	179	398	398	.....	.....	.....	.....	....	.....
58	529	529	529	131	238	238	529	.....	.....	.....	.....	....	.....
59	242	242	242	85	134	242	.....	11	11	11	.....	....	11
60	416	416	416	78	137	137	416	.....	.....	.....	.....	.....	.....
61	167	66	167	81	81	147	134	.....	.....	.....	.....	.....	.....
62	253	585	460	79	150	585	585	.....	.....	.....	.....	.....	.....
63	520	520	520	392	449	520	520	10	17	17	17	.....	.....
64	268	332	268	90	219	219	332	.....	.....	.....	.....	.....	.....
65	537	537	537	442	442	442	537	.....	.....	.....	.....	.....	.....
66	713	669	713	384	384	384	.....	44	.....	.....	.....	.....	.....
67	479	653	671	75	178	132	.....	.....	.....	.....	.....	.....	.....
68	1,098	1,672	1,098	547	726	1,098	1,672	.....	.....	.....	.....	.....	.....
69	324	64	260	115	191	150	79	33	41	41	41	41	41
70	513	.....	230	87	230	513	.....	.....	.....	.....	.....	.....	.....
71	179	253	179	56	117	117	.....	.....	.....	.....	.....	.....	.....
72	471	206	471	197	307	199	329	65	65	65	65	65	.....
73	473	473	473	153	254	153	631	.....	.....	.....	.....	.....	.....
74	408	150	480	94	277	90	131	7	7	3	3	.....	.....
75	331	488	331	109	151	109	488	.....	.....	.....	.....	.....	.....
76	1,087	289	1,087	375	732	732	1,515	.....	.....	.....	.....	....	.....
77	440	834	369	111	304	440	834	.....	.....	.....	.....	.....	.....
78	537	599	537	206	206	599	599	.....	.....	.....	.....	.....	.....
79	463	797	463	151	242	306	797	.....	.....	.....	.....	.....	.....
80	828	828	828	247	247	828	828	.....	.....	.....	.....	.....	.....
81	435	435	435	194	296	435	435	.....	.....	.....	.....	.....	.....
82	259	384	151	62	151	151	.....	.....	.....	.....	.....	.....	.....

THE PUBLIC

II.—Table B.—Number of pupils in the

Towns.	Reading.						Writing.	Arithmetic.	Drawing.
	1st Reader, Part I.	1st Reader, Part II.	2nd Reader.	3rd Reader.	4th Reader.	5th Reader.			
83 Rainy River	54	71	32	22	15	4	198	198	198
84 Rat Portage (Kenora)	314	116	146	136	137	.....	849	849	849
85 Renfrew	142	69	63	64	102	.....	440	440	440
86 Ridgetown	116	45	100	90	95	.....	446	446	446
87 St. Mary's	83	87	80	162	145	.....	557	557	492
88 Sandwich	42	32	25	38	26	.....	163	163	121
89 Sarnia	424	192	323	282	248	.....	1,469	1,469	1,423
90 Sault Ste. Marie	358	242	242	233	222	.....	1,297	1,297	1,297
91 Seaforth	34	43	61	54	77	.....	269	269	269
92 Simcoe	124	38	117	65	136	.....	480	480	480
93 Smith's Falls	289	154	216	186	203	.....	1,048	1,048	1,048
94 Stayner	71	44	52	53	26	40	286	286	264
95 Steelton	134	63	135	72	50	.....	454	454	454
96 Strathroy	99	69	122	90	112	.....	492	492	492
97 Sturgeon Falls	72	35	43	43	25	20	238	238	238
98 Sudbury	60	36	29	31	47	21	224	224	224
99 Thessalon	129	66	52	57	62	15	381	381	381
100 Thornbury	35	24	24	43	28	8	162	162	162
101 Thorold	88	51	71	88	69	.....	367	367	345
102 Tillsonburg	78	54	89	96	116	.....	433	433	433
103 Toronto Junction	361	221	262	317	292	.....	1,453	1,453	1,453
104 Trenton	130	93	159	102	110	.....	594	594	594
105 Uxbridge	63	62	66	73	56	.....	320	320	320
106 Vankleek Hill	46	7	33	42	44	.....	172	172	172
107 Walkerton	83	74	77	77	114	.....	425	425	425
108 Walkerville	93	40	63	73	23	38	330	330	330
109 Wallaceburg	195	82	122	102	49	92	598	642	598
110 Waterloo	110	97	119	139	117	.....	582	582	582
111 Welland	62	50	42	58	70	.....	282	282	282
112 Whitby	78	46	77	87	99	.....	387	387	387
113 Wiarton	159	163	161	107	69	.....	659	659	659
114 Wingham	101	86	100	107	60	120	574	574	490
Totals.	16,007	9,328	12,450	12,609	11,505	1,345	63,029	63,185	62,316
Totals.									
1 †Counties, etc.	61,764	38,396	50,135	52,822	50,410	11,993	260,154	261,272	254,462
2 Cities	13,412	8,667	13,160	16,154	14,613	2,044	68,050	68,050	65,968
3 Towns	16,007	9,328	12,450	12,609	11,505	1,345	63,029	63,185	62,316
4 Grand Totals, 1904	91,183	56,391	75,745	81,585	76,528	15,382	391,233	392,507	382,746
5 Grand Totals, 1903	91,872	58,777	77,258	81,937	77,791	15,526	396,594	399,051	388,612
6 Increases	.....	.....	.....	.....	.....	.....	.....	.....	.....
7 Decreases	689	2,386	1,513	352	1,263	144	5,361	6,544	5,866
8 Percentages	22.98	14.21	19.09	20.56	19.28	3.88	98.59	98.91	96.45

† In incorporated villages included in Counties, etc., the numbers in the Readers were: 1st Part I., 6,179; Part II., 4,026; 2nd, 4,994; 3rd, 5,029; 4th, 4,930; 5th, 2,321.

SCHOOLS.—*Continued.*

various branches of instruction.—*Concluded.*

	Geography.	Music.	Grammar and Composition.	English History.	Canadian History.	Physiology and Temperance.	Drill and Calisthenics.	Bookkeeping.	Algebra.	Geometry.	Botany.	Elementary Physics.	Agriculture.
83	73	198	73	41	41	198	198	4	4	4	.....	.....	.....
84	849	849	536	536	536	536	849	.....	.....	.....	.....	.....	.....
85	298	220	284	149	139	166	99	.....	.....	.....	.....	.....	.....
86	446	388	446	185	185	185	388	.....	.....	.....	.....	.....	.....
87	438	.....	487	145	307	145	31	.....	.....	.....	.....	.....	.....
88	90	.....	121	64	64	64	.....	.....	.....	.....	64	.....	.....
89	1,122	1,280	1,249	152	595	1,306	1,469	.....	.....	.....	123	.....	.....
90	1,033	1,221	814	356	631	861	1,297	.....	.....	.....	.....	.....	.....
91	192	269	269	131	192	131	192	.....	.....	.....	.....	.....	.....
92	480	480	201	201	201	480	480	.....	.....	.....	.....	.....	.....
93	1,048	1,048	1,048	145	342	1,048	1,048	.....	.....	.....	.....	.....	.....
94	286	237	286	239	229	246	286	18	40	40	47	40	47
95	321	188	297	79	141	246	219	.....	.....	.....	.....	.....	56
96	492	492	492	61	202	492	492	.....	.....	.....	.....	.....	.....
97	166	150	166	88	88	116	.....	20	20	20	.....	.....	.....
98	128	142	224	68	100	47	149	21	21	21	21	14	.....
99	201	381	171	77	171	77	.....	15	15	15	15	.....	77
100	127	83	127	63	79	162	162	8	8	8	8	8	.....
101	259	.....	228	93	157	157	.....	.....	.....	.....	.....	.....	.....
102	301	433	166	166	166	166	433	.....	.....	.....	.....	.....	.....
103	871	1,453	871	292	609	320	1,453	.....	.....	.....	.....	.....	.....
104	371	565	371	110	212	212	514	.....	.....	.....	.....	.....	.....
105	195	320	195	56	129	129	320	.....	.....	.....	.....	.....	.....
106	172	128	172	86	126	172	172	.....	.....	.....	172	.....	.....
107	425	425	425	114	277	425	425	.....	.....	.....	.....	.....	.....
108	273	330	237	48	134	237	330	38	38	18	18	.....	.....
109	423	265	423	257	257	151	.....	46	92	92	46	46	.....
110	394	.....	351	117	292	117	99	.....	.....	.....	.....	.....	.....
111	170	112	282	70	128	128	112	.....	.....	.....	.....	.....	.....
112	387	387	387	119	186	348	348	.....	.....	.....	.....	.....	.....
113	659	659	197	69	176	176	267	.....	.....	.....	.....	.....	.....
114	389	320	473	180	180	60	.....	70	120	120	60	40	.....
	48,039	49,196	46,797	16,446	25,975	34,618	48,276	1,510	1,293	1,233	1,379	873	331
	184,827	128,051	170,019	74,184	102,921	106,332	135,825	11,823	11,248	10,770	8,931	5,410	34,509
	57,752	56,825	57,631	15,486	25,981	50,755	45,719	4,023	679	1,006	953	516	1,103
	48,039	49,196	46,797	16,446	25,975	34,618	48,276	1,510	1,293	1,233	1,379	873	331
	290,618	234,072	274,447	106,116	154,877	191,705	229,820	17,356	13,220	13,009	11,263	6,799	35,943
	284,106	231,937	263,904	98,924	150,165	174,947	242,337	17,096	13,396	13,944	9,300	4,964	36,268
	6,512	2,135	10,543	7,192	4,712	16,758	.....	260	.....	.....	1,963	1,835	.....
	.....	.....	.....	.....	.....	.....	12,517	.....	176	935	.....	.....	325
	73.24	58.99	69.16	26.74	39.03	48.31	57.91	4.37	3.33	3.28	2.81	1.71	9.06

THE PUBLIC

III.—Table C.—Teachers,

Counties, (including incorporated villages, but not cities or towns) etc.	Number of teachers.	Male.	Female.	Salaries. Highest salary paid.	Average salary male teacher.	Average salary female teacher.
				$	$	$
1 Brant	70	18	52	575	412	336
2 Bruce	224	69	155	900	412	315
3 Carleton	150	29	121	600	402	319
4 Dufferin	106	17	89	750	389	299
5 Dundas	108	39	69	600	367	274
6 Durham	116	19	97	600	410	306
7 Elgin	131	34	97	550	455	293
8 Essex	119	40	79	600	410	335
9 Frontenac	153	20	133	500	296	246
10 Glengarry	82	13	69	550	367	272
11 Grey	252	68	184	750	393	294
12 Haldimand	94	14	80	675	457	305
13 Haliburton, etc	127	18	109	575	366	244
14 Halton	76	17	59	650	428	327
15 Hastings	208	53	155	850	387	291
16 Huron	221	80	141	900	426	307
17 Kent	149	38	111	725	410	349
18 Lambton	206	51	155	600	395	322
19 Lanark	132	10	122	600	357	257
20 Leeds and Grenville	262	45	217	800	351	262
21 Lennox and Addington	125	18	107	550	330	258
22 Lincoln	82	27	55	700	462	279
23 Middlesex	205	55	150	550	404	328
24 Norfolk	121	37	84	600	365	300
25 Northumberland	126	41	85	700	405	283
26 Ontario	141	40	101	800	411	316
27 Oxford	139	52	87	625	429	323
28 Peel	89	28	61	650	402	317
29 Perth	121	48	73	550	414	325
30 Peterborough	113	29	84	700	374	282
31 Prescott & Russell	110	22	88	600	363	251
32 Prince Edward	81	25	56	600	357	299
33 Renfrew	157	23	134	600	374	257
34 Simcoe and W. Muskoka	304	103	201	750	396	303
35 Stormont	89	21	68	500	344	279
36 Victoria and S. E. Muskoka	156	41	115	650	393	278
37 Waterloo	116	42	74	675	467	323
38 Welland	102	19	83	800	446	306
39 Wellington	169	50	119	700	435	336
40 Wentworth	95	23	72	600	457	327
41 York	219	62	157	700	442	302
42 Rainy River and Thunder Bay	48	18	30	900	410	363
43 Algoma and Manitoulin	125	30	95	650	329	255
44 N. Nipissing, etc	83	12	71	500	367	255
45 W. Parry Sound	95	18	77	600	366	268
*1 Totals, Counties, etc	6,197	1,576	4,621	900	402	295
2 Totals, Cities	1,281	191	1,090	1,600	953	498
3 Totals, Towns	1,132	190	942	1,200	705	341
4 Grand Totals 1904	8,610	1,957	6,653	1,600	485	335
5 Grand Totals 1903	8,560	2,062	6,498	1,600	465	324
6 Increases	50	.....	155	.....	20	11
7 Decreases	.....	105	.....	.....	.....	.....
8 Percentages	.....	22.73	77.27	.....	.....	.....

*In incorporated villages, included in Counties, etc., there were 535 teachers, 146 male and 389 female, with average salaries of $564 and $305 respectively. 77 held First Class, 336 Second Class, and 109 Third Class certificates. 14 were University graduates.

SCHOOLS.—*Continued.*

Salaries, Certificates, Etc.

Number of University Graduates.	Number of teachers who have attended Normal School or Normal College.	Certificates.						
		Provincial First Class.	Provincial Second Class.	First Class, old County Board.	Second Class, old County Board.	Third Class.	Temporary	Other certificates.
1	43	8	36	.....	.....	25	1	.....
2 2	92	18	74	.....	1	119	11	1
3 5	74	9	65	1	.....	69	6	.....
4 3	38	5	34	.....	.....	67	.....	.....
5	42	5	39	.....	.....	64	.....	.....
6	48	4	45	.....	.....	67	.....	.....
7	58	11	47	.....	.....	71	2	.....
8 1	37	4	38	.....	.....	64	9	4
9 5	23	1	22	.....	1	102	25	2
10 1	21	1	20	.....	.....	48	13	.....
11	105	11	100	.....	1	137	2	1
12 1	47	9	39	.....	.....	46	.....	.....
13	3	3	9	.....	1	28	30	56
14	39	4	35	.....	.....	37	.....	.....
15 1	69	2	71	.....	.....	128	7	.....
16	110	9	102	.....	.....	109	1	.....
17 1	74	3	71	1	.....	70	4	.....
18	106	7	98	.....	1	86	14	.....
19 3	34	1	33	2	.....	78	18	.....
20 1	79	8	71	.....	.....	179	2	2
21 1	31	1	30	1	.....	83	10	.....
22 1	40	6	34	.....	.....	39	3	.....
23 1	119	7	114	.....	.....	82	2	.....
24	42	3	39	.....	2	68	9	.....
25 1	71	2	69	.....	1	52	1	1
26	67	4	63	.....	.....	67	7	.....
27 1	79	7	72	1	.....	59	.....	.....
28	45	4	41	.....	.....	44	.....	.....
29	69	3	66	.....	.....	52	.....	.....
30 1	40	2	38	.....	1	52	14	6
31	13	2	12	.....	.....	43	7	46
32	23	1	22	.....	.....	53	5	.....
33	23	1	20	1	.....	94	24	17
34 4	64	11	79	.....	1	208	5	.....
35	20	3	17	.....	2	65	1	1
36 1	44	2	43	.....	.....	88	11	12
37	64	6	59	.....	1	48	1	1
38 1	37	4	32	4	.....	62	.....	.....
39	89	11	82	.....	.....	74	2	.....
40	60	11	49	.....	.....	34	.....	1
41	136	8	131	2	.....	78	.....	.....
42	14	1	13	.....	.....	17	12	5
43 2	22	1	22	.....	.....	19	29	54
44	9	.....	9	.....	2	11	41	20
45	11	2	12	.....	.....	59	22	.....
1 38	2,374	226	2,217	13	15	3,145	351	230
2 26	1,232	248	988	10	6	23	.....	6
3 22	958	151	827	9	6	120	9	10
4 86	4,564	625	4,032	32	27	3,288	360	246
5 85	4,795	597	4,292	37	36	3,129	347	122
6 1	.....	28	.....	.....	.....	159	13	124
7	231	.....	260	5	9	.....	.....	.....
8 1	53.01	7.26	46.83	.....	....	38.19	4.18	.....

THE PUBLIC

IV. Table D.—School

Totals.	School Houses.					School Visits.				
	Number of Schools.	Brick.	Stone.	Frame.	Log.	By Inspector.	By Trustees.	By Clergymen.	By other persons.	Total.
1 Counties, etc.....	5,340	2,342	421	2.291	286	10 833	6,552	3,035	20,229	40,649
2 Cities	173	152	17	4	.....	2,846	1,712	429	12,729	17,716
3 Towns	245	165	27	53	.....	1,998	1,917	392	3.481	7,788
4 Grand Totals, 1904	5,758	2,659	465	2,348	286	15,677	10,181	3,856	36,439	66,153
5 Grand Totals, 1903	5,734	2,625	468	2,344	297	16,298	11,183	4,362	36,819	68,662
6 Increases.....	24	34	.....	4	.....	.....	.....	.....	.....	.....
7 Decreases	.....	.....	3	.....	11	621	1,002	506	380	2,509
8 Percentages.....	.....	46.18	8 07	40 78	4.97	23.70	15.39	5.83	55.08	.....

* In the City of Toronto there were set out 48 shrubs, 5,560 bulbs and 15,470 plants.

† To each school.

SCHOOLS.—*Continued*.

Houses, Prayers, Etc.

Maps and Globes.		Examinations. Prizes.		Lectures.							
Number of Maps.	Number of Globes.	Number of Public Examinations.	Number of Schools distributing Prizes or Merit Cards.	By Inspector.	By other persons.	Total.	Number of Trees planted on Arbor Day.	Number of Schools using authorized Scripture Readings.	Number of Schools opened or closed with Prayer.	Number of Schools using the Bible.	Number of Schools imparting Religious Instruction.
46,020	4,890	2,160	594	838	227	1,065	5,389	3,056	4,983	2,237	1,015
6,991	268	97	98	4	88	92	*	47	170	156	1
2,886	340	67	32	105	39	144	163	108	231	144	23
55,897	5,498	2,324	724	947	354	1,301	5,552	3,211	5,384	2,537	1,039
55,758	5,408	2,494	699	1,074	346	1,420	7,724	3,134	5,551	2,551	980
139	90	.....	25	.....	8	.....	.....	77	.....	.....	59
.....	.....	170	.....	127	.....	119	2,172	.....	167	14	.....
†9.71	† .95	.....	12.57	72.79	27.21	.....	....	55.76	93.5	44.06	18.04

THE PUBLIC

V.—Table E.—

Counties (including incorporated villages but not cities or towns), etc.	Receipts.			
	Legislative grants.	Municipal grants and assessments.	Clergy Reserve fund, balances and other sources	Total receipts for all Public School purposes.
	$ c.	$ c.	$ c.	$ c.
1 Brant	2,190 58	29,243 24	22,670 90	54,104 72
2 Bruce	8,091 43	98,157 08	44,297 29	150,545 80
3 Carleton	5,200 36	52,466 00	17,955 23	75,621 59
4 Dufferin	3,353 67	45,632 09	14,436 25	63,422 01
5 Dundas	3,362 18	39,364 40	11,785 54	54,512 12
6 Durham	3,219 86	44,687 54	20,905 31	68,812 71
7 Elgin	5,073 81	53,629 60	33,025 59	91,729 00
8 Essex	4,333 20	51,147 42	26,041 21	81,521 83
9 Frontenac	4,619 25	40,671 90	17,047 36	62,338 51
10 Glengarry	2,587 49	27,102 44	10,362 10	40,052 03
11 Grey	8,262 20	95,202 49	46,310 98	149,775 67
12 Haldimand	3,035 30	37,774 13	17,786 62	58,596 05
13 Haliburton, etc	10,595 55	25,975 07	11,014 86	47,585 48
14 Halton	2,607 33	27,705 85	15,627 88	45,941 06
15 Hastings	7,826 59	68,222 54	40,030 03	116,079 16
16 Huron	8,361 32	93,485 09	40,375 80	142,222 21
17 Kent	6,461 90	65,984 35	52,230 75	124,677 00
18 Lambton	6,770 58	82,772 80	50,930 65	140,474 03
19 Lanark	4,110 32	37,257 77	16,400 20	57,768 29
20 Leeds and Grenville	7,338 86	81,226 46	32,231 03	120,796 35
21 Lennox and Addington	3,681 53	35,422 17	16,854 30	55,958 00
22 Lincoln	2,800 08	35,312 22	17,657 22	55,769 52
23 Middlesex	7,060 82	88,866 81	44,500 12	140,427 75
24 Norfolk	3,797 37	44,800 70	27,578 70	76,176 77
25 Northumberland	4,146 33	49,073 44	22,688 52	75,908 29
26 Ontario	5,554 30	56,914 87	25,503 60	87,972 77
27 Oxford	4,956 36	63,726 18	40,263 12	108,945 66
28 Peel	2,738 74	38,253 49	20,008 53	61,000 76
29 Perth	4,489 23	54,728 46	25,957 36	85,175 05
30 Peterborough	4,159 93	38,535 90	14,356 83	57,052 66
31 Prescott and Russell	4,074 28	34,180 23	24,535 12	62,789 63
32 Prince Edward	2,349 70	28,633 61	15,959 93	46,943 24
33 Renfrew	6,598 48	47,265 47	19,786 54	73,650 49
34 Simcoe and W. Muskoka	15,673 63	117,313 72	58,718 36	191,705 71
35 Stormont	2,884 33	28,643 58	8,292 20	39,820 11
36 Victoria and S.E. Muskoka	8,041 66	54,166 72	18,728 52	80,936 90
37 Waterloo	4,062 50	54,825 29	47,337 14	106,224 93
38 Welland	3,290 83	37,986 61	21,382 81	62,660 25
39 Wellington	5,997 72	77,165 11	45,113 22	128,276 05
40 Wentworth	3,726 44	39,403 79	34,248 16	77,378 39
41 York	7,288 69	95,936 65	81,070 99	184,296 33
42 Rainy River and Thunder Bay	6,542 12	17,908 06	11,342 66	35,792 84
43 Algoma and Manitoulin	15,582 85	37,989 90	22,201 52	75,774 27
44 N. Nipissing, etc	8,270 00	19,845 93	10,110 23	38,226 16
45 W. Parry Sound	10,611 50	23,313 23	7,126 44	41,051 17
46 Moose Fort and Albany	200 00	.....	.....	200 00
Totals	255,981 20	2,317,920 40	1,222,787 72	3,796,689 32

SCHOOLS.—*Continued.*

Financial Statement.

	Expenditure.					
	Teachers' salaries.	Sites, and building school houses.	Libraries, maps, apparatus, prizes and school books.	Rent and repairs, fuel and other expenses.	Total expenditure for all Public School purposes.	Balances.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
	24,909 04	1,461 67	557 23	9,322 65	36,250 59	17,854 13
	74,892 30	13,545 06	1,037 16	28,415 91	117,890 43	32,655 37
	47,145 82	4,862 97	1,605 87	11,413 91	65,028 57	10,593 02
	32,929 32	1,830 62	936 17	14,689 60	50,385 71	13,036 30
	34,220 14	3,400 94	487 19	9,425 99	47,534 26	6,977 86
	37,501 83	4,322 00	250 86	10,962 63	53,037 32	15,775 39
	44,106 06	4,054 99	2,048 17	15,707 27	65,916 49	25,812 51
	41,374 07	4,264 61	402 19	15,936 96	61,977 83	19,544 00
	36,349 10	2,714 33	886 76	9,727 23	49,677 42	12,661 09
	23,001 64	1,384 78	676 77	6,000 65	31,063 84	8,988 19
	81,292 20	8,298 81	1,254 17	29,936 78	120,781 96	28,993 71
	29,821 25	2,933 09	380 97	8,815 75	41,951 06	16,644 99
	28,216 35	2,181 22	416 92	9,193 73	40,008 22	7,577 26
	26,439 54	745 07	267 31	9,783 55	37,235 47	8,705 59
	60,984 16	13,975 39	1,608 64	18,067 45	94,635 64	21,443 52
	76,759 20	8,913 07	2,290 14	24,499 28	112,461 69	29,760 52
	54,490 57	6,401 10	1,012 01	20,717 79	82,621 47	42,055 53
	68,363 02	17,445 14	1,317 31	25,335 35	112,460 82	28,013 21
	34,587 57	850 59	535 65	8,958 85	44,932 66	12,835 63
	71,690 90	5,878 37	1,055 32	19,118 69	97,743 28	23,053 07
	32,117 00	2,885 08	324 34	8,695 04	44,021 46	11,936 54
	27,477 10	749 76	862 48	12,026 53	41,115 87	14,653 65
	70,191 27	4,895 46	2,483 88	24,706 06	102,276 67	38,151 08
	38,131 52	905 35	676 14	9,920 17	49,633 18	26,543 59
	41,612 16	2,369 08	487 58	13,137 97	57,606 79	18,301 50
	47,743 24	2,756 05	1,535 00	16,484 04	68,518 33	19,454 44
	51,276 71	761 77	1,502 01	16,894 65	70,435 14	38,510 52
	30,496 68	5,585 48	1,339 42	11,515 57	48,937 15	12,063 61
	42,943 79	4,532 79	1,082 07	16,954 91	65,513 56	19,661 49
	32,826 92	4,372 65	841 72	8,892 22	46,933 51	10,119 15
	29,471 16	9,459 91	1,295 48	11,175 14	51,401 69	11,387 94
	25,304 54	1,695 90	1,938 63	5,707 57	34,646 64	12,296 60
	41,056 29	8,301 32	1,791 13	11,406 58	62,555 32	11,095 17
	99,570 35	18,462 16	3,402 58	26,023 80	147,458 89	44,246 82
	25,512 66	3,192 05	167 85	6,241 42	35,113 98	4,706 13
	46,337 88	4,359 23	1,581 30	14,526 89	66,805 30	14,131 60
	43,290 19	4,290 14	369 58	13,969 43	61,919 34	44,305 59
	33,288 93	532 94	914 01	9,516 69	44,252 57	18,407 68
	60,280 91	12,817 35	1,344 64	21,428 08	95,870 98	32,405 07
	33,256 20	5,874 03	1,495 96	11,108 14	51,734 33	25,644 06
	74,639 99	24,480 30	1,714 39	33,532 95	134,367 63	49,928 70
	16,556 68	9,441 17	748 36	6,396 01	33,142 22	2,650 62
	36,124 88	7,872 71	1,149 62	13,955 21	59,102 42	16,671 85
	17,735 20	6,779 60	441 56	9,126 55	34,082 91	4,143 25
	24,806 12	2,103 91	280 08	7,622 71	34,812 82	6,238 35
	160 00	.....	.....	40 00	200 00	.....
	1,951,282 45	258,940 01	48,796 62	647,034 35	2,906,053 43	890,635 89

THE PUBLIC

V.—Table E.—

Cities.	Receipts.			
	Legislative grants.	Municipal grants and assessments.	Clergy Reserve fund, balances and other sources.	Total receipts for all Public School purposes.
	$ c.	$ c.	$ c.	$ c.
1 Belleville	1,026 00	11,296 86	514 38	12,837 24
2 Brantford	2,367 65	38,175 30	3,744 27	44,287 22
3 Chatham	1,284 10	20,459 86	3,558 51	25,302 47
4 Guelph	2,056 45	31,158 63	825 86	34,040 94
5 Hamilton	7,127 10	119,806 72	11,628 40	138,562 22
6 Kingston	2,279 35	28,686 00	1,750 90	32,716 25
7 London	*6,770 60	98,099 76	2,523 82	107,394 18
8 Niagara Falls	844 00	11,000 00	430 98	12,274 98
9 Ottawa	5,646 45	106,762 00	20,139 98	132,548 43
10 St. Catharines	1,179 00	15,073 00	146 00	16,398 00
11 St. Thomas	1,642 00	24,103 17	1,240 19	26,985 36
12 Stratford	1,788 20	18,150 00	2,068 12	22,006 32
13 Toronto	31,233 40	593,826 00	38,083 55	663,142 95
14 Windsor	1,490 00	28,150 00	219 01	29,859 01
15 Woodstock	1,361 00	14,950 00	2,341 71	18,652 71
Totals	68,095 30	1,159,697 30	89,215 68	1,317,008 28
Towns.				
1 Alexandria	65 00	700 90	1,480 43	2,246 33
2 Alliston	352 00	2,300 00	595 13	3,247 13
3 Almonte	270 00	5,488 74	646 90	6,405 64
4 Amherstburg	330 00	2,600 00	1,629 96	4,559 96
5 Arnprior	275 00	4,062 37	4,052 26	8,389 63
6 Aurora	201 00	2,600 00	807 31	3,608 31
7 Aylmer	291 65	4,661 69	302 81	5,256 15
8 Barrie	776 00	10,556 32	425 28	11,757 60
9 Berlin	1,404 75	30,208 38	771 33	32,384 46
10 Blenheim	287 00	4,112 93	679 94	5,079 87
11 Bothwell	204 00	1,521 00	672 56	2,397 56
12 Bowmanville	339 00	4,800 00	224 14	5,363 14
13 Bracebridge	623 00	7,453 24	303 64	8,379 88
14 Brampton	495 00	4,556 93	342 88	5,394 81
15 Brockville	1,346 00	14,700 00	984 11	17,030 11
16 Bruce Mines	287 00	350 00	1,699 33	2,336 33
17 Cache Bay	69 00	695 26	4,315 20	5,079 46
18 Carleton Place	503 00	5,500 00	34 83	6,037 83
19 Clinton	427 00	3,150 00	384 33	3,961 33
20 Cobourg	386 05	6,640 00	17 73	7,043 78
21 Collingwood	850 00	13,200 00	887 78	14,937 78
22 Copper Cliff	291 00	3,879 68	1,032 92	5,203 60
23 Cornwall	471 00	6,150 10	1,191 42	7,812 52
24 Deseronto	429 00	5,300 00	359 79	6,088 79
25 Dresden	293 00	2,950 00	260 85	3,503 85
26 Dundas	324 00	5,029 00	245 83	5,598 83
27 Dunnville	269 00	3,143 40	16,528 16	19,940 56
28 Durham	558 00	3,841 56	1,174 07	5,573 63
29 East Toronto	211 00	4,200 00	1,693 53	6,104 53
30 Essex	177 00	2,374 34	43 62	2,594 96

* Grant of $1,500 *re* Normal School included.

SCHOOLS.—*Continued.*

Financial Statement.—*Continued.*

Expenditure.

	Teachers' salaries.	Sites, and building school houses.	Libraries, maps, apparatus, prizes and school books.	Rent and repairs, fuel and other expenses.	Total expenditure for all Public School purposes.	Balances.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1	9,158 36	.....	.....	3,159 46	12,317 82	519 42
2	22,804 54	7,175 30	1,575 75	12,731 63	44,287 22	.....
3	13,133 27	.....	.....	11,626 49	24,759 76	542 71
4	15,623 42	10,170 08	142 10	8,105 34	34,040 94	.....
5	87,625 89	19,426 47	5,528 28	25,924 53	138,505 17	57 05
6	21,866 15	.....	1,578 93	8,848 29	32,293 37	422 88
7	68,768 34	4,897 01	.....	33,728 83	107,394 18	.....
8	7,825 00	.....	75 35	3,495 14	11,395 49	879 49
9	76,688 60	13,210 21	3,645 40	32,285 77	125,829 98	6,718 45
10	10,707 16	495 00	.....	5,107 07	16,309 23	88 77
11	18,687 31	815 36	43 10	7,373 39	26,919 16	66 20
12	12,860 60	1,045 57	1,312 08	6,714 89	21,933 14	73 18
13	432,158 07	49,885 52	8,882 49	164,949 06	655,875 14	7,267 81
14	18,971 71	650 65	53 43	7,841 64	27,517 43	2,341 58
15	12,517 50	.....	1,073 82	4,429 39	18,020 71	632 00
	829,395 92	107,771 17	23,910 73	336,320 92	1,297,398 74	19,609 54
1	864 83	16 99	9 00	1,190 19	2,081 01	165 32
2	2,337 10	.....	.....	780 31	3,117 41	129 72
3	4,272 47	.....	4 50	1,545 62	5,822 59	583 05
4	2,745 00	685 47	....	874 71	4,305 18	254 78
5	3,675 00	.....	.....	2,033 65	5,708 65	2,680 98
6	2,274 96	.....	14 93	572 13	2,862 02	746 29
7	3,225 33	710 17	34 98	1,036 50	5,006 98	249 17
8	8,493 03	410 40	37 25	2,600 31	11,540 99	216 61
9	14,451 61	9'960 12	2,329 85	5,618 87	32,360 45	24 01
10	2,923 45	449 08	59 85	1,233 42	4 665 80	414 07
11	1,613 07	55 25	.....	349 14	2,017 46	380 10
12	4,308 68	83 89	.....	839 59	5,232 16	130 98
13	4,621 50	.....	109 34	3,262 83	7,993 67	386 21
14	4,134 09	65 85	18 00	1,160 30	5,378 24	16 57
15	10,437 17	398 38	.....	5,540 38	16,411 93	618 18
16	1,525 00	.....	.....	797 09	2,322 09	14 24
17	725 00	82 75	30 00	4,241 71	5,079 46	.....
18	4,373 14	.....	27 25	1,101 01	5,501 40	536 43
19	2,987 50	.....	.....	861 40	3,848 90	112 43
20	4,335 25	.....	.....	2,392 04	6,727 29	316 49
21	9,681 43	542 92	363 26	4,350 17	14,937 78	.....
22	2,855 00	308 49	54 35	1,577 71	4,795 55	408 05
23	5,215 60	270 06	.....	2,325 72	7,811 38	1 14
24	4,439 54	.....	3 50	1,296 10	5,739 14	349 65
25	2,941 28	.....	25 85	536 72	3,503 85	.....
26	4,314 51	.....	10 00	1,225 58	5,550 09	48 74
27	2,607 11	7,209 27	.....	621 89	10,438 27	9,502 29
28	3,301 97	1,510 38	19 00	705 39	5,536 74	36 89
29	4,635 70	.....	270 00	1,019 56	5,925 26	179 27
30	2,087 70	.....	.....	491 11	2,578 81	16 15

THE PUBLIC

V.—Table E.—

Towns.—*Continued.*	Receipts.			
	Legislative grants.	Municipal grants and assessments.	Clergy Reserve fund, balances and other sources.	Total receipts for all Public School purposes.
	$ c.	$ c.	$ c.	$ c.
31 Forest	341 00	2,500 00	526 86	3,367 86
32 Fort Frances	129 00	1,972 10	235 94	2,337 04
33 Fort William	523 00	8,434 05	1,422 94	10,379 99
34 Galt	948 35	14,900 00	628 98	16,477 33
35 Gananoque	597 00	6,237 56	424 04	7,258 60
36 Goderich	579 00	5,213 29	2,436 04	8,228 33
37 Gore Bay	487 00	1,105 00	572 20	2,164 20
38 Gravenhurst	267 00	4,685 56	64 57	5,017 13
39 Haileybury	100 00	600 00	3,137 17	3,837 17
40 Harriston	219 00	2,781 00	35 84	3,035 84
41 Hawkesbury	32 00	2,800 00	540 23	3,372 23
42 Hespeler	315 15	4,896 00	60 71	5,271 86
43 Huntsville	467 00	13,800 00	176 45	14,443 45
44 Ingersoll	970 85	6,624 50	352 02	7,947 37
45 Kincardine	441 00	4,636 08	468 58	5,545 66
46 Kingsville	252 00	3,547 61	2,754 13	6,553 74
47 Leamington	318 00	4,324 00	199 65	4,841 65
48 Lindsay	800 00	12,855 80	112 00	13,767 80
49 Listowel	335 45	4,473 00	144 24	4,952 69
50 Little Current	221 00	1,439 00	811 24	2,471 24
51 Massey	40 50	150 00	989 01	1,179 51
52 Mattawa	34 00	950 00	161 16	1,145 16
53 Meaford	393 00	4,007 00	174 93	4,574 93
54 Midland	559 00	7,000 00	549 53	8,108 53
55 Milton	490 00	2,676 58	721 12	3,887 70
56 Mitchell	376 00	3,224 00	144 23	3,744 23
57 Mount Forest	401 00	3,654 00	354 54	4,409 54
58 Napanee	498 00	5,750 00	260 45	6,508 45
59 New Liskeard	121 00	1,800 00	492 19	2,413 19
60 Newmarket	409 00	3,875 00	765 71	5,049 71
61 Niagara	174 00	2,100 00	459 36	2,733 36
62 North Bay	282 00	4,938 00	389 18	5,609 18
63 North Toronto	284 00	4,974 72	262 49	5,521 21
64 Oakville	186 00	3,548 99	42 16	3,777 15
65 Orangeville	462 00	4,437 00	452 55	5,351 55
66 Orillia	485 00	8,300 00	6,767 44	15,552 55
67 Oshawa	466 00	6,800 00	1,050 70	8,316 70
68 Owen Sound	1,252 55	17,022 00	1,440 65	19,715 20
69 Palmerston	271 00	3,529 00	42 60	3,842 60
70 Paris	368 00	5,200 00	34 58	5,602 58
71 Parkhill	138 00	2,245 00	154 56	2,537 56
72 Parry Sound	1,040 00	8,162 50	126 47	9,328 97
73 Pembroke	325 00	4,961 76	9 00	5,295 76
74 *Penetanguishene	338 00	3,774 02	651 58	4,763 60
75 Perth	459 00	4,405 24	169 63	5,033 87
76 Peterborough	1,363 30	23,000 00	5,945 71	30,309 01
77 Petrolea	475 00	8,500 00	2 76	8,977 76
78 Picton	549 50	5,500 00	4,135 86	10,185 36
79 Port Arthur	401 00	7,495 00	153 21	8,049 21
80 Port Hope	648 00	6,941 35	467 40	8,056 75
81 Prescott	434 00	3,340 81	314 73	4,089 54

* Including Protestant Separate School.

SCHOOLS.—*Continued.*

Financial Statement.—*Continued.*

Expenditure.					
Teachers' salaries.	Sites, and building school houses.	Libraries, maps, apparatus, prizes and school books.	Rent and repairs, fuel, and other expenses.	Total expenditure for all Public School purposes.	Balances.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
2,665 00	.....	82 91	364 46	3,112 37	255 49
1,447 75	.....	117 07	755 95	2,320 77	16 27
5,966 20	910 30	184 01	3,319 48	10,379 99	.....
11,305 00	150 50	97 45	4,924 38	16,477 33	....
5,124 97	.....	167 70	1,920 33	7,213 00	45 60
4,534 40	2,291 04	34 90	1,367 99	8,228 33	.....
1,800 00	.....	.....	317 88	2,117 88	46 32
3,322 63	447 95	12 55	1,234 00	5,017 13	... .
532 50	2,464 70	.....	790 97	3,788 17	49 00
2,020 00	73 58	4 75	679 47	2,777 80	258 04
1,272 50	500 00	.....	763 14	2,535 64	836 59
3,450 00	298 37	25 37	1,498 12	5,271 86	.....
3,027 57	10,020 76	30 04	724 59	13,802 96	640 49
5,775 00	.....	61 81	2,081 89	7,918 70	28 67
3,351 25	.....	.....	1,406 37	4,757 62	788 04
2,977 09	85 20	48 60	3,410 45	6,521 34	32 40
2,949 28	413 00	.....	983 69	4,345 97	495 68
9,242 34	.....	.....	4,228 12	13,470 46	297 34
3,249 02	.....	.....	1,450 19	4,699 21	253 48
1,447 58	.....	8 10	574 10	2,029 78	441 46
851 08	.....	.....	280 45	1,131 53	47 98
866 17	.....	.....	278 99	1,145 16	.....
3,355 00	.....	.....	1,219 93	4,574 93	.....
5,531 50	925 00	.....	1,333 89	7,790 39	318 14
2,851 52	223 00	.....	420 98	3,495 50	392 20
2,992 98	.....	33 44	647 86	3,674 28	69 95
3,211 09	.....	.....	1,194 03	4,405 12	4 42
4,386 30	.....	20 70	1,369 25	5,776 25	732 20
1,343 00	130 00	30 00	854 99	2,357 99	55 20
2,768 00	.....	.....	2,256 78	5,024 78	24 93
1,485 00	.....	15 00	983 47	2,483 47	249 89
2,790 00	.....	75 00	2,744 06	5,609 06	12
3,421 91	412 17	71 00	1,489 46	5,394 54	126 67
2,022 40	.....	31 00	1,723 75	3,777 15	.....
3,957 32	.....	13 95	1,379 19	5,350 46	1 09
6,871 68	.....	77 28	2,205 74	9,154 70	6,397 74
5,193 60	947 55	353 05	1,822 50	8,316 70	.....
12,114 50	2,516 02	50 44	2,963 46	17,644 42	2,070 78
2,760 00	.....	.....	1,012 60	3,772 60	70 00
3,940 75	.....	.....	1,625 63	5,566 38	36 20
1,575 00	.....	13 00	562 74	2,150 74	386 82
5,010 07	1,965 83	440 46	1,729 39	9,145 75	183 22
4,052 31	.....	38 20	1,205 25	5,295 76	.....
3,428 66	258 50	5 00	873 49	4,565 65	297 95
3,655 00	.....	.....	1,314 81	4,969 81	64 06
16,871 96	51 80	53 00	13,332 25	30,309 01	.....
6,361 35	.....	.....	2,475 05	8,836 40	141 36
4,748 48	.....	284 35	2,113 61	7,146 44	3,038 92
5,327 35	2 65	102 08	2,349 64	7,781 72	267 49
6,305 00	.....	29 00	1,722 75	8,056 75	.....
3,162 83	.....	26 80	841 04	4,030 67	58 87

THE PUBLIC

V.—Table E.

Towns.—*Concluded.*	Receipts.		
	Legislative grants.	Municipal grants and assessments.	Clergy Reserve fund, balances and other sources.	Total receipts for all Public School purposes.
	$ c.	$ c.	$ c.	$ c.
82 Preston	265 30	3,000 00	1,321 52	4,586 82
83 Rainy River	136 00	2,250 00	630 58	3,016 58
84 Rat Portage (Kenora)	754 00	10,088 56	28 00	10.870 56
85 Renfrew	386 00	4,253 26	274 94	4,914 20
86 Ridgetown	274 00	3,654 12	55 94	3,984 06
87 St. Mary's	418 00	5,000 00	527 94	5,945 94
88 Sandwich	88 00	.....	1,274 87	1,362 87
89 Sarnia	1,005 00	28,618 36	924 24	30,547 60
90 Sault Ste. Marie	1,129 00	11,511 00	575 68	13.215 68
91 Seaforth	210 00	2,800 00	936 84	3,946 84
92 Simcoe	535 45	3,979 01	769 46	5,283 92
93 Smith's Falls	727 00	9,120 12	10 19	9,857 31
94 Stayner	339 00	3,860 00	195 18	4,394 18
95 Steelton	151 50	9,526 27	57 99	9,735 76
96 Strathroy	523 00	4,746 00	114 53	5,383 53
97 Sturgeon Falls	155 00	3,192 04	206 59	3,553 63
98 Sudbury	128 00	2,700 00	1,098 17	3,926 17
99 Thessalon	232 00	2,130 00	42 24	2,404 24
100 Thornbury	95 00	1,840 85	41 74	1,977 59
101 Thorold	166 00	2,850 00	54 87	3,070 87
102 Tillsonburg	292 15	4,848 96	37 66	5,178 77
103 Toronto Junction	1,181 60	31.961 08	699 63	33,842 31
104 Trenton	461 00	4,478 74	821 81	5,761 55
105 Uxbridge	192 00	2,688 98	229 25	3,110 23
106 Vankleekhill	277 00	2,837 75	312 80	3,427 55
107 Walkerton	402 00	4,037 58	199 44	4,639 02
108 Walkerville	428 00	7,500 00	35 91	7,963 91
109 Wallaceburg	509 00	5,170 00	320 79	5,999 79
110 Waterloo	379 90	7,100 00	133 50	7,613 40
111 Welland	360 45	2,900 00	2,124 74	5,385 19
112 Whitby	393 00	4,550 00	70 24	5,013 24
113 Wiarton	297 00	3,750 00	334 69	4,381 69
114 Wingham	475 00	3,700 25	508 50	4,683 75
Totals	48,235 45	647,455 29	101,547 86	797,238 60
Totals.				
1 Counties, etc	255,981 20	2,317,920 40	1,222,787 72	3,796,689 32
2 Cities	68,095 30	1,159,697 30	89,215 68	1,317,008 28
3 Towns	48,235 45	647,455 29	101,547 86	797,238 60
4 Grand totals, 1904	372,311 95	4,125,072 99	1,413,551 26	5,910,936 20
5 " 1903	357,964 25	3,957,108 16	1,273,539 07	5,588,611 48
6 Increases	14,347 70	167,964 83	140,012 19	322,324 72
7 Decreases	.....	.....	.....	.....
8 Percentages	6.3	69.79	23.91	.....

Cost per pupil, enrolled attendance : Counties, etc., $10.94 ; Cities, $19.06 ;

SCHOOLS.—*Concluded.*

Financial Statement.—*Concluded.*

Expenditure.					Balances.
Teachers' salaries.	Sites, and building school houses.	Libraries, maps, apparatus, prizes and school books.	Rent and repairs, fuel, and other expenses.	Total expenditure for all Public School purposes.	
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
3,233 00	.....	.....	992 45	4,225 45	361 37
905 53	895 12	65 25	1,126 18	2,992 08	24 50
6,965 00	66 20	.....	2,850 59	9,881 79	988 77
3,634 80	11 26	14 82	929 25	4,590 13	324 07
2,996 05	.....	13 20	935 38	3,944 63	39 43
4,067 59	5 40	.....	1,872 95	5,945 94	.....
912 50	.....	.....	342 92	1,255 42	107 45
9,675 48	16,189 22	89 46	4,593 44	30,547 60	.....
8,869 81	.....	.....	4,312 74	13,182 55	33 13
2,420 00	.....	34 28	992 19	3,446 47	500 37
4,199 50	1 37	151 29	498 70	4,850 86	433 06
7,047 75	.....	148 59	2,660 97	9,857 31	.....
2,169 32	1 10	33 53	2,071 89	4,275 84	118 34
4,326 49	1,085 80	138 54	3,449 09	8,999 92	735 84
4,056 25	.....	77 40	1,243 58	5,377 23	6 30
1,750 98	29 30	7 25	1,280 45	3,067 98	485 65
1,972 50	.....	96 96	1,744 66	3,814 12	112 05
1,960 00	.....	.....	437 44	2,397 44	6 80
1,416 99	.....	4 90	554 95	1,976 84	75
2,029 67	.....	.....	1,037 72	3,067 39	3 48
3,368 00	.....	.....	1,810 77	5,178 77	.....
13,550 00	9,381 50	.....	10,386 39	33,317 89	524 42
3,666 12	.....	177 00	1,528 51	5,371 63	389 92
2,473 21	.....	.....	603 47	3,076 68	33 55
1,964 00	1 25	.....	727 40	2,692 65	734 90
3,540 78	.....	.....	971 82	4,512 60	126 42
4,726 68	342 70	229 03	1,784 00	7,082 41	881 50
4,687 00	.....	110 75	1,034 90	5,832 65	167 14
5,133 37	.....	178 28	2,216 00	7,527 65	85 75
2,314 50	296 00	.....	722 92	3,333 42	2,051 77
3,700 00	.....	13 70	1,250 98	4,964 68	48 56
3,410 00	.....	.....	936 14	4,346 14	35 55
3,642 10	.....	.....	832 98	4,475 08	208 67
465,895 88	76,153 61	7,643 15	200,037 57	749,730 21	47,508 39
1,951.282 45	258,940 01	48,796 62	647,034 35	2,906,053 43	890,635 89
829,395 92	107,771 17	23,910 73	336,320 92	1,297,398 74	19,609 54
465,895 88	76,153 61	7,643 15	200,037 57	749,730 21	47,508 39
3,246,574 25	442,864 79	80,350 50	1,183,392 84	4,953,182 38	957,753 82
3,096,132 36	347,955 03	67,515 56	1,141,947 39	4,653,550 34	935,061 14
150,441 89	94,909 76	12,834 94	41,445 45	299,632 04	22,692 68
.....	.....	.....	.....	.....	.....
65.55	8.94	1.62	23.89	.....	.....

...wns, $11.85; Province, $12.48.

ROMAN CATHOLIC

I.—Table F.—Financial Statement,

Counties, (including incorporated villages, but not cities or towns), etc.	Number of Schools.	Receipts. Legislative grants.	Municipal grants and assessments.	Balances, subscribed and other sources.	Total amount received.	Expenditure. Teachers' salaries.
		$ c.	$ c.	$ c.	$ c.	$ c.
1 Bruce	7	463 50	4,590 69	2.138 98	7,193 17	3,736 66
2 Carleton	16	949 00	8,358 63	1,480 20	10.782 83	5,427 62
3 Essex	26	1,391 00	13,805 25	7,733 79	22,930 04	11.252 95
4 Frontenac	12	548 00	3,523 67	883 97	4,955 64	3,060 00
5 Grey	7	275 00	2,190 46	910 97	3,376 43	1,861 50
6 Hastings	7	307 00	1,810 09	789 32	2,906 41	1,830 00
7 Huron	9	258 00	4,187 86	3,427 50	7.873 36	2,964 00
8 Kent	10	398 26	4,530 96	2,810 34	7.739 56	3,525 65
9 Lambton	2	61 00	647 05	127 37	835 42	550 00
10 Lanark	3	125 00	794 25	158*96	1,078 21	755 00
11 Leeds and Grenville	5	248 00	1,535 48	406 84	2,190 32	1,510 50
12 Lennox and Addington	2	112 00	573 12	85 76	770 88	560 00
13 Lincoln	2	75 00	1,101 02	290 19	1,466 21	800 00
14 Middlesex	6	171 00	1,992 01	376 35	2,539 36	1,687 90
15 Norfolk	1	46 00	452 12	288 51	786 63	350 00
16 Northumberland	6	315 00	2,221 42	1.022 25	3,558 67	1,895 00
17 Ontario	1	75 00	321 96	761 34	1,158 30	750 00
18 Peel	1	53 00	136 22	38 87	228 09	220 00
19 Perth	7	194 00	3,246 19	2,049 37	5,489 56	2,366 25
20 Peterborough	1	51 00	356 36	4 53	411 89	261 56
21 Prescott and Russell	73	2,848 00	25,135 38	12.956 28	40,939 66	20,586 86
22 Renfrew	12	1,090 00	3,416 88	3,263 18	7,770 06	3,547 83
23 Simcoe	3	212 00	1,192 58	292 84	1,697 42	1,115 00
24 Stormont, Dundas and Glengarry	13	673 00	4,481 09	3,980 03	9,134 12	4,474 82
25 Waterloo	7	304 00	4,818 82	3,562 88	8,685 70	2,955 00
26 Wellington	8	285 00	3,458 92	985 18	4,729 10	2,530 00
27 Wentworth	1	41 00	125 00	87 56	253 56	225 00
28 York	2	48 00	539 44	460 11	1,047 55	520 00
29 Districts	23	2,486 00	5,440 80	4,591 15	12,517 95	6,017 42
Totals	273	14,102 76	104,978 72	55,964 62	175,046 10	87,336 52
Cities						
1 Belleville	2	286 00	2,115 88	150 51	2,552 39	1,735 00
2 Brantford	2	240 00	1,946 25	1,019 03	3,205 28	1,150 00
3 Chatham	1	199 00	2,469 33	1,222 07	3.890 40	1.249 98
4 Guelph	3	258 00	3,476 83	133 08	3,867 86	1,900 00
5 Hamilton	8	1,120 00	11,800 00	1,427 07	14,347 07	7,765 00
6 Kingston	3	459 00	11,728 08	3,473 81	15,660 89	3,972 13
7 London	7	704 00	8,446 51	3,255 87	12,406 38	3,466 67
8 Niagara Falls	1	112 00	922 37	1,478 13	2,512 50	600 00
9 Ottawa	23	3,975 00	48,750 00	46,834 01	99,559 01	29,607 80
10 St. Catharines	3	272 00	4,090 82	93 87	4,456 69	2,040 00
11 St. Thomas	1	185 00	1,913 95	4,824 93	6,923 88	1,000 00
12 Stratford	1	247 00	2,516 40	992 48	3,755 88	1,300 00
13 Toronto	22	3,787 00	50,385 36	11,306 33	65,478 69	23,200 00
14 Windsor	2	492 00	6,336 00	.....	6,828 00	5,428 20
15 Woodstock	1	66 00	485 50	448 50	1,000 00	600 00
Totals	80	12,402 00	157,383 28	76,659 64	246,444 92	85,014 78

SEPARATE SCHOOLS.

Teachers, Etc.

ture.					Teachers.				
Sites and building school houses.	Libraries, maps, apparatus, prizes and school books.	All other purposes.	Total amount expended.	Balances.	Number of Teachers.	Male.	Female.	Average salary, male.	Average salary, female (in addition members of Religious Orders received free residence).
$ c.	$ c.	$ c.	$ c.	$ c.				$	$
302 42	87 46	1,681 10	6,007 64	1,185 53	15	4	11	380	200
2,005 30	247 88	1,708 23	9,384 03	1,398 80	29	.....	29	.....	214
885 02	366 37	8,233 57	20,737 91	2,192 13	40	6	34	346	267
405 55	16 25	774 38	4,256 18	699 46	12	3	9	237	261
76 00	40 47	447 47	2,425 44	950 99	7	1	6	300	284
16 10	.....	455 54	2,301 64	604 77	7	1	6	240	265
2,869 86	35 80	761 37	6,690 83	1,242 53	10	.....	10	.....	302
1,508 39	80 18	1,319 54	6,433 76	1,305 80	12	2	10	437	271
8 12	.....	125 08	683 20	152 22	2	.....	2	.....	275
175 36	.....	84 04	1,014 40	63 81	3	1	2	280	237
22 05	.....	617 37	2,149 92	40 40	8	1	7	250	189
116 02	6 75	58 42	741 19	29 69	2	1	1	225	335
343 00	20 90	249 45	1,413 35	52 86	4	.....	4	.....	200
160 96	8 12	406 86	2,263 84	275 52	6	1	5	300	268
.....	20 65	50 00	420 65	365 98	1	.....	1	.....	350
467 00	30 79	612 16	3,004 95	558 72	7	.....	7	.....	271
269 01	.....	127 31	1,146 32	11 98	2	1	1	500	250
.....	.....	7 87	227 87	22	1	.....	1	.....	220
1,305 06	131 97	944 32	4,747 60	741 96	8	1	7	315	302
4 95	29 20	84 39	330 10	81 79	1	.....	1	.....	260
7,197 55	551 58	4,454 11	32,790 40	8,149 26	95	10	85	300	222
673 11	323 21	760 09	5,304 24	2,465 82	15	.....	15	.....	233
50 00	.....	348 28	1,513 28	184 14	5	1	4	425	187
2,653 50	342 57	818 59	8,289 48	844 64	18	1	17	300	266
1,616 82	1 75	1,161 57	5,735 14	2,950 56	12	1	11	400	232
737 13	41 45	583 39	3,891 97	837 13	10	.....	10	.....	253
3 12	6 44	19 00	253 56	.....	1	.....	1	.....	225
.....	17 25	205 77	748 02	304 53	2	.....	2	.....	210
2,301 35	327 19	1,985 72	10,581 68	1,936 27	25	3	22	358	245
26,372 55	2,734 53	28,979 99	145,423 59	29,622 51	360	39	321	328	242
70 00	.....	531 50	2,336 50	215 89	6	1	5	600	200
624 97	.....	1,232 43	3,007 40	197 88	5	.....	5	.....	230
1,286 29	29 20	1,118 98	3,686 45	208 95	7	.....	7	.....	200
515 88	142 55	1,238 61	3,792 04	75 82	8	.....	8	.....	237
2,415 75	985 05	2,678 34	13,839 14	507 93	37	.....	37	.....	190
1,999 27	147 00	4,235 27	10,293 67	5,367 22	13	1	12	700	240
6,139 87	150 00	2,526 00	12,282 54	123 84	20	.....	20	.....	208
900 00	.....	810 50	2,310 50	202 00	3	.....	3	.....	200
39,028 60	689 91	30,232 70	99,559 01	.....	125	38	87	408	240
1,292 50	.....	1,124 19	4,456 69	.....	9	1	8	600	180
5,499 84	15 00	400 82	6,915 66	8 22	5	.....	5	.....	200
895 25	85 20	1,354 26	3,634 71	121 17	6	.....	6	.....	217
12,479 56	1,365 25	25,368 36	62,413 17	3,065 52	105	26	79	323	200
730 00	66 80	603 00	6,828 00	.....	13	.....	13	.....	400
.....	.....	400 00	1,000 00	.....	2	.....	2	.....	300
73,819 78	3,675 96	73,844 96	286,355 48	10,089 44	364	67	297	385	223

ROMAN CATHOLIC

I.—Table F.—Financial

Towns.	Number of schools.	Receipts.				Expenditure.
		Legislative grants.	Municipal grants and assessments.	Balances, subscribed and from other sources.	Total amount received.	Teachers' salaries.
		$ c.	$ c.	$ c.	$ c.	$ c.
1 Alexandria	2	185 00	2,243 69	575 35	3,004 04	1,750 00
2 Almonte	1	85 00	1,113 50	90 00	1,288 50	800 00
3 Amherstburg	1	234 00	899 75	2,510 59	3,644 34	1,695 00
4 Arnprior	2	174 00	2,189 77	3,818 52	6,182 29	1,596 00
5 Barrie	1	116 00	1,410 65	1,273 17	2,799 82	900 00
6 Berlin	1	291 00	3,740 03	366 76	4,397 79	1,750 00
7 Brockville	1	256 00	2,617 16	418 76	3,291 92	1,800 00
8 Cobourg	1	141 00	1,000 00	144 65	1,285 65	900 00
9 Cornwall	3	407 00	5,049 14	1,422 75	6,878 89	4,130 00
10 Dundas	1	91 00	915 97	542 40	1,549 37	600 00
11 Fort Frances	1	15 00	242 50	.....	257 50	142 50
12 Fort William	1	171 00	1,267 92	362 60	1,801 52	900 00
13 Galt	1	62 00	580 94	54 83	697 77	325 00
14 Goderich	1	58 00	529 80	34 62	622 42	400 00
15 Hawkesbury	2	226 00	4,000 00	259 73	4,485 73	2,400 00
16 Ingersoll	1	57 00	835 17	145 33	1,037 50	575 00
17 Lindsay	2	210 00	2,570 01	57 56	2,837 57	2,250 00
18 Mattawa	1	167 00	5,492 67	3,740 62	9,400 29	1,709 07
19 Newmarket	1	32 00	258 68	209 50	500 18	300 00
20 North Bay	2	159 00	1,890 00	11,334 83	13,383 83	1,322 29
21 Oakville	1	23 00	234 35	54 10	311 45	250 00
22 Orillia	1	130 00	1,672 24	1,480 60	3,282 84	1,195 00
23 Oshawa	1	57 00	440 80	61 38	559 18	438 28
24 Owen Sound	1	70 00	1,023 29	1,059 41	2,152 70	500 00
25 Paris	1	52 00	434 41	482 86	969 27	400 00
26 Parkhill	1	29 00	211 28	211 01	451 29	315 00
27 Pembroke	1	289 00	3,374 73	283 82	3,947 55	2,474 25
28 Perth	1	143 00	1,028 20	148 00	1,319 20	800 00
29 Peterborough	3	479 00	5,521 50	435 97	6,436 47	4,064 00
30 Picton	1	38 00	499 39	501 63	1,039 02	440 00
31 Port Arthur	1	143 00	1,470 00	1,619 22	3,232 22	1,200 00
32 Prescott	1	102 00	1,251 26	1,227 31	2,580 57	1,224 96
33 Preston	1	54 00	834 00	358 10	1,246 10	365 70
34 Rainy River	1	34 00	550 00	.....	584 00	330 00
35 Rat Portage (Kenora)	2	102 00	2,100 00	139 07	2 341 07	1,498 00
36 Renfrew	2	157 00	1,134 92	1,540 22	2,832 14	1,546 18
37 St. Mary's	1	46 00	381 13	259 77	686 90	350 00
38 Sandwich	1	110 00	2,338 80	303 88	2,752 18	947 74
39 Sarnia	2	117 00	1,045 98	614 81	1,777 79	920 00
40 Sault Ste. Marie	1	143 00	2,000 82	251 34	2,395 16	1,200 00
41 Seaforth	1	47 00	617 17	83 91	748 08	552 50
42 Steelton	4	100 00	530 00	.....	630 00	558 00
43 Sturgeon Falls	1	153 00	1,620 64	14,460 20	16,233 84	1,212 50
44 Sudbury	1	137 00	1,898 63	10 00	2,045 63	1,100 00
45 Thorold	1	83 00	825 00	43 66	951 66	600 00
46 Trenton	1	129 00	1,265 00	147 47	1,541 47	700 00
47 Vankleekhill	1	152 00	882 00	438 75	1,472 75	1,000 00
48 Walkerton	1	113 00	690 04	204 16	1,007 20	600 00
49 Wallaceburg	1	69 00	747 00	665 52	1,481 52	958 02
50 Waterloo	1	75 00	1,100 00	242 50	1,417 50	500 00
51 Whitby	1	32 00	222 72	115 84	370 56	300 00
Totals	66	6,545 00	76,792 15	54,807 08	138,144 23	54,784 99
Totals.						
*1 Counties, etc	273	14,102 76	104,978 72	55,964 62	175,046 10	87,336 52
2 Cities	80	12,402 00	157,383 28	76,659 64	246,444 92	85,014 78
3 Towns	66	6,545 00	76,792 15	54,807 08	138,144 23	54,784 99
4 Grand totals, 1904	419	33,049 76	339,154 15	187,431 34	559,635 25	227,136 29
5 Grand totals, 1903	412	32,191 60	306,784 98	133,418 48	472,395 06	213,860 74
6 Increases	7	858 16	32,369 17	54,012 86	87,240 19	13,275 55
7 Decreases	.....	.....	.....	.....	.....	.....
8 Percentages	.....	5.91	60.6	33.49	.....	44.86

* In incorporated villages included with Counties, etc., there were 48 teachers, all female. Note—Cost per

SEPARATE SCHOOLS.—*Continued.*

Statement, Teachers, etc.—*Concluded.*

Fire.	Sites, and building school houses.	Libraries, maps, apparatus, prizes, and school books	All other purposes.	Total amount expended.	Balances.	Teachers. Number of teachers.	Male.	Female.	Average salary, male.	Average salary, female. (In addition members of Religious Orders receive free residence.)
	$ c.	$ c.	$ c.	$ c.	$ c.				$	$
	594 28	71 80	733 96	2,950 04	54 00	8	.....	8	.....	219
	170 00	35 00	264 00	1,269 00	19 50	3	.....	3	.....	266
	18 30	.....	1,894 41	3,607 71	36 63	7	.....	7	.....	242
	3,483 18	.....	557 29	5,636 47	545 82	7	1	6	450	200
	320 97	.....	1,527 74	2,748 71	51 11	4	.....	4	.....	225
	1,190 65	213 50	858 34	4,012 49	385 30	9	.....	9	.....	200
	.....	66 71	785 56	2,652 27	639 65	8	.....	8	.....	225
	.....	.....	369 15	1,269 15	16 50	4	.....	4	.....	225
	50 00	33 26	2,115 91	6,329 17	549 72	15	1	14	720	244
	205 00	.....	363 42	1,168 42	380 95	3	.....	3	.....	200
	.....	.....	.....	142 50	115 00	1	.....	1	.....	425
	46 00	.....	855 52	1,801 52	.....	3	.....	3	.....	300
	182 47	7 00	176 71	691 18	6 59	1	.....	1	.....	325
	.....	10 00	206 45	616 45	5 97	2	.....	2	.....	200
	175 00	.....	1,457 28	4,082 28	453 45	13	.....	13	.....	200
	160 00	12 78	234 28	982 06	55 44	2	.....	2	.....	287
	.....	.....	516 84	2,766 84	70 73	7	1	6	750	250
	3,199 40	55 82	4,436 00	9,400 29	.....	5	1	4	750	225
	.....	.....	98 94	398 94	101 24	1	.....	1	.....	300
	11,419 72	.....	641 82	13,383 83	.....	4	.....	4	.....	381
	.....	.....	52 15	302 15	9 30	1	.....	1	.....	250
	.....	10 30	439 56	1,644 86	1,687 98	4	.....	4	.....	299
	.....	7 15	118 76	559 18	.....	2	.....	2	.....	200
	228 80	4 30	155 00	888 10	1,264 60	2	.....	2	.....	250
	.....	.....	88 69	488 69	480 58	2	.....	2	.....	200
	.....	20 00	115 65	450 65	64	1	.....	1	.....	340
	299 23	6 65	792 44	3,562 57	384 98	10	1	9	600	214
	205 04	5 00	309 16	1,319 20	.....	4	.....	4	.....	200
	459 13	16 81	1,896 58	6,436 47	.....	14	1	13	650	272
	.....	.....	68 81	508 81	530 21	2	.....	2	.....	225
	1,296 66	.....	681 00	3,127 66	104 56	4	.....	4	.....	300
	2 95	.....	303 09	1,531 00	1,049 57	4	.....	4	.....	318
	282 50	.....	116 06	744 26	501 84	1	.....	1	.....	350
	121 09	32 00	84 30	567 39	16 61	1	1	.....	750	.....
	130 00	.....	363 46	1,991 46	349 61	4	2	2	475	325
	1 70	.....	946 62	2,494 50	337 64	6	.....	6	.....	257
	25 00	6 00	80 93	411 93	274 97	1	.....	1	.....	350
	80 00	1 75	1,193 84	2,223 33	528 85	4	.....	4	.....	237
	12 00	27 30	288 00	1,247 30	580 49	4	.....	4	.....	230
	81 00	22 40	842 51	2,095 91	299 25	4	.....	4	.....	300
	.....	.....	128 87	681 87	66 71	2	.....	2	.....	295
	.....	.....	66 30	624 30	5 70	4	.....	4	.....	275
	10,730 89	362 66	3,927 79	16,233 84	.....	5	2	3	300	200
	350 63	75 27	302 79	1,828 69	216 94	4	.....	4	.....	275
	45 00	58 00	237 87	940 87	10 97	3	.....	3	.....	200
	175 00	.....	587 48	1,412 48	128 99	4	.....	4	.....	175
	.....	64 90	.....	1,064 90	407 85	6	.....	6	.....	167
	.....	.....	314 12	914 12	93 08	4	.....	4	.....	150
	.....	.....	277 52	1,285 54	245 98	2	1	1	550	325
	129 72	10 00	131 00	770 72	646 78	3	.....	3	.....	167
	7 25	.....	63 31	370 56	.....	1	.....	1	.....	300
	35,596 56	1,236 36	32,912 22	124,582 18	18,612 10	220	12	208	564	239
	25,372 55	2,734 53	28,979 99	145,423 59	29,622 51	360	39	321	328	242
	73,819 78	3,675 96	73,844 96	236,355 48	10,089 44	364	67	297	385	223
	35,596 56	1,236 36	32,912 22	124,582 13	18,612 10	220	12	208	564	239
	135,790 89	7,646 85	135,737 17	506,311 20	58,324 05	944	118	826	384	234
	90,861 61	6,970 05	122,626 59	424,318 99	48,076 07	896	98	798	391	228
	54,929 28	676 80	13,110 58	81,992 21	5,247 98	48	20	28	.....	6
	.....	.....	.....	.....	.....	.....	.....	.....	7	.....
	26.82	1.51	26.61	.....	.....	.....	12.5	87.5	.....	.....

[1] Enrolled attendance: Counties, etc., $8.19; Cities, $13.31; Towns, $10.14; Province, $10.59.

ROMAN CATHOLIC

II. Table G.—Attendance, pupils in the

Counties (including incorporated villages but not cities or towns) etc.	Number of pupils.	Boys.	Girls.	Average daily attendance.	Percentage of average to total attendance.	Reading.						Writing.	Arithmetic.
						First Reader, Part I.	First Reader, Part II.	Second Reader.	Third Reader.	Fourth Reader.	Fifth Reader.		
1 Bruce	771	406	365	532	69	145	106	174	186	160	....	771	771
2 Carleton	1,559	738	821	931	60	480	296	313	305	153	12	1,559	1,559
3 Essex	2,233	1,201	1,032	1,288	58	739	379	421	409	273	12	2,233	2,233
4 Frontenac	404	207	197	216	53	92	45	67	73	112	15	404	404
5 Grey	263	119	144	104	40	50	33	63	57	58	2	263	263
6 Hastings	249	126	123	128	51	59	28	48	51	58	5	249	249
7 Huron	435	228	207	236	54	102	48	62	90	106	27	435	435
8 Kent	640	325	315	290	45	224	116	101	88	87	24	640	640
9 Lambton	58	31	27	32	55	9	9	8	18	14	....	58	58
10 Lanark	99	55	44	45	45	25	25	13	22	14	....	99	99
11 Leeds and Grenville	221	104	117	124	56	46	25	28	49	27	46	221	221
12 Lennox&Addington	73	37	36	40	55	14	6	22	15	14	2	73	73
13 Lincoln	136	65	71	94	69	36	17	19	37	27	....	136	136
14 Middlesex	169	91	78	90	53	20	17	27	44	47	14	169	169
15 Norfolk	74	30	44	51	68	19	13	8	15	19	....	74	74
16 Northumberland	240	122	118	143	60	73	18	37	58	47	7	240	240
17 Ontario	78	34	44	44	56	10	13	14	18	22	6	78	78
18 Peel	23	12	11	5	22	6	1	3	8	5	....	23	23
19 Perth	410	229	181	231	56	71	46	83	96	111	3	410	410
20 Peterborough	32	18	14	15	47	10	3	6	5	8	....	32	32
21 Prescott & Russell	5,478	2,715	2,763	3,079	56	2,520	1,107	922	628	285	16	5,478	5,478
22 Renfrew	746	372	374	382	51	212	148	113	124	106	43	746	746
23 Simcoe	188	92	96	106	56	56	31	26	38	31	6	188	188
24 Stormont, Dundas & Glengarry	1,008	502	506	482	48	411	137	203	128	113	16	1,008	1,008
25 Waterloo	595	313	282	347	58	143	74	164	162	47	5	595	595
26 Wellington	407	211	196	249	61	78	76	64	81	100	8	407	407
27 Wentworth	14	8	6	4	29	2	2	5	2	3	....	14	14
28 York	83	43	40	49	59	23	17	37	2	4	....	83	83
29 Districts	1,075	526	549	499	46	506	244	184	111	30	....	1,075	1,075
Totals	17,761	8,960	8,801	9,836	55	6,181	3,080	3,235	2,915	2,081	269	17,761	17,761
Cities.													
1 Belleville	379	189	190	246	65	68	62	65	72	112	....	379	379
2 Brantford	336	176	160	227	67	59	50	83	74	70	....	336	336
3 Chatham	334	188	146	234	70	87	54	46	85	62	....	334	334
4 Guelph	370	182	188	291	79	54	66	101	80	69	....	370	370
5 Hamilton	1,712	870	842	1,200	70	485	261	300	332	227	107	1,712	1,712
6 Kingston	734	401	333	517	70	146	116	156	169	147	....	734	734
7 London	784	384	400	601	77	144	197	157	126	160	....	784	784
8 Niagara Falls	153	88	65	106	69	26	17	34	40	36	....	153	153
9 Ottawa	5,856	2,853	3,003	3,776	64	1,510	1,493	1,159	991	620	83	5,856	5,856
10 St. Catharines	352	192	160	256	73	87	33	68	72	92	....	352	352
11 St. Thomas	234	120	114	190	81	53	28	52	43	58	....	234	234
12 Stratford	319	162	157	236	74	87	53	55	48	76	....	319	319
13 Toronto	5,297	2,734	2,563	3,608	68	1,353	674	1,229	1,137	669	235	5,297	5,297
14 Windsor	799	395	404	560	70	188	145	220	166	80	....	799	799
15 Woodstock	103	49	54	69	67	18	15	21	26	23	....	103	103
Totals	17,762	8,963	8,779	12,117	68	4,365	3,264	3,746	3,461	2,501	425	17,762	17,762

SEPARATE SCHOOLS.—*Continued.*

various branches of instruction, Maps, etc.

Drawing.	Geography.	Music.	Grammar and Composition.	English History.	Canadian History.	Temperance and Hygiene.	Drill and Calisthenics.	Bookkeeping.	Algebra.	Geometry.	Botany.	Elementary Physics.	Agriculture.	Maps and prizes. Number of maps.	Maps and prizes. Number of schools giving prizes.	Number of trees planted on Arbor Day.
726	545	545	516	162	334	363	545	6	....	....	....	....	....	61	8	13
1,381	810	548	816	251	510	241	956	12	12	12	2	2	122	122	7	28
2,122	1,325	1,312	1,223	437	613	920	1,408	12	12	12	37	....	132	202	10	51
387	277	170	284	112	190	160	377	20	15	14	....	....	77	58	5	....
256	196	174	183	72	105	125	77	2	2	2	....	....	.....	51	4	....
242	172	29	161	66	112	83	156	1	1	1	....	....	1	41	....	2
421	332	263	273	155	209	149	232	27	26	26	85	6	49	68	5	6
612	393	105	335	149	174	149	363	27	24	24	....	14	48	81	5	....
56	52	58	38	18	32	32	58	.....	....	....	....	....	.....	16	1	24
69	50	.....	55	12	36	23	66	.....	....	....	....	....	.....	25	....	....
220	149	131	151	89	114	140	196	60	45	45	43	43	8	41	1	10
73	58	.....	63	16	27	41	.....	.....	....	....	....	....	14	13	....	....
136	117	136	97	64	64	136	136	.....	....	....	....	....	.....	12	....	....
160	138	142	132	56	91	85	190	12	11	11	11	15	15	45	1	4
74	42	74	42	19	34	19	.....	.....	....	....	....	....	19	8	1	....
240	192	184	147	69	109	106	150	13	7	7	....	1	53	39	1	6
78	78	37	55	28	35	35	78	28	6	6	....	....	28	13	....	....
23	17	.....	15	5	13	3	.....	.....	....	....	....	....	.....	11	....	....
375	290	206	259	115	190	152	299	3	3	3	....	1	17	55	6	12
22	19	32	19	13	13	13	.....	.....	....	....	....	....	8	6	1	....
3,986	2,876	1,330	2,285	286	1,171	953	1,046	46	14	14	8	12	158	334	40	99
651	416	425	443	167	206	281	347	35	42	42	2	7	51	70	7	31
198	188	145	181	35	56	175	145	6	6	6	....	....	.....	13	1	....
694	484	276	484	111	174	136	269	20	13	13	11	11	73	95	4	22
571	400	389	363	165	251	116	472	5	5	5	5	5	28	58	4	15
407	317	280	325	133	174	254	232	8	8	8	144	....	14	55	....	10
.....	5	.....	5	.....	.....	.....	.....	.....	....	....	....	....	.....	6	....	....
83	43	68	14	4	4	4	29	.....	....	....	....	....	.....	15	....	....
562	304	103	287	40	108	112	45	6	....	....	....	....	10	80	15	34
14,799	10,275	7,161	9,251	2,849	5,149	5,006	7,872	349	252	251	348	117	925	1,694	122	367
379	249	379	184	112	184	184	379	.....	....	....	....	....	.....	30	....	....
336	227	.....	227	70	144	227	.....	.....	....	....	....	....	.....	7	....	....
334	334	334	193	147	193	147	334	.....	....	....	....	....	.....	10	1	....
370	370	370	314	149	149	250	370	.....	....	....	....	....	.....	30	3	....
1,712	1,658	1,712	1,712	512	665	1,082	1,712	92	50	50	50	50	.....	116	8	24
734	437	734	437	316	316	199	734	.....	....	....	....	....	.....	35	....	....
784	784	784	784	160	286	286	784	.....	....	....	....	....	.....	35	7	....
100	66	158	100	45	45	45	.....	.....	....	....	....	....	.....	10	....	....
5,262	4,044	4,324	4,240	599	2,628	3,067	3,400	240	83	83	7	15	266	210	23	18
305	265	348	265	121	164	267	352	.....	....	....	....	....	.....	10	3	....
234	234	234	234	96	96	234	234	.....	....	....	....	....	.....	8	1	....
319	319	319	319	76	124	319	319	.....	....	....	....	....	.....	22	1	....
5,297	3,944	5,297	3,944	904	2,041	5,297	5,297	235	235	235	235	235	.....	308	....	16
799	466	799	799	80	246	799	.....	.....	....	....	....	....	.....	22	2	....
103	70	103	103	23	49	103	103	.....	....	....	....	....	.....	11	1	24
17,068	13,462	15,890	13,855	3,410	7,330	12,456	14,018	567	368	368	292	300	266	864	50	82

ROMAN CATHOLI

II.—Table G.—Attendance, Pupils in variou

Towns.	Number of pupils.	Boys.	Girls.	Average daily attendance.	Percentage of average to total attendance.	Reading.						Writing.	Arithmetic
						First Reader, Part I.	First Reader, Part II.	Second Reader.	Third Reader.	Fourth Reader.	Fifth Reader.		
1 Alexandria	438	216	222	234	53	140	70	81	72	75	....	438	43
2 Almonte	132	69	63	86	65	33	14	31	24	30	....	132	13
3 Amherstburg	331	145	186	210	63	90	43	57	48	47	46	331	33
4 Arnprior	357	185	172	225	63	58	105	53	49	92	....	357	35
5 Barrie	150	76	74	102	68	17	25	30	32	46	....	150	15
6 Berlin	492	256	236	353	72	98	58	118	115	103	....	492	49
7 Brockville	385	186	199	269	70	74	51	87	91	82	....	385	38
8 Cobourg	211	116	95	137	65	57	29	33	41	51	....	211	21
9 Cornwall	942	453	489	623	66	290	186	215	123	128	....	942	94
10 Dundas	122	55	67	83	68	25	24	25	28	20	....	122	12
11 Fort Frances	28	18	10	7	25	11	8	5	4	....	....	28	2
12 Fort William	225	117	108	148	66	70	25	66	35	29	....	225	22
13 Galt	81	41	40	62	76	28	14	12	19	13	....	81	8
14 Goderich	62	33	29	56	90	4	12	16	13	17	....	62	6
15 Hawkesbury	887	438	449	636	72	430	203	144	49	52	9	887	88
16 Ingersoll	72	35	37	53	74	14	9	22	10	17	....	72	7
17 Lindsay	394	160	234	271	69	94	41	69	87	60	43	394	39
18 Mattawa	283	128	155	194	69	77	47	44	66	34	15	283	28
19 Newmarket	60	31	29	35	58	21	10	1	9	19	....	60	6
20 North Bay	340	183	157	198	58	136	66	48	43	47	....	340	34
21 Oakville	39	23	16	24	62	6	5	11	6	11	....	39	3
22 Orillia	234	134	100	167	71	43	29	55	58	49	....	234	23
23 Oshawa	85	32	53	55	65	14	13	18	21	19	....	85	8
24 Owen Sound	130	61	69	73	56	32	22	23	21	32	....	130	13
25 Paris	56	26	30	38	68	6	5	14	19	12	....	56	5
26 Parkhill	50	26	24	31	62	10	....	15	17	8	....	50	5
27 Pembroke	602	405	197	363	60	188	116	110	104	84	....	602	60
28 Perth	250	141	109	169	67	66	39	32	59	54	....	250	25
29 Peterborough	788	378	410	574	73	217	123	171	162	115	....	788	78
30 Picton	50	25	25	34	68	11	6	8	13	12	....	50	5
31 Port Arthur	227	120	107	147	65	43	30	55	51	48	....	227	22
32 Prescott	184	96	88	126	68	40	12	39	36	57	....	184	18
33 Preston	91	50	41	66	72	25	7	18	22	19	....	91	9
34 Rainy River	68	37	31	28	41	28	8	17	5	10	....	68	6
35 Rat Portage(Kenora)	228	97	131	118	52	67	36	41	48	36	....	228	22
36 Renfrew	816	169	147	221	70	108	51	58	51	48	....	316	31
37 St. Mary's	66	24	42	48	73	12	9	18	8	19	....	66	5
38 Sandwich	180	95	85	116	64	78	35	41	21	10	....	180	18
39 Sarnia	269	127	142	185	69	65	50	55	42	57	....	269	26
40 Sault Ste. Marie	255	133	122	145	57	72	28	54	47	59	....	255	25
41 Seaforth	92	49	43	53	57	19	11	20	19	23	....	92	9
42 Steelton	349	184	165	145	41	167	50	83	35	14	....	349	34
43 Sturgeon Falls	375	235	140	197	52	145	57	98	61	14	....	375	37
44 Sudbury	274	136	138	174	63	80	65	55	33	34	7	274	27
45 Thorold	118	45	73	84	71	20	17	29	29	23	....	118	11
46 Trenton	148	74	74	126	85	24	19	42	38	25	....	148	14
47 Vankleek Hill	270	124	146	143	53	69	48	66	43	44	....	270	27
48 Walkerton	173	81	92	134	77	29	21	36	50	37	....	173	17
49 Wallaceburg	136	68	68	75	55	32	39	18	15	32	....	136	13
50 Waterloo	145	74	71	94	65	31	17	39	46	12	....	145	14
51 Whitby	44	26	18	32	73	7	3	7	12	15	....	44	4
Totals	12,284	6,236	6,048	7,967	65	3,511	2,006	2,503	2,150	1,994	120	12,284	12,28
Totals.													
*1 Counties, etc	17,761	8,960	8,801	9,836	55	6,181	3,080	3,235	2 915	2,081	269	17,761	17,7
2 Cities	17,762	8,983	8,779	12,117	68	4,365	3,264	3 746	3,461	2,501	425	17,762	17,7
3 Towns	12,284	6,236	6,048	7,967	65	3,511	2,006	2,503	2,150	1,994	120	12,284	12,2
4 Grand totals, 1904	47,807	24,179	23,628	29,920	62.58	14,057	8,350	9,484	8,526	6,576	814	47,807	47,8
5 Grand totals, 1903	47,117	23,836	23,281	29,538	62.69	14,878	7,782	9,324	8,128	6,190	815	47,117	47,1
6 Increases	690	343	347	382	.....	.....	568	160	398	386	....	690	6
7 Decreases	.....	.....	.....	.....	.11	821	.....	.....	.....	.....	1	.....	.....
8 Percentages	.....	50.58	49.42	62.58	.....	29.40	17.47	19.84	17.83	13.76	1.7	100	1

*In incorporated villages included with Counties, etc., there were 2,669 pupils, with an average daily attendanc

SEPARATE SCHOOLS.—*Concluded.*

branches of instruction, Maps, etc.—*Concluded.*

Drawing.	Geography.	Music.	Grammar and Composition.	English History.	Canadian History.	Temperance and Hygiene.	Drill and Calisthenics.	Bookkeeping.	Algebra.	Geometry.	Botany.	Elementary Physics.	Agriculture.	Maps and prizes. Number of maps.	Maps and prizes. Number of schools giving prizes.	Number of trees planted on Arbor Day.
438	438	438	438	147	147	438	438	.....	.....	.....	.....	.....	438	10	.....	28
99	54	54	99	54	54	30	132	.....	.....	.....	.....	.....	30	12	1	.....
198	98	98	198	98	193	47	190	46	46	46	17	46	.....	11	1	.....
141	92	92	141	92	92	92	357	.....	.....	.....	.....	.....	46	8	.....	.....
150	46	46	150	46	78	46	150	.....	.....	.....	.....	.....	.....	18	.....	.....
492	103	228	492	103	228	492	492	.....	.....	.....	.....	.....	.....	30	.....	.....
385	173	298	385	173	298	385	385	.....	.....	.....	.....	.....	.....	20	.....	.....
154	51	92	154	51	92	51	211	.....	.....	.....	.....	.....	.....	9	1	.....
942	128	185	942	128	185	942	942	.....	.....	.....	.....	.....	†251	20	3	.....
48	48	48	48	48	48	25	122	.....	.....	.....	.....	.....	.....	12	.....	.....
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
94	29	35	64	29	35	64	225	.....	.....	.....	.....	.....	.....	4	.....	.....
60	13	32	13	13	32	13	81	.....	.....	.....	.....	.....	.....	7	1	.....
30	17	30	30	17	30	30	62	.....	.....	.....	.....	.....	.....	12	1	.....
254	20	104	29	20	104	29	887	61	9	9	106	20	20	20	2	2
49	27	27	72	27	27	72	72	.....	.....	.....	.....	.....	.....	9	.....	.....
351	103	140	117	103	140	117	160	20	20	20	15	20	.....	12	.....	.....
249	49	159	283	49	159	283	283	15	15	15	2	5	.....	30	1	.....
29	28	28	28	28	28	28	60	.....	.....	.....	.....	.....	25	9	.....	.....
90	47	90	47	47	90	47	.....	.....	.....	.....	.....	.....	.....	11	.....	.....
33	17	17	.....	17	17	.....	39	.....	.....	.....	.....	.....	.....	5	.....	.....
107	49	107	107	49	107	107	234	.....	.....	.....	.....	.....	.....	11	.....	.....
85	19	40	40	19	40	40	85	.....	.....	.....	.....	.....	.....	5	1	.....
76	32	53	53	32	53	53	.....	.....	.....	.....	.....	.....	.....	7	1	.....
31	12	31	56	12	31	56	56	.....	.....	.....	.....	.....	.....	4	.....	.....
40	25	25	50	25	25	50	50	.....	.....	.....	.....	.....	50	9	1	.....
298	188	188	298	188	188	298	602	.....	.....	.....	.....	.....	.....	.....	.....	.....
118	118	113	113	118	113	113	250	.....	.....	.....	.....	.....	.....	4	.....	.....
277	277	277	218	277	277	218	467	.....	.....	.....	.....	.....	.....	49	.....	.....
483	25	25	39	25	25	39	50	.....	.....	.....	.....	.....	25	8	.....	.....
39	99	154	99	99	154	99	227	.....	.....	.....	.....	.....	.....	6	1	.....
184	57	93	93	57	93	93	88	.....	.....	.....	.....	.....	.....	10	.....	.....
184	41	41	41	41	41	41	.....	.....	.....	.....	.....	.....	.....	12	1	.....
66	10	15	15	10	15	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
32	84	84	228	84	84	228	.....	.....	.....	.....	.....	.....	.....	6	.....	.....
125	99	99	316	99	99	316	.....	.....	.....	.....	.....	.....	.....	12	2	.....
316	19	27	45	19	27	45	.....	.....	.....	.....	.....	.....	.....	5	.....	.....
54	31	31	72	31	31	72	.....	.....	.....	.....	.....	.....	.....	15	.....	.....
72	31	99	57	31	99	57	269	.....	.....	.....	.....	.....	.....	14	2	.....
154	57	106	59	57	106	59	255	.....	.....	.....	.....	.....	.....	7	.....	.....
183	59	42	28	59	42	28	.....	.....	.....	.....	.....	.....	.....	11	1	.....
62	23	49	132	23	49	132	132	.....	.....	.....	.....	.....	.....	2	.....	.....
182	49	75	205	49	75	205	.....	.....	.....	.....	.....	.....	.....	17	1	.....
82	14	129	129	14	129	274	7	7	7	.....	7	7	.....	9	1	.....
274	74	52	23	74	52	118	.....	.....	.....	.....	.....	.....	.....	8	.....	.....
81	23	63	63	23	63	148	.....	.....	.....	.....	.....	.....	.....	12	.....	.....
63	63	158	270	63	158	270	.....	.....	.....	.....	.....	.....	.....	14	.....	5
270	44	87	178	44	87	178	.....	.....	.....	.....	.....	.....	.....	22	1	.....
178	37	47	47	37	47	136	.....	.....	.....	.....	.....	.....	47	11	.....	.....
65	32	58	97	32	58	145	.....	.....	.....	.....	.....	.....	.....	15	1	.....
58	12	27	15	12	27	44	.....	.....	.....	.....	.....	.....	.....	6	.....	.....
34	15			15												
11,999	8,746	9,869	8,276	2,967	4,467	6,254	9,589	149	97	97	140	98	939	575	25	30
14,799	10,275	7,161	9,251	2,849	5,149	5,006	7 872	349	252	251	348	117	925	1,694	122	367
17,968	13,492	15,890	13,855	3,410	7,330	12,456	14,018	567	368	368	292	300	266	864	50	82
11,999	8,746	9,869	8,276	2.967	4,467	6,254	9,589	149	97	97	140	98	939	575	25	30
43,966	32,493	32,920	31,382	9,226	16,946	23,716	31,479	1,065	717	716	780	515	2,130	3,133	197	479
43,636	30,212	34,244	28,609	8,069	15,499	20,559	35,706	1,293	770	766	173	404	1.130	3,013	191	471
			2,773	1,157	1,447	3,157	.....	.....	.....	.....	607	111	1,000	120	6	8
208	2,271	676	.....	.....	.....	.....	4,227	228	53	50	.....	.....	.....	.....	.....	.....
91.76	67.95	68.86	65.64	19.3	35.45	49.61	65.84	2.23	1.5	1.5	1.63	1.08	4.45	.....	.....	.....

of 1,735 : the numbers in the Readers were : 1st, Part I, 982 ; Part II, 509 ; 2nd, 446 ; 3rd, 411 ; 4th, 272 ; 5th, 49

Nature Study.

COLLEGIATE INSTITUTES

I.—Table II.—

Collegiate Institutes.	Receipts.						Teachers' salaries.
	Legislative grants.	Municipal grants (county).	Municipal grants (local).	School fees.	Balances and other sources.	Total receipts.	
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1 Aylmer	886 03	1,604 27	1,650 00	1,071 50	66 00	5,277 80	3,650 00
2 Barrie	*1,121 59	1,903 62	1,800 00	1,860 00	631 59	7,316 80	5,563 24
3 Berlin	†3,134 84	2,376 48	21,148 85	1,732 54	274 00	28,666 71	7,295 00
4 Brantford	*1,312 84	.....	7,900 00	2,881 95	1,147 72	13,242 51	8,896 32
5 Brockville	1,148 36	1,450 00	6,300 00	.....	806 80	9,705 16	7,283 68
6 Chatham	*1,316 65	3,295 68	5,320 00	1,948 73	2,007 95	13,884 01	8,885 00
7 Clinton	942 10	1,645 08	3,600 00	927 20	172 64	7,287 02	4,535 75
8 Cobourg	*†1,260 46	1,914 76	2,500 00	736 50	955 97	7,367 69	5,435 00
9 Collingwood	*992 26	942 26	3,100 00	1,259 25	393 79	6,687 56	4,487 00
10 Galt	*1,261 25	1,930 37	3,500 00	2,229 50	878 52	9,799 64	7,570 45
11 Goderich	1,035 88	1 284 25	2,800 00	1,580 00	2,588 05	9,238 18	5 405 00
12 Guelph	*1,198 08	672 91	6,067 28	480 85	562 45	8,981 57	6,945 00
13 Hamilton	*§5,891 16	.....	26,548 28	5,083 50	2 00	37,519 94	19,512 15
14 Ingersoll	1,010 35	1 342 87	4,271 00	776 25	940 24	8,340 71	5,610 00
15 Kingston	†2,594 02	.....	6,000 00	4,915 09	1,316 40	14,825 51	11,904 33
16 Lindsay	*1,235 61	2,264 63	4,064 89	1,653 50	115 00	9,333 63	6,747 11
17 London	†1,648 70	.....	24,486 37	5,230 00	692 03	32,057 10	23,084 50
18 Morrisburg	*1,064 22	3,641 20	2,420 86	.....	4,045 86	11,172 14	5,585 39
19 Napanee	*1,131 42	2,700 00	2,800 00	74 00	2,020 15	8,725 57	5,258 63
20 Niagara Falls	*1,170 57	973 58	6,000 00	.....	83 73	8,227 88	6,105 00
21 Orillia	*1,135 36	1,285 36	2,500 00	1,434 60	1,172 69	7,528 01	5,333 56
22 Ottawa	*1,421 88	.....	13,331 00	10,835 66	1,853 16	27,441 70	20,335 00
23 Owen Sound	*1,267 93	2,865 43	4,153 00	2,481 00	2,045 88	13,813 24	9,680 00
24 Perth	924 51	1,297 06	4,385 54	227 50	256 15	7,090 76	4,910 00
25 Peterborough	*1,297 62	.....	7,000 00	2,192 50	1,389 05	11,879 17	8,093 70
26 ‡Renfrew	†1,192 30	1,522 87	2,450 00	36 75	2,105 13	7,307 05	5,010 00
27 Ridgetown	975 39	2,225 80	1,400 00	922 50	1,453 44	6,977 13	4,780 90
28 St. Catharines	*1,289 62	.....	6,678 17	85 00	1,597 83	9,650 62	7,300 00
29 St. Mary's	930 04	1 093 31	2,600 00	1,073 25	106 68	5,803 28	4,629 04
30 St. Thomas	*1,361 27	2,022 17	7,046 83	2,443 50	126 77	13,000 54	10,220 08
31 Sarnia	*1,282 51	1,945 03	5,490 64	.....	609 62	9,327 80	7,219 62
32 Seaforth	*1,012 75	1,700 09	1,900 00	1,229 10	2,233 97	8,075 91	4,694 97
33 Stratford	†2,254 46	1,300 00	6,500 00	3,423 30	857 47	14,335 23	8,444 73
34 Strathroy	958 14	1,644 18	2,700 00	1,145 00	120 88	6,568 20	5,070 00
35 Toronto (Harbord)	*1,380 95	.....	16,912 52	3,796 00	§3,938 00	26,027 47	20,356 00
36 Toronto (Jameson)	*1,339 20	.....	16,402 01	2,372 00	50 00	20,163 21	15,857 00
37 Toronto (Jarvis)	*1,345 16	.....	19,900 91	2,939 25	80 00	24,265 32	18,859 00
38 Toronto Junction	1,055 07	675 82	6,635 00	2,050 00	469 32	10,885 21	6,888 50
39 Vankleekhill	*945 94	2,304 71	1,400 00	21 50	438 46	5,110 61	3,738 33
40 Whitby	817 97	1,372 34	2,300 00	387 25	148 62	5,026 18	4,199 25
41 Windsor	1,278 59	1,200 00	8,194 36	75 00	2,007 34	12,755 29	8,087 46
42 Woodstock	*†1,731 60	1,829 32	4,638 19	1,926 50	.....	10,125 61	7,320 00
Totals	58,554 65	56,175 45	286,790 70	75,532 52	43,761 35	520,814 67	350,785 99

* Grant for Cadet Corps included. † Grant for Technical Education included.

§ Grant ($4,500) for Normal College included. ‡ Statistics for preceding year except Legislative grant.

AND HIGH SCHOOLS.

Financial Statement.

	Expenditure.					Balances.	Charges per year.
	Buildings, sites, and all permanent improvements.	Repairs to school accommodation.	Library, scientific apparatus, maps, etc., typewriters, drawing models, and equipment for physical education.	School books, stationery, prizes, fuel, examinations and other expenses.	Total expenditure.		
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
1	.....	33 83	27 12	1,085 66	4,796 61	481 19	$10 ; res. Form I, $5.
2	.....	94 25	70 98	1,296 88	7,024 85	291 95	$10.
3	15,092 21	81 87	1,486 56	3,245 02	27,200 66	1,466 05	$10.
4	500 00	114 49	.....	3,186 09	12,696 90	545 61	Res. $10 ; non-res. $16.
5	.....	.....	.....	2,421 48	9,705 16	.....	$5.
6	2,072 74	406 57	432 25	1,758 75	13,555 31	328 70	City $6 ; County $10.
7	168 32	.....	712 78	725 08	6,137 13	1,149 89	$6 ; $8 ; $10.
8	97 37	.....	212 75	1,080 07	6,825 19	542 50	$12.
9	318 80	649 02	46 85	1,171 62	6,673 29	14 27	Res. $7.50 ; non-res. $10.
10	.....	15 65	180 19	1,640 93	9,407 22	392 42	Co. $10 ; others $14.
11	.....	350 81	124 50	955 74	6,836 05	2,402 13	Res. $5, $7 $10 ; Co. $6, $8, $10 ; non-res. $8, $10, $12.
12	14 50	52 97	253 72	1,715 38	8,981 57	.....	City free ; Co. $10 ; other Cos. $20.
13	.....	734 60	.....	17,273 19	37,519 94	.....	Res. F. I $2.50; other F's. $10, non-res. $20
14	.....	148 65	61 85	2,519 09	8,339 59	1 12	$7.50.
15	.....	159 09	243 29	2,043 01	14,339 72	485 79	Res. $5 to $35 ; non-res. $20 to $35.
16	263 95	450 96	174 05	1,178 35	8,814 62	519 01	$7.50, $10.
17	1,631 36	.....	405 65	4,843 16	31,764 67	292 43	City and Co. $10 ; others $30.
18	464 53	142 92	173 52	465 62	6,831 98	4,340 16	Free.
19	.....	209 62	24 50	1,177 32	6,670 07	2,055 50	Town and Co. free ; others $10.
20	164 63	151.94	78 61	1,449 58	7,949 76	278 12	Free.
21	70 00	196 43	6 20	1,218 01	6,824 20	703 81	Town $5 ; others $10.
22	962 66	667 60	204 66	5,281 78	27,441 70	.....	Res. $20, $25 ; non-res. $45, $50.
23	.....	113 23	50 59	1,634 46	11,478 28	2,334 96	Res. $8, $12; Co. $10; adj. Co. $10 ; others $12, $15.
24	.....	303 08	26 12	1,100 40	6,339 60	751 16	Co. $6 ; non-res. $16.
25	1,100 00	.....	.....	2,685 47	11,879 17	.....	Res. $10 ; non-res. $25.
26	305 56	425 87	352 44	1,166 58	7,260 47	46 58	Res. free ; non-res. $15.
27	.....	127 46	36 52	1,662 51	6,607 39	369 74	Town $6 ; Co. $10 ; non-res. $10.
28	.....	414 61	.....	1,898 08	9,612 69	37 93	Res. free ; non-res. $16.
29	.....	287 47	.....	840 60	5,757 11	46 17	Res. $5 ; others $10.
30	.....	446 08	230 35	2,104 03	13,000 54	.....	H.S.D. 1 year free ; Co. $10 ; others $30.
31	.....	.....	116 29	1,725 58	9,061 49	266 31	Free.
32	.....	37 94	41 15	843 17	5,617 23	2,458 68	$6 ; $8 ; $10.
33	26 80	551 13	154 39	4,885 89	14,062 94	272 29	$10.
34	.....	191 06	.....	1,234 49	6,495 55	72 65	Form I, town, free ; others $10.
35	228 75	1,515 00	172 40	3,765 32	26,027 47	.....	$6; $15; $21; $27
36	228 50	1,262 70	56 46	2,768 55	20,163 21	.....	6; 15; 21, 27 } $6 extra to children of non-ratepayers.
37	349 50	1,733 51	330 47	2,952 84	24,265 32	.....	6; 15; 21; 27 }
38	974 01	314 03	134 43	1,821 12	10,132 09	753 12	$10 ; $15.
39	.....	79 80	214 07	1,032 66	5,064 86	45 75	Province free ; others $10.
40	.....	48 79	46 20	722 52	5,016 76	9 42	F. I free ; H. S. D. $6 ; Co. $6.75. others $10.
41	363 87	1,189 36	65 70	3,048 90	12,755 29	.....	Free.
42	.....	216 03	117 25	1,791 73	9,445 01	690 60	Res. $7.50 ; non-res. $10.
43	38 18	13,918 42	7,064 86	97,406 21	496,378 66	24,436 01	9 free ; 33 fee.

$3,38. of this sum, overdraft for the three Toronto Collegiate Institutes.

COLLEGIATE INSTITUTES AND

I.—Table H.—Financial

High Schools.	Receipts.						Teachers' salaries.
	Legislative grants.	Municipal grants (county.)	Municipal grants (local.)	School fees.	Balances and other sources.	Total receipts.	
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1 Alexandria	637 54	723 87	2,073 75	.....	1,234 88	4,670 04	2,684 00
2 Almonte	704 88	704 88	2,189 21	219 50	425 33	4,243 80	3,270 00
3 Arnprior	601 04	601 04	1,600 00	129 00	1,384 38	4,315 46	2,442 77
4 Arthur	*663 41	1,026 41	425 80	894 65	69 07	3,078 84	2,261 91
5 Athens	686 13	1,717 29	1,252 00	411 25	1,228 05	5,294 73	3,354 34
6 Aurora	616 16	700 00	850 00	648 00	537 98	3,352 14	2,175 00
7 Beamsville	472 95	530 00	685 00	.....	459 55	2,147 50	1,440 00
8 Belleville	811 76	405 00	4,167 14	232 75	.....	5,616 65	4,645 00
9 Bowmanville	776 75	776 75	2,200 00	348 00	1,069 21	5 170 71	3,842 55
10 Bradford	557 66	688 58	600 00	725 00	359 30	2,930 54	2,115 00
11 Brampton	845 91	2,000 00	1,400 00	1,232 00	352 97	5,830 88	4,706 56
12 Brighton	468 93	909 64	850 00	48 25	251 24	2,528 06	1,750 00
13 Caledonia	572 34	1,538 94	933 00	75 50	444 63	3,564 41	2,200 00
14 Campbellford	665 58	935 14	2,017 69	460 40	94 13	4,172 94	3,214 40
15 Carleton Place	684 53	684 58	2,553 00	121 00	770 72	4,813 78	3,330 00
16 Cayuga	556 91	1,803 97	650 00	.....	680 34	3,701 22	2,300 00
17 †Chesley	.....	1,000 00	100 00	242 00	.....	1,342 00	750 00
18 Colborne	459 98	511 00	1,349 60	.....	1,651 99	3,972 57	1,590 00
19 Cornwall	841 27	2,709 37	3,487 20	.....	3,188 21	10,226 05	4,710 99
20 Deseronto	629 98	1,268 48	2,150 00	188 00	193 51	4,429 97	2,679 87
21 Dundas	*696 66	1,046 66	900 00	626 00	289 48	3.558 80	2,525 66
22 Dunnville	*712 19	2,285 02	1,000 00	.....	784 42	4,781 63	2,989 80
23 Dutton	604 52	1,498 79	500 00	1,399 00	897 10	4,899 41	2,738 05
24 East Toronto	412 78	412 78	1,300 00	496 00	81 68	2,703 24	1,945 00
25 Elora	542 80	816 80	800 00	449 50	19 46	2,628 56	2,177 50
26 Essex	‡955 03	1,500 00	1,500 00	8 60	464 39	4,428 02	3,247 50
27 Fergus	570 14	570 15	500 00	407 75	727 91	2,775 95	21 75
28 Forest	617 33	1,360 12	500 00	391 00	920 42	3,788 87	2,350 00
29 Fort William	969 64	.....	2,324 45	.....	18 00	3,312 09	2,102 00
30 Gananoque	669 52	919 52	1,965 44	104 00	37 00	3,695 48	2,748 31
31 Georgetown	601 20	639 56	1,334 69	795 50	.....	3,870 95	2,545 50
32 Glencoe	597 25	710 69	800 00	663 50	843 00	3,614 44	2,042 33
33 Gravenhurst	977 46	.....	600 00	422 83	179 45	2,179 74	1,493 00
34 Grimsby	438 71	559 44	220 00	.....	974 88	2,188 03	1,300 00
35 Hagersville	619 02	2,897 60	600 00	.....	856 84	4,973 46	2,393 84
36 Harriston	606 86	662 44	1,500 00	868 25	7,313 03	10,950 58	2,883 55
37 Hawkesbury	589 50	1,766 36	.....	.....	734 53	3,090 44	2,051 50
38 Iroquois	712 35	1,910 00	1,799 96	.....	795 72	5,218 03	3,210 00
39 Kemptville	744 34	250 00	1,784 81	2,041 01	6 10	4,826 26	3,828 04
40 Kincardine	737 92	1,278 93	799 00	1,196 00	854 90	4,866 75	3,524 08
41 Leamington	709 52	1,390 94	2,400 00	96 30	209 36	4,806 12	3,356 00
42 Listowel	666 36	800 00	1,400 00	1,107 76	141 93	4,116 05	2,900 00
43 Lucan	654 24	867 17	700 00	1,118 00	124 04	3,463 45	2,473 00
44 Madoc	563 26	987 26	700 00	657 10	311 72	3,219 34	2,296 15
45 Markham	681 47	1,530 00	800 00	1,563 00	638 74	5,213 21	3,600 00
46 Meaford	814 22	1,903 07	1,500 00	802 50	115 92	5,135 71	3,424 27
47 †Midland	.....	.....	1,000 00	106 50	9,926 00	11,032 50	880 00
48 Mitchell	635 08	800 00	1,600 00	774 50	366 85	4,176 38	2,550 00
49 Mount Forest	*765 02	1,421 16	1,400 00	684 00	345 20	4.615 38	3,070 46
50 Newburgh	537 93	1,655 27	550 00	.....	310 87	3,054 07	2,360 00
51 Newcastle	475 33	635 37	950 00	.....	48 00	2,108 70	1,250 00
52 Newmarket	637 01	782 00	800 00	1,011 80	686 84	3,917 65	2,636 25
53 Niagara	432 27	490 00	550 00	.....	169 64	1,641 91	1,310 26
54 Niagara Falls South	582 56	778 52	2,100 00	.....	606 00	4,067 08	1,919 08
55 North Bay	1,009 60	.....	3,400 00	60 00	10,890 40	15,360 00	2,613 83
56 Norwood	*630 51	608 66	1,141 28	584 00	621 75	3,586 20	2,171 93
57 Oakville	544 97	544 97	2,020 00	415 50	41 00	3,566 44	2,400 00
58 Omemee	453 05	453 05	725 00	174 00	23 00	1,828 10	1,500 00

* Grant for Cadet Corps included. † School established in 1904. ‡ Including grant for Technical Education.

HIGH SCHOOLS.—*Continued.*

Statement.—*Continued.*

	Expenditure.							
	Buildings, sites, and all permanent improvements.	Repairs to school accommodations.	Library, Scientific Apparatus, maps, etc., typewriters, drawing models and equipment for physical education.	School books, stationery, prizes, fuel, examinations, and other expenses.	Total expenditure.	Balances.	Charges per year.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
1	.....	84 68	37 24	486 09	3,292 01	1,378 03	Free.
2	300 00	.....	133 42	536 64	4,240 06	3 74	Res. $1; Co. and others $6.
3	75 80	.....	37 23	536 65	3,091 95	1,223 51	Res. free; non-resident $10.
4	47 43	18 00	33 16	713 34	3,078 84	.....	$10.
5	.....	50 82	47 71	553 52	4,006 39	1,288 34	Res. free; Co. $5; others $10.
6	.....	94 44	57 46	457 00	2,788 90	568 24	$10.
7	33 80	33 69	10 90	303 21	1,821 60	325 90	Free.
8	.....	59 52	.....	912 13	5,616 65	.....	Res. free; others $25.
9	.....	17 05	17 50	942 44	4,819 54	351 17	Form I $4; F. II $6; others $7.50.
10	.....	41 75	.....	390 00	2,536 75	393 79	H. S. D. Form I free; others $10.
11	.....	41 00	144 18	724 72	5,616 46	214 42	$10.
12	.....	37 65	10 73	286 52	2,084 90	448 16	Free.
13	.....	143 68	.....	942 35	3,286 03	278 38	Free; other Co's $4.50.
14	.....	.....	.....	958 54	4,172 94	.....	H. S. D. $6; Co. free.
15	.....	22 71	24 79	688 12	4,065 62	748 16	Res. free; Co. $5; others $10.
16	93 22	45 10	.....	523 05	2,961 37	739 85	Free.
17	18 70	.....	420 61	34 02	1,223 33	118 67	$10.
18	45 00	110 13	27 60	451 91	2,224 64	1,747 98	Free.
19	259 20	105 57	.....	1,290 00	6,365 76	3,860 29	Free.
20	.....	79 31	6 75	915 70	3,681 63	748 34	Res. free; others $10.
21	96 86	56 53	.....	851 18	3,520 25	38 55	Form I free; Town $9.50; Co. $10.
22	900 00	191 02	94 92	605 89	4,781 63	.....	Free.
23	45 00	.....	5 50	615 84	3,402 39	1,497 02	$10.
24	37 80	15 58	102 12	200 03	2,300 53	402 71	Res. and Co. $10; others $20.
25	1 00	35 20	29 70	311 28	2,554 63	73 93	Res. $5; non-resident $10.
26	.....	231 98	96 91	570 57	4,146 96	281 06	Free.
27	.....	33 24	.....	442 38	2,650 62	125 33	H. S. D. free; others, $10.
28	.....	170 00	.....	740 02	3,260 02	528 85	$10.
29	.....	.....	15 55	454 75	2,572 30	739 79	Free.
30	.....	64 75	63 31	819 11	3,695 48	.....	Res. free; Co. and non-resident $5.
31	25 37	155 11	1 50	633 27	3,370 95	.....	Form I $7; others $10.
32	.....	26 75	15 00	1,293 05	3,377 13	237 31	$10.
33	.....	.....	23 10	663 64	2,179 74	.....	Form I $5; others $10.
34	4 25	43 87	.....	176 85	1,524 97	663 06	Free.
35	18 00	8 50	10 99	2,221 41	4,652 74	320 72	Free.
36	1,337 23	96 88	272 62	2,015 56	6,605 84	4,344 74	$10.
37	.....	.....	.....	820 44	2,871 94	218 50	Free.
38	.....	45 19	18 77	843 65	4,117 61	1,100 42	Free.
39	267 08	.....	75 00	656 14	4,826 26	.....	Res. free; Co. $5; non-res. $25 or 65% of cost.
40	72 62	.....	50 88	931 96	4,579 54	287 21	H. S. D. $8; others $10.
41	.....	27 89	80 44	466 96	3,931 29	874 83	Co. free; non-res. $10.
42	.....	109 80	154 67	792 65	3,957 12	158 93	F. I, $7; others $10.
43	10 00	5 00	.....	892 00	3,410 00	53 45	$10.
44	.....	61 03	325 99	66 29	2,749 46	469 86	Res. $7; non-res. $10.
45	.....	302 62	117 98	768 93	4,789 53	423 68	$10.
46	.....	.....	.....	1,280 95	4,705 22	430 49	Town, first year $5; $8; others $10.
47	1,566 81	.....	259 90	167 31	2,894 02	8,138 48	H. S. D. $5; others $10.
48	938 54	108 40	32 29	343 89	3,973 12	203 26	Res. $6; non-res. $10.
49	184 50	231 51	.....	902 64	4,389 11	226 27	$10; Form I free to res.
50	40 50	47 79	.....	459 74	2,908 03	146 04	Free.
51	70 00	.....	92 00	221 00	1,633 00	475 70	Free.
52	428 59	.....	24 19	828 62	3,917 65	.....	$10.
53	.....	69 20	31 46	183 55	1,594 47	47 44	Free.
54	197 63	185 96	26 10	304 06	2 632 83	1,434 25	Free.
55	600 00	.....	136 84	490 28	15,240 95	119 05	Free; Commercial course $12.
56	168 00	140 98	.....	494 61	2,975 52	610 68	$6.
57	350 00	17 25	50 51	578 68	3,566 44	.....	$5; $8.
58	.....	.....	.....	328 10	1,828 10	.....	H. S. D. free; others $10.

COLLEGIATE INSTITUTES AND

I.—Table H.—Financial

High Schools.	Receipts.						Teachers' salaries.
	Legislative grants.	Municipal grants (county).	Municipal grants (local).	School fees.	Balances and other sources.	Total receipts.	
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
59 Orangeville	793 83	1,100 00	2,600 00	1,389 90	200 26	6,083 99	4,238 00
60 Oshawa	761 35	1,513 18	3,700 00	584 25	145 90	6,704 68	4,627 87
61 Paris	624 40	624 40	1,800 00	179 07	375 33	3,603 20	2,770 00
62 Parkhill	587 18	587 18	1,150 00	892 75	589 68	3,806 79	2,820 00
63 Pembroke	714 50	714 50	3,671 71	.....	12 15	5,112 86	3,813 67
64 Petrolea	735 93	1,621 90	3,200 00	.....	2,815 34	8,373 17	3,747 43
65 Picton	841 12	2,405 00	3,500 00	.....	1,661 46	8,407 58	4,750 00
66 Port Arthur	1,186 32	.....	2,300 00	.....	39 05	3,525 37	3,041 73
67 Port Dover	448 31	448 31	771 36	.....	35 00	1,702 98	1,400 00
68 Port Elgin	572 23	791 18	1,000 00	440 00	211 80	3,015 21	2,380 00
69 Port Hope	855 88	1,561 50	1,976 73	1,010 00	48 74	5,452 85	4,485 53
70 Port Perry	*684 55	734 55	1,335 86	333 00	578 70	3,666 66	2,880 00
71 Port Rowan	425 78	575 36	852 38	.....	.....	1,853 52	1,350 00
72 Prescott	599 40	406 73	2,080 00	102 00	79 09	3,267 22	2,379 96
73 Rat Portage (Kenora)	988 00	.....	1,761 44	.....	65 00	2,814 44	2,200 00
74 Richmond Hill	515 91	808 14	300 00	628 25	213 32	2,465 62	1,829 25
75 Sault Ste. Marie	1,052 50	.....	4,225 00	723 00	12 85	6,013 35	2,884 62
76 Simcoe	778 33	2,089 15	1,817 75	16 00	58 71	4,759 94	3,915 00
77 Smith's Falls	681 16	.....	3,342 59	225 50	57 00	4,306 25	3,677 50
78 Smithville	509 48	685 00	800 00	.....	831 73	2,826 21	1,630 00
79 Stirling	515 46	715 53	1,652 28	295 00	202 79	3,381 06	1,868 25
80 Streetsville	445 22	1,150 00	250 00	198 50	975 91	3,014 63	1,477 50
81 Sydenham	565 04	2,100 00	.....	426 20	205 17	3,296 41	2,340 64
82 Thorold	551 53	689 41	1,100 00	.....	404 30	2,745 24	1,800 00
83 Tillsonburg	616 48	928 05	1,300 00	280 00	128 51	3,253 04	2,279 02
84 Toronto Technical	1,620 00	.....	22,615 74	5,299 72	2,198 00	31,733 46	21,915 96
85 Trenton	648 54	977 80	3,219 47	.....	223 00	5,068 81	3,052 08
86 Uxbridge	*677 09	828 20	1,300 00	724 29	342 74	3,872 32	2,949 35
87 Vienna	440 73	540 73	575 50	.....	678 66	2,235 62	1,111 31
88 Walkerton	746 19	1,190 95	2,300 00	649 64	388 40	5,275 18	3,800 00
89 Wardsville	438 46	438 46	340 00	210 00	280 51	1,707 46	1,200 00
90 Waterdown	499 29	899 29	450 00	344 00	373 08	2,565 66	1,900 00
91 Waterford	605 52	1,290 95	700 00	.....	792 65	3,389 12	2,336 97
92 Watford	671 37	1,865 00	700 00	439 25	1,713 58	5,389 20	2,826 50
93 Welland	682 98	1,705 21	1,800 00	.....	1,415 98	5,604 17	3,050 00
94 Weston	525 67	700 00	700 00	463 00	215 12	2,603 79	1,862 85
95 Wiarton	599 86	713 25	1,100 00	378 00	1,458 60	4,249 71	2,278 26
96 Williamstown	612 97	729 82	2,658 01	.....	6,744 10	10,744 90	2,610 75
1 Totals High Schools	62,244 84	92,095 92	160,943 34	41,225 52	83,543 36	440,052 98	269,924 28
2 " Collegiate Institutes	58,554 65	56,175 45	286,790 70	75,532 52	43,761 35	520,814 67	350,785 99
3 Grand totals 1904	120,799 49	148,271 37	447,734 04	116,758 04	127,304 71	960,867 65	620,710 27
4 " " 1903	118,772 82	149,288 03	392,965 94	111,028 26	104,682 31	876,737 36	571,558 64
5 Increases	2,026 67	.....	54,768 10	5,729 78	22,622 40	84,130 29	49,151 63
6 Decreases	.....	1,016 66	.....	.....	.....	.....	.....
7 Percentages	12.57	15.43	46.6	12.15	13.25	.....	70.77

*Grant for Cadet Corps included.

HIGH SCHOOLS.—*Continued.*

Statement.—*Concluded.*

	Expenditure.						
	Buildings, sites, and all permanent improvements.	Repairs to school accommodations.	Library, scientific apparatus, maps, etc., typewriters, drawing models, and equipment for physical education.	School books, stationery, prizes, fuel, examinations, and other expenses	Total expenditure.	Balances.	Charges per year.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
59	166 70	....	105 94	1,311 06	5,821 70	262 29	Town $9; others $10.
60	255 04	516 62	94 94	730 55	6,255 02	449 66	$7.50.
61	....	45 33	8 40	760 92	3,584 65	18 55	Free; Co. and non-res. $10.
62	124 70	116 48	151 50	536 86	3,749 54	57 25	$6; $8; $10.
63	30 00	35 63	76 66	1,156 90	5,112 86	....	Free.
64	25 50	301 03	....	587 73	4,661 69	3,711 48	Free.
65	....	....	146 68	1,047 16	5,943 84	2,463 74	Free; non-res. $10.
66	121 26	27 15	169 90	165 33	3,525 37	....	Free.
67	....	....	66 59	236 39	1,702 98	....	Free.
68	....	....	....	452 96	2,832 96	182 25	Res. $6.50; others $10.
69	....	....	42 55	924 77	5,452 85	....	Co. free; towns and others $9.
70	126 00	....	16 85	643 81	3,666 66	....	$7 50.
71	169 90	....	30 00	303 62	1,853 52	....	Free.
72	....	131 86	4 05	693 55	3,209 42	57 80	Res. free; non-res. $5.
73	....	15 00	24 44	575 00	2,814 44	....	Free.
74	....	8 95	....	471 00	2,309 20	156 42	$10.
75	720 00	41 37	182 87	438 74	4,267 60	1,745 75	$10.
76	11 37	4 00	43 46	786 11	4,759 94	....	Res. free; non-res. $10.
77	....	146 06	107 05	375 64	4,306 25	....	Town free; Co. $5; others $10.
78	63 21	177 70	65 50	279 62	2,216 03	610 18	Free.
79	61 83	174 87	....	164 94	2,269 89	1,111 17	$10.
80	....	241 02	19 61	231 47	1,969 60	1,045 03	$5.
81	95 00	232 77	5 00	359 44	3,082 85	263 56	Res. $5; non-res. $6.
82	159 18	147 50	17 90	485 09	2,609 67	135 57	Free.
83	25 22	10 12	17 50	710 81	3,042 67	210 37	$6.
84	25 75	2,008 88	3,094 97	4,692 90	31,738 46	....	1st year, free; 2nd, $9; 3rd, $15; special, $2 per subject.
85	95 85	114 08	12 00	825 17	4,099 13	969 68	Town free; Co. $26.10.
86	273 50	75 50	25 00	472 90	3,796 25	76 07	Res. $5; Co. $7.50.
87	232 00	....	17 82	61 64	1,422 77	812 85	Free.
88	....	266 33	188 60	493 51	4,748 44	526 74	$10.
89	....	54 87	21 21	374 87	1,650 95	56 51	Res. $7.50; others $10.
90	5 00	....	2 80	654 86	2,565 66	....	$5.
91	....	42 77	....	544 88	2,924 62	464 50	Free.
92	....	90 65	....	1,065 00	3,982 15	1,407 05	$10; Co. free.
93	307 40	59 04	....	538 31	3,954 75	1,649 42	Free.
94	78 00	8 63	22 33	397 43	2,369 24	234 55	$10.
95	21 00	12 20	....	1,801 75	4,113 21	136 50	$5.
96	221 56	....	64 43	6,422 16	9,319 20	1,425 70	Free.
1	23,308 92	8,563 49	8,064 07	70,848 03	380,708 79	59,344 19	47 free; 49 fee.
2	27,203 18	13,918 42	7,064 86	97,406 21	496,378 66	24,436 01	9 free; 33 fee.
3	50,512 10	22,481 91	15,128 93	168,254 24	877,087 45	83,780 20	56 free; 82 fee.
4	46,723 59	18,967 15	9,880 31	166,952 88	816,082 07	60,655 29	54 free; 81 fee.
5	3,788 51	3,514 76	5,248 62	1,301 86	61,005 38	23,124 91	2 free; 1 fee.
6	....	....	....	....	....	....	
7	5.76	2.56	1.72	19.18	....	....	40.58% free; 59.42% fee.

Cost per pupil, enrolled attendance, $31.65; average attendance, $52.42.

COLLEGIATE INSTITUTES

II.—Table I.—Attendance, Pupils in the

	Collegiate Institutes.	Pupils.				Number of pupils						
		Boys.	Girls.	Total.	Average attendance.	English Grammar.	English Composition and Rhetoric.	English Literature.	Canadian History.	British History.	Ancient History.	Mediæval History.
1	Aylmer	94	93	187	110	171	179	183	162	177	89	....
2	Barrie	145	143	288	166	262	288	286	182	197	116	....
3	Berlin	130	117	247	140	235	242	244	155	171	84	....
4	Brantford	169	215	384	237	304	371	371	147	158	146	....
5	Brockville	164	170	334	195	296	334	334	296	320	127	....
6	Chatham	198	257	455	266	438	455	455	251	290	180	....
7	Clinton	95	91	186	110	165	184	184	78	78	99	....
8	Cobourg	69	94	163	89	152	163	163	152	152	39	11
9	Collingwood	103	140	243	139	219	243	243	134	207	100	....
10	Galt	140	147	287	169	248	287	287	184	262	76	....
11	Goderich	108	160	268	167	245	262	262	85	118	95	....
12	Guelph	133	189	322	182	294	322	322	222	132	100	....
13	Hamilton	373	480	853	508	624	831	831	261	620	356	....
14	Ingersoll	71	89	160	94	150	160	160	120	160	40	....
15	Kingston	256	317	573	344	487	568	546	395	313	120	....
16	Lindsay	141	164	305	168	296	305	305	259	259	95	....
17	London	490	492	982	590	885	971	971	885	971	343	....
18	Morrisburg	134	134	268	168	247	268	268	175	208	151	....
19	Napanee	125	166	291	166	270	270	287	184	195	94	....
20	Niagara Falls	104	185	289	164	260	289	289	202	231	58	....
21	Orillia	119	171	290	174	253	272	272	220	282	104	6
22	Ottawa	397	306	703	410	555	703	699	341	537	89	....
23	Owen Sound	234	246	480	300	408	469	468	354	399	192	....
24	Perth	101	118	219	142	210	216	217	180	187	52	....
25	Peterborough	168	196	364	246	320	364	364	364	364	76	....
26	*Renfrew	105	155	260	155	242	260	260	203	211	100	....
27	Ridgetown	108	110	218	119	207	218	218	169	190	79	....
28	St. Catharines	132	205	337	178	314	337	337	314	331	81	....
29	St. Mary's	103	145	248	154	208	240	240	103	216	80	....
30	St Thomas	217	282	499	309	481	499	499	352	195	147	....
31	Sarnia	135	195	330	192	316	330	327	152	198	118	....
32	Seaforth	104	110	214	136	181	192	190	135	190	62	....
33	Stratford	169	214	383	224	360	378	378	236	244	147	....
34	Strathroy	80	104	184	128	180	182	182	152	156	65	....
35	Toronto (Harbord)	292	345	637	384	541	635	636	375	193	178	....
36	Toronto (Jameson)	201	240	441	262	410	441	441	362	425	92	....
37	Toronto (Jarvis)	322	306	628	370	541	621	621	178	559	172	....
38	Toronto Junction	147	157	304	175	289	298	299	284	216	105	....
39	Vankleek Hill	86	125	211	129	201	208	208	93	161	75	....
40	Whitby	60	87	147	90	140	145	145	80	140	50	15
41	Windsor	141	216	357	215	226	335	118	200	200	57	....
42	Woodstock	126	212	338	201	312	338	330	312	338	91	....
	Totals	6,789	8,088	14,877	8,865	13,138	14,673	14,439	9,678	11,101	4,720	32

* Statistics of preceding year.

AND HIGH SCHOOLS.—*Continued.*

various subjects, and Examination Results.

in the various branches of Instruction.

Reading.	Arithmetic and Mensuration.	Algebra.	Geometry.	Trigonometry.	French.	German.	Latin.	Greek.	Zoology.	Botany.	Chemistry.	Physics.	Mineralogy.	Writing.
177	180	180	16	122	3	156	2	.....	98	98	112	....		98
260	270	194	21	167	35	176	2	4	122	136	243	....		109
289	243	158	17	35	153	104	4	40	101	163	163	....		136
347	315	201	20	295	73	230	12	3	86	83	141	....		189
290	290	230	25	206	74	246	6	6	296	112	300	....		207
438	363	256	17	211	34	277	48	161	186	115	338	....		289
165	184	184	19	111	25	157	16	88	95	58	172	....		57
152	163	163	11	44	14	122	12	48	48	121	121	....		124
211	225	225	20	72	14	189	....	9	152	82	139	....		97
278	241	189	14	162	65	134	3	.....	97	86	118	....		170
245	240	145	21	129	47	135	6	1	85	57	132	....		98
294	232	232	28	234	59	210	5	2	66	109	172	....		167
643	807	791	73	569	264	772	8	21	320	211	462	....		344
150	150	85	14	130	.....	92	....	84	84	54	129	....		41
524	471	470	19	407	102	392	12	.....	112	104	179	....		147
296	225	179	26	195	18	286	9	7	52	202	208	....		118
885	798	544	81	685	98	744	18	28	28	324	330	....		628
244	250	200	34	206	30	218	14	70	104	70	229	9		90
269	245	137	18	234	34	216	6	134	134	111	233	12		95
260	281	281	25	164	16	167	3	128	164	101	216	....		174
255	236	220	20	195	53	208	7	92	120	126	174	....		110
555	701	399	49	611	94	514	22	2	176	97	356	....		350
408	404	404	47	308	35	313	13	98	198	134	374	....		168
208	216	149	10	138	18	176	14	129	84	29	132	....		57
340	364	265	15	199	16	170	4	.....	196	57	72	....		243
242	203	153	8	193	25	181	6	.....	60	32	133	....		107
207	163	153	21	66	15	163	4	8	78	65	154	....		115
314	310	194	18	196	70	175	14	4	120	73	120	....		195
221	239	185	28	155	34	237	7	91	106	75	239	....		68
481	375	263	18	113	29	244	3	94	203	81	197	....		236
311	318	163	17	146	23	191	16	95	95	84	216	....		109
180	163	131	25	130	22	167	5	5	6	48	76	....		138
346	308	309	32	129	87	290	4	109	187	132	215	....		205
178	168	168	6	98	15	137	3	2	82	44	175	....		75
608	602	558	74	619	213	521	50	223	249	108	445	....		288
419	425	401	14	420	105	404	26	8	264	76	382	....		340
527	608	573	68	584	194	537	37	27	401	131	535	....		236
284	236	154	15	150	48	180	17	73	126	64	171	....		141
202	208	161	12	142	10	173	3	88	88	45	109	....		47
140	143	117	12	55	10	130	2	2	105	28	57	....		80
330	216	122	16	183	37	214	1	37	121	39	74	....		145
312	276	264	18	192	41	206	10	148	148	117	222	....		133
13,435	13,060	10,545	1,062	9,400	2,352	10,451	454	2,169	5,592	4,082	8,799	21		6,964

COLLEGIATE INSTITUTES AND

II.—Table I.—Attendance, Pupils in the various

Collegiate Institutes.	Number of pupils in the various branches of instruction.—*Con.*									
						Special Courses.				
	Bookkeeping.	Stenography.	Typewriting.	Art.	Physical Education.	Commercial.	Manual Training.	Household Science.	Arithmetic and English Grammar.	Art.
1 Aylmer	98	.....	.....	98	162	.....	.....	.....	44	.....
2 Barrie	129	89	42	46	288	.....	.....	.....	125	.....
3 Berlin	161	76	44	130	141	44	96	108	38	8
4 Brantford	164	86	51	167	338	86	77	73	48	23
5 Brockville	146	42	42	140	.....	42	.....	.....	45	.....
6 Chatham	289	137	137	196	438	137	.....	.....	114	.....
7 Clinton	77	.....	58	79	176	9	.....	.....	34	.....
8 Cobourg	124	98	72	.....	163	98	45	.....	28	.....
9 Collingwood	97	48	48	137	219	27	.....	.....	34	.....
10 Galt	120	67	70	106	266	64	.....	.....	41	.....
11 Goderich	131	76	20	104	240	12	.....	.....	48	.....
12 Guelph	175	90	90	30	294	90	.....	.....	40	.....
13 Hamilton	300	113	16	261	720	25	309	349	80	.....
14 Ingersoll	41	24	15	75	159	5	30	43	30	.....
15 Kingston	187	97	99	66	.....	93	143	.....	35	85
16 Lindsay	118	51	51	108	300	35	.....	.....	45	.....
17 London	628	165	90	640	940	165	298	306	177	.....
18 Morrisburg	110	60	38	113	230	38	.....	.....	110	.....
19 Napanee	110	80	47	186	278	.....	.....	.....	86	.....
20 Niagara Falls	205	112	64	169	260	87	.....	.....	34	.....
21 Orillia	110	49	68	98	270	.....	.....	.....	70	.....
22 Ottawa	407	61	50	492	690	36	.....	.....	34	.....
23 Owen Sound	240	40	35	215	278	44	.....	.....	75	.....
24 Perth	103	.....	.....	154	209	.....	.....	.....	26	.....
25 Peterborough	243	81	20	.....	.....	.....	.....	.....	32	.....
26 *Renfrew	97	62	47	60	101	.....	31	.....	.....	.....
27 Ridgetown	115	58	54	64	207	75	.....	.....	56	.....
28 St. Catharines	195	123	35	.....	333	123	.....	.....	42	.....
29 St. Mary's	86	30	7	103	221	.....	.....	.....	66	.....
30 St. Thomas	236	124	124	228	499	61	.....	.....	129	.....
31 Sarnia	135	99	56	69	320	99	.....	.....	28	.....
32 Seaforth	94	31	45	86	201	31	.....	.....	49	.....
33 Stratford	150	79	60	80	.....	90	98	118	111	.....
34 Strathroy	75	37	32	88	178	10	.....	.....	35	.....
35 Toronto (Harbord)	177	74	30	439	588	.....	.....	.....	30	.....
36 Toronto (Jameson)	265	82	12	292	390	.....	.....	.....	39	.....
37 Toronto (Jarvis)	196	59	47	328	586	140	.....	.....	61	.....
38 Toronto Junction	98	62	64	131	.....	62	.....	.....	19	.....
39 Vankleek Hill	46	23	23	78	200	.....	.....	.....	29	.....
40 Whitby	100	20	.....	100	140	80	.....	.....	15	.....
41 Windsor	198	142	62	333	325	139	.....	.....	15	31
42 Woodstock	130	61	44	80	292	61	53	.....	7	.....
Totals	6,906	2,908	2,009	6,369	1,640	2,108	1,180	997	2,204	147

*Statistics of preceding year.

HIGH SCHOOLS.—*Continued.*

Subjects and Examination Results.—*Continued.*

	Examination Results.												
	Number passed District Certificate Examination.	Number passed Junior Examination.	Number of Honors obtained by such pupils.	Number awarded Middle School Graduation Diplomas.	Number passed Senior Examination.	Number of Honors obtained by such pupils.	Number awarded Upper School Graduation Diplomas.	Number passed the full Departmental Matriculation Examination.	Number passed the Junior Matriculation Examination held by any University.	Number of first-class Junior Matriculation Honors taken by Matriculation candidates.	Number of second-class Junior Matriculation Honors taken by Matriculation candidates.	Number passed the Senior Matriculation Examination held by any University.	Number passed the Entrance Examination other than the Departmental, for any profession.
1		15			6			3				1	2
2		13			14			8				1	3
3	5	7		7	3	1	3	6					
4		11			9			17	3		32		
5	4	5		15	9		5	10	25	5	10	3	6
6		10			3			12	1	7	8		
7		15			4			5		2	3		
8		10			4			2					
9		14			6			6	10	2	2		4
10		13	2	20	5		1	17					
11		20	2	21	4		3	1					
12		13			4			4			4		3
13		15		1	25			39	8	23	23		13
14		3			5								
15		5						18	13	6		4	
16		5		21	5		5	13					3
17		29			24	1		41	1	21	8		
18		20		20	2		4	4	1			2	
19		11	1		9			10		1	3	1	
20		12		12	6		6	1			1		4
21		9			4			4					
22		7			4		11	12	22	8	5		
23		35	1		13	3		15		11			
24		11		12	3		2	5	2				2
25		15			7			12		3	2		
26	9	12			1				4	1		1	2
27		18		20	5		5	7	7	2	1		3
28	5	6			7	2		10	3	5	4		
29		21		14	7		7	9		3	10		
30		19		26	6		7	9	2	5	5		
31		11		17	4		3	6		2	8		1
32		24	1		16	1		1		9	1		
33		17		17	13	1		3	3				
34		13	1	15	1		1	2		2	2		
35		5			6	1		30		18	6		
36		11		33	1		5	20	5	12	4		
37		37	8		6	2		10	27	12	8		
38		9	1	9	11	2	4	6					
39		20	1		1			10	3				
40		8		7	6	1	3	1					
41		9		17	2			6					
42		14			7			7				1	2
	23	577	18	304	278	15	75	402	140	160	150	14	48

COLLEGIATE INSTITUTES

II.—Table I.—Attendance, Pupils in the

High Schools.	Pupils.				Number of Pupils					
	Boys.	Girls.	Total.	Average Attendance.	English Grammar.	English Composition and Rhetoric.	English Literature.	Canadian History.	British History.	Ancient History.
1 Alexandria	61	62	123	84	123	123	123	123	123	37
2 Almonte	60	76	136	78	129	132	134	100	85	31
3 Arnprior	53	79	132	82	128	132	132	88	128	44
4 Arthur	58	72	130	84	118	130	130	88	88	42
5 Athens	79	115	194	126	190	192	192	190	191	95
6 Aurora	47	56	103	64	95	103	103	69	69	26
7 Beamsville	29	29	58	40	58	58	58	56	56	36
8 Belleville	125	134	259	147	248	257	256	178	255	43
9 Bowmanville	55	85	140	87	128	133	133	80	126	51
10 Bradford	69	74	143	80	92	143	143	92	94	51
11 Brampton	107	80	187	117	158	187	187	158	187	68
12 Brighton	29	40	69	39	69	69	69	36	36	33
13 Caledonia	51	62	113	69	107	108	108	75	108	42
14 Campbellford	76	82	158	91	149	157	158	105	112	43
15 Carleton Place	77	84	161	105	95	159	159	42	100	37
16 Cayuga	48	45	93	52	91	93	93	89	93	27
17 Chesley	30	40	70	60	65	70	70	65	70	21
18 Colborne	40	36	76	47	76	76	76	44	44	28
19 Cornwall	126	166	292	178	286	292	292	270	292	83
20 Deseronto	45	77	122	80	109	122	122	112	122	45
21 Dundas	76	63	139	82	138	139	139	123	123	45
22 Dunnville	72	75	147	95	141	142	138	116	121	37
23 Dutton	103	113	216	137	176	216	216	176	216	109
24 East Toronto	51	34	85	46	85	85	85	85	85	10
25 Elora	35	60	95	45	90	95	95	47	79	48
26 Essex	55	83	138	89	128	138	138	84	84	86
27 Fergus	65	77	142	82	78	142	142	131	142	69
28 Forest	56	69	125	83	117	125	125	83	83	42
29 Fort William	39	38	77	49	77	77	77	77	77	15
30 Gananoque	60	90	150	94	149	150	150	109	150	50
31 Georgetown	58	76	134	75	123	134	134	92	99	38
32 Glencoe	54	48	102	61	94	100	100	68	68	42
33 Gravenhurst	26	38	64	32	64	64	64	47	64	17
34 Grimsby	27	40	67	33	67	67	67	67	67	13
35 Hagersville	61	59	120	70	114	120	120	114	114	38
36 Harriston	73	63	136	80	115	131	131	54	131	73
37 Hawkesbury	32	32	64	33	56	63	63	42	34	18
38 Iroquois	76	88	164	110	155	164	164	129	129	46
39 Kemptville	112	133	245	153	230	245	245	202	222	103
40 Kincardine	87	102	189	121	170	189	189	121	127	63
41 Leamington	78	80	158	83	140	158	158	90	90	50
42 Listowel	86	76	162	96	142	162	162	96	113	71
43 Lucan	71	86	157	99	136	157	157	81	115	76
44 Madoc	46	53	99	55	94	99	98	57	60	38
45 Markham	138	85	223	140	190	210	210	190	210	87
46 Meaford	75	86	161	98	146	161	161	94	94	67
47 Midland	23	27	50	46	47	50	50	42	50	8
48 Mitchell	69	70	139	89	139	139	139	106	106	56
49 Mount Forest	79	77	156	96	148	156	156	94	156	62
50 Newburgh	75	80	155	101	155	155	156	155	155	62
51 Newcastle	27	43	70	40	69	70	70	60	60	20
52 Newmarket	71	77	148	91	148	148	148	123	123	49
53 Niagara	18	33	51	28	51	51	51	15	16	20
54 Niagara Falls South	32	40	72	27	71	71	71	61	65	9
55 North Bay	44	62	106	63	105	105	105	80	80	24
56 Norwood	72	78	150	90	145	145	145	110	110	58
57 Oakville	48	64	112	64	112	112	82	52	81	29

AND HIGH SCHOOLS.—*Continued.*

various subjects and Examination Results.—*Continued.*

in the various branches of instruction.

Mediæval History.	Modern History.	Geography.	Reading.	Arithmetic and Mensuration.	Algebra.	Geometry.	Trigonometry.	French.	German.	Latin.	Greek.	Zoology.	Botany.	Chemistry.	Physics.	Mineralogy.	Writing.
.....	.....	123	123	123	123	69	.....	119	.....	119	.....	75	78	37	97	.....	
.....	.....	111	111	128	134	68	5	61	2	103	3	71	91	84	97	.....	
.....	.....	128	88	128	132	132	3	49	.....	120	5	43	43	25	120	.....	
.....	.....	88	88	88	130	130	8	28	1	121	.....	88	88	62	123	.....	
.....	.....	130	137	189	192	192	7	111	7	190	4	.....	77	128	144	.....	
.....	.....	95	103	95	103	95	8	51	7	93	1	.....	34	84	93	.....	
.....	.....	52	51	58	58	36	.....	17	.....	31	.....	28	31	21	52	.....	
.....	.....	142	257	178	259	97	11	85	.....	72	.....	2	94	86	86	.....	
.....	.....	126	112	129	135	135	6	102	12	121	2	33	33	32	140	.....	
.....	.....	86	92	92	143	143	2	92	2	112	.....	.....	46	39	97	.....	
.....	.....	158	110	158	185	139	27	115	3	145	8	20	168	56	170	.....	11
.....	.....	36	36	69	69	48	.....	26	.....	56	.....	.....	.....	33	47	.....	
.....	.....	107	75	107	108	108	1	60	8	102	.....	.....	65	95	48	.....	
.....	.....	105	106	157	139	137	7	58	8	61	2	.....	48	71	82	.....	
.....	.....	95	110	95	159	146	6	62	8	57	.....	93	77	90	135	.....	
.....	4	76	66	87	93	56	4	39	.....	60	.....	66	51	24	85	.....	
.....	.....	65	49	66	70	49	4	44	5	68	.....	.....	49	11	67	.....	
.....	.....	44	44	76	76	61	.....	43	4	66	.....	.....	16	25	45	.....	
.....	.....	208	292	286	206	206	14	180	12	178	8	82	182	17	187	.....	2
.....	.....	109	85	112	122	122	11	87	14	73	1	.....	42	18	122	.....	
.....	.....	123	139	139	139	82	.....	93	5	96	1	76	76	63	122	.....	
.....	.....	114	109	145	146	93	6	43	17	83	.....	.....	84	67	122	.....	
.....	.....	176	97	176	216	216	42	80	.....	194	3	13	90	216	216	.....	
.....	.....	61	75	85	85	85	.....	77	14	79	8	48	48	81	83	.....	
.....	.....	70	70	88	95	69	7	33	9	90	.....	19	47	42	95	.....	
.....	.....	110	84	128	136	86	16	70	18	123	12	84	84	40	45	.....	
.....	.....	73	73	73	142	142	11	82	14	102	2	73	37	65	141	.....	
.....	.....	83	83	117	125	125	8	70	42	95	1	.....	50	36	63	.....	
.....	.....	75	62	77	77	77	2	72	.....	70	.....	58	60	28	77	.....	
2	2	109	109	145	148	90	2	87	20	75	.....	30	30	96	88	.....	
.....	.....	128	130	123	131	96	8	35	9	120	1	.....	92	14	123	.....	
.....	.....	75	65	93	102	82	6	66	.....	90	.....	.....	44	65	97	.....	
.....	.....	64	47	64	64	64	.....	32	.....	27	.....	.....	43	16	64	.....	
.....	.....	67	54	67	84	67	.....	26	.....	38	.....	.....	42	5	45	.....	
.....	.....	93	82	116	118	78	6	.....	.....	.....	.....	74	66	56	120	.....	
.....	.....	54	54	115	131	131	14	57	34	86	6	.....	30	66	123	.....	
.....	.....	49	49	57	61	31	5	59	.....	53	.....	30	41	50	49	.....	
.....	.....	129	131	155	160	94	12	77	6	124	8	78	110	126	96	.....	
.....	.....	202	142	230	245	245	20	92	11	215	10	142	142	76	245	.....	
.....	.....	120	146	179	149	149	7	112	17	132	1	.....	71	33	142	.....	1
.....	.....	93	93	140	148	100	8	79	7	80	.....	55	55	55	80	.....	
.....	.....	162	92	152	161	161	18	41	74	154	3	.....	86	39	69	.....	
.....	.....	81	81	136	157	155	21	101	12	144	.....	4	73	95	157	.....	
.....	.....	56	56	99	98	60	4	32	10	60	.....	.....	48	30	50	.....	
.....	.....	123	123	190	223	198	30	183	7	210	7	3	70	80	147	.....	1
.....	.....	92	94	146	159	155	15	82	24	153	.....	94	94	93	112	.....	
.....	.....	47	42	47	50	50	3	38	6	37	.....	.....	19	45	45	.....	
.....	.....	104	106	139	139	115	1	51	.....	75	.....	62	71	52	131	.....	
.....	.....	94	148	148	156	99	8	55	4	140	1	61	62	57	156	.....	
.....	.....	155	155	155	154	155	.....	82	.....	111	.....	.....	86	31	104	.....	
.....	.....	60	30	69	50	50	.....	33	3	40	.....	.....	20	15	25	.....	
.....	.....	123	99	148	128	116	.....	89	.....	88	4	32	80	98	99	.....	
.....	.....	51	31	51	51	36	.....	36	.....	33	.....	.....	15	20	36	.....	
.....	.....	61	61	71	70	61	.....	58	.....	55	.....	.....	31	10	26	.....	
.....	.....	80	82	106	104	46	.....	90	2	57	.....	.....	7	19	24	.....	
.....	.....	145	130	147	149	110	.....	120	5	135	.....	90	90	60	125	.....	1
.....	.....	75	83	112	83	83	.....	22	2	56	.....	31	82	29	50	.....	

COLLEGIATE INSTITUTES AND

II.—Table I.—Attendance, Pupils in the various

High Schools.	Number of pupils in the various branches of instruction.—*Con.*									
						Special Courses.				
	Bookkeeping.	Stenography.	Typewriting.	Art.	Physical Education.	Commercial.	Manual Training.	Household Science.	Arithmetic and English Grammar.	Art.
1 Alexandria	83			88	123				18	
2 Almonte	91	50	46	92		36			26	
3 Arnprior	43			43					27	
4 Arthur	88			88	130				41	
5 Athens	77			115					84	
6 Aurora	46	34	20	34					26	
7 Beamsville	33			33					15	
8 Belleville	46			60					28	
9 Bowmanville	50	6		80	76				26	
10 Bradford	86	26		76	143				49	
11 Brampton	110	48	32	110					19	
12 Brighton	36								18	
13 Caledonia	50			50					40	
14 Campbellford	78	25								
15 Carleton Place	110			95					57	
16 Cayuga	66								14	
17 Chesley	20			49					16	
18 Colborne	16								28	
19 Cornwall	124	60	58	108	209	40			69	
20 Deseronto	77			85					18	
21 Dundas	94	35	35	94	137	8			29	
22 Dunnville	73	33			128					
23 Dutton	34			34					77	
24 East Toronto	62			62					16	
25 Elora	47		3						24	
26 Essex	60			60	84			60		
27 Fergus	40			37					58	
28 Forest	50			50					34	
29 Fort William	59	19			77				4	
30 Gananoque	71	29	8	77	150	29			24	
31 Georgetown	78			78					14	
32 Glencoe	29			44					21	
33 Gravenhurst	14	16		47	45				8	
34 Grimsby	52			53					12	
35 Hagersville	63			63					32	
36 Harriston	45	50		45		7			33	
37 Hawkesbury	41			41					9	
38 Iroquois	93	21		93					24	
39 Kemptville	66			142					68	
40 Kincardine	138	48	46	70	178	48			53	
41 Leamington	47	12							35	
42 Listowel	92			92	155				50	
43 Lucan	77	17	29	77	110				40	
44 Madoc	33								38	
45 Markham	123	50	10						67	
46 Meaford	42	20	7	44	146				52	
47 Midland	19				42				5	
48 Mitchell	68			68	139				37	
49 Mount Forest	94			94					54	
50 Newburgh		86		107					62	
51 Newcastle	25								17	
52 Newmarket	95	85	64	98	148	28			27	
53 Niagara	36	25	25	31		7			16	
54 Niagara Falls South	54	27	36	42	37				10	
55 North Bay	82	34	30						24	
56 Norwood	96						60		58	
57 Oakville	44	21	21	24		21			21	

HIGH SCHOOLS.—*Continued.*

subjects and Examination Results.—*Continued.*

Examination Results.

Number passed District Certificate Examination.	Number passed Junior Examination.	Number of Honors obtained by such pupils.	Number awarded Middle School Graduation Diplomas.	Number passed Senior Examination.	Number of Honors obtained by such pupils.	Number awarded Upper School Graduation Diplomas.	Number passed the full Departmental Matriculation Examination.	Number passed the Junior Matriculation Examination held by any University.	Number of first-class Junior Matriculation Honors taken by Matriculation Candidates.	Number of second-class Junior Matriculation Honors taken by Matriculation Candidates.	Number passed the Senior Matriculation Examination held by any University.	Number passed the Entrance Examination other than the Departmental for any profession.
.....	11	.....	.....	.....	.....	.....	6	.....	.....	.....	.....	.....
.....	3	.....	3	1	.....	.....	1	1	.....	.....	.....	1
.....	1	.....	.....	1	.....	.....	3	2	1	.....	1	.....
.....	6	.....	2	3	.....	2	4	.....	.....	.....	.....	.....
.....	26	1	30	.....	.....	.....	20	.....	.....	1	.....	1
2	11	.....	11	3	.....	3	4	.....	.....	.....	.....	.....
.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	11	6	8	4	8	.....	.....	.....	3	.....
.....	7	.....	.....	5	2	.....	1	1	.....	.....	4	.....
.....	5	.....	6	1	.....	1	1	.....	.....	.....	.....	3
.....	11	.....	11	5	.....	2	13	2	3	18	.....	.....
.....	7	.....	7	.....	.....	.....	2	.....	.....	.....	.....	.....
.....	8	.....	7	3	.....	2	4	.....	3	4	.....	.....
.....	3	.....	.....	3	.....	.....	1	.....	.....	.....	.....	.....
.....	10	1	6	2	.....	3	.....	1	3	1	2	.....
.....	7	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	5	.....	5	.....	.....	.....	1	.....	.....	.....	.....	.....
.....	11	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	.....
.....	7	.....	.....	5	.....	.....	1	.....	.....	.....	.....	.....
.....	12	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....
.....	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	27	1	27	24	3	15	2	2	6	4	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
.....	11	.....	.....	1	.....	.....	3	.....	.....	.....	.....	1
.....	8	.....	9	5	.....	7	5	.....	.....	.....	2	1
.....	11	.....	8	2	.....	4	5	.....	2	4	.....	.....
.....	15	.....	15	6	.....	6	6	1	.....	.....	.....	.....
7	2	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
.....	8	.....	.....	.....	.....	.....	6	2	.....	.....	.....	.....
1	10	.....	8	3	.....	4	.....	.....	.....	.....	1	1
.....	6	.....	3	2	.....	1	.....	.....	.....	.....	.....	.....
7	3	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
.....	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	6	1	.....	2	.....	.....	.....	.....	.....	.....	.....	.....
.....	8	.....	.....	2	.....	.....	5	.....	.....	.....	1	.....
.....	3	.....	.....	1	.....	.....	1	.....	.....	.....	2	.....
.....	10	1	9	1	.....	1	8	.....	2	1	.....	.....
.....	23	.....	.....	6	.....	.....	12	.....	1	2	1	1
.....	24	.....	.....	2	1	.....	3	.....	.....	.....	.....	.....
.....	8	.....	12	4	.....	2	6	.....	.....	.....	.....	.....
.....	15	.....	.....	2	1	.....	1	.....	.....	.....	2	.....
.....	16	.....	.....	4	.....	.....	4	.....	1	1	.....	.....
1	11	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....
.....	9	.....	9	3	.....	.....	10	.....	1	5	1	1
.....	9	.....	.....	5	.....	.....	6	3	.....	.....	.....	1
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	10	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	2
.....	5	.....	.....	2	.....	.....	1	.....	2	3	.....	.....
.....	15	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
.....	4	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
.....	7	.....	9	.....	.....	.....	3	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
6	1	.....	.....	.....	.....	.....	4	1	.....	.....	.....	2
.....	1	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....

COLLEGIATE INSTITUTES AND

II.—Table I.—Attendance, Pupils in the various

High Schools.	Pupils.				Number of Pupils in the							
	Boys.	Girls.	Total.	Average attendance.	English Grammar.	English Composition and Rhetoric.	English Literature.	Canadian History.	British History.	Ancient History.	Mediæval History.	Modern History.
58 Omemee	26	34	60	37	60	60	60	40	60	53	.....	.....
59 Orangeville	83	123	206	118	192	201	201	154	160	87	.....	.....
60 Oshawa	85	94	179	121	171	179	179	125	179	43	.....	.....
61 Paris	67	63	130	80	123	130	130	65	101	29	.....	.....
62 Parkhill	75	90	165	105	144	165	155	77	99	78	.....	.....
63 Pembroke	94	82	176	87	155	176	176	163	170	77	.....	.....
64 Petrolea	72	93	165	97	158	165	165	96	77	77	.....	.....
65 Picton	95	120	215	122	206	215	215	151	154	63	.....	.....
66 Port Arthur	24	56	80	40	80	80	80	77	77	15	.....	77
67 Port Dover	42	42	84	52	84	35	84	49	49	35	35	35
68 Port Elgin	48	37	85	50	85	85	85	78	78	29	.....	.....
69 Port Hope	96	133	229	145	213	229	229	213	229	62	.....	.....
70 Port Perry	53	58	111	63	105	111	111	111	111	73	.....	.....
71 Port Rowan	31	18	49	28	49	49	49	24	24	25	.....	.....
72 Prescott	44	67	111	57	105	111	111	83	87	28	.....	.....
73 Rat Portage (Kenora)	40	56	96	41	87	96	96	89	89	89	.....	.....
74 Richmond Hill	58	48	106	50	106	106	106	76	106	51	5	106
75 Sault Ste. Marie	56	91	147	74	144	147	147	93	56	34	.....	.....
76 Simcoe	81	89	170	90	155	170	170	135	135	69	.....	.....
77 Smith's Falls	64	127	191	127	186	191	191	177	191	63	.....	.....
78 Smithville	36	44	80	51	78	80	80	48	50	32	.....	.....
79 Stirling	26	33	59	38	50	59	59	50	59	35	.....	.....
80 Streetsville	24	25	49	35	49	49	49	32	32	17	.....	.....
81 Sydenham	44	81	125	81	125	125	125	70	125	55	.....	125
82 Thorold	33	40	73	58	73	73	73	62	64	25	.....	.....
83 Tillsonburg	50	58	108	66	108	108	108	108	108	31	.....	.....
84 Toronto Technical	310	290	600	504	525	525	525	320	320	.....	.....	320
85 Trenton	77	83	160	95	136	158	158	139	154	44	.....	.....
86 Uxbridge	66	94	160	88	150	160	160	141	159	60	.....	.....
87 Vienna	16	22	38	20	38	38	38	38	38	16	.....	.....
88 Walkerton	76	80	156	88	149	150	150	103	103	55	.....	150
89 Wardsville	15	25	40	23	38	40	40	31	38	21	.....	38
90 Waterdown	53	69	122	66	122	122	122	117	122	36	.....	.....
91 Waterford	56	63	119	76	106	115	115	106	90	41	.....	.....
92 Watford	80	96	176	110	160	168	168	60	108	108	.....	168
93 Welland	71	132	203	126	169	201	201	75	140	51	.....	.....
94 Weston	32	45	77	45	73	77	77	61	61	18	.....	.....
95 Wiarton	50	55	105	64	105	105	105	98	105	37	.....	.....
96 Williamstown	50	55	105	62	105	105	105	74	33	29	.....	.....
1 Totals, High Schools	5,929	6,903	12,832	7,865	11,881	12,625	12,631	9,336	10,419	4,422	42	1,025
2 Totals, Collegiate Institutes	6,789	8,088	14,877	8,865	13,138	14,673	14,439	9,678	11,101	4,720	32	968
3 Grand Totals, 1904	12,718	14,991	27,709	16,730	25,019	27,298	27,070	19,014	21,520	9,142	74	1,993
4 Grand Totals, 1903	11,988	13,734	25,722	15,317	23,069	25,375	24,885	15,239	17,494	9,187	.....	.....
5 Increases	730	1,257	1,987	1,413	1,950	1,923	2,185	3,775	4,026	.....	.....	.....
6 Decreases	.....	.....	.....	.....	.....	.....	.....	.....	.....	45	.....	.....
7 Percentages	45.9	54.1	.....	60.38	90.65	98.51	97.69	68.62	77.66	32.99	.26	7.19

HIGH SCHOOLS.—*Continued.*

subjects and Examination Results.—*Continued.*

various branches of Instruction.

	Geography.	Reading.	Arithmetic and Mensuration.	Algebra.	Geometry.	Trigonometry.	French.	German.	Latin.	Greek.	Zoology.	Botany.	Chemistry.	Physics.	Mineralogy.	Writing.
58	40	40	60	60	53	1	25	.....	43	.....	.....	.....	53	53	.....	20
59	154	120	194	202	195	19	143	33	164	12	7	6	94	127	.....	76
60	158	139	174	179	179	10	98	33	125	6	.....	139	41	179	.....	95
61	65	101	123	110	110	7	36	8	63	1	.....	65	12	97	.....	85
62	87	82	154	141	116	22	69	14	94	3	4	65	47	77	.....	87
63	110	99	163	173	173	11	129	.....	141	.....	.....	78	74	80	.....	78
64	96	96	158	165	164	7	124	1	123	.....	119	162	54	.....	165	44
65	96	178	207	177	138	9	132	31	153	.....	102	116	38	90	.....	90
66	80	65	80	80	80	.....	75	10	75	4	25	77	65	80	.....	77
67	68	68	84	84	84	.....	25	7	75	3	37	37	40	60	.....	37
68	60	60	85	82	53	.....	30	8	77	3	.....	49	41	78	.....	32
69	100	100	213	184	178	17	96	32	164	6	83	83	61	88	.....	48
70	105	111	100	101	83	6	64	29	61	4	.....	84	17	63	.....	67
71	24	37	49	46	46	.....	31	.....	30	.....	.....	37	15	48	.....	30
72	80	82	107	111	53	4	30	6	51	.....	35	35	24	63	.....	56
73	84	55	89	96	96	.....	27	.....	69	.....	.....	35	14	26	.....	50
74	106	55	101	103	106	5	55	6	50	1	.....	39	30	100	.....	58
75	127	130	145	147	68	.....	46	.....	124	.....	72	94	25	62	.....	93
76	12	101	154	166	120	15	60	25	80	4	.....	101	69	110	.....	101
77	177	177	186	191	191	14	138	9	160	4	.....	177	98	191	.....	177
78	48	48	78	80	53	2	.....	.....	63	.....	48	27	54	48	.....	.....
79	50	24	50	59	59	9	13	.....	55	.....	5	5	49	59	.....	24
80	32	32	49	45	35	.....	35	6	45	.....	30	30	35	45	.....	18
81	125	70	125	125	125	.....	103	12	109	.....	.....	70	16	114	.....	44
82	71	47	73	70	70	4	62	.....	63	.....	.....	.....	40	73	.....	47
83	104	91	107	107	95	.....	60	.....	64	.....	75	75	50	90	.....	71
84	200	525	525	320	175	35	450	.....	.....	.....	.....	.....	150	150	.....	370
85	136	112	140	158	158	17	81	37	136	.....	.....	45	74	82	.....	112
86	141	99	150	160	96	9	68	46	105	5	77	87	119	140	.....	68
87	22	22	38	38	38	.....	2	.....	29	.....	.....	22	16	38	.....	22
88	94	94	139	150	118	17	34	38	109	7	.....	31	34	109	.....	47
89	38	31	40	40	40	.....	9	.....	27	1	.....	31	21	34	.....	31
90	89	117	117	122	122	5	110	10	100	5	.....	45	25	122	.....	45
91	82	115	110	112	88	9	37	12	104	3	47	61	92	114	.....	61
92	75	116	156	164	104	12	60	10	164	.....	.....	60	83	165	.....	60
93	107	107	169	199	145	12	140	26	169	4	.....	70	48	198	.....	51
94	62	61	72	73	41	3	36	12	50	1	25	25	13	39	.....	25
95	68	68	93	105	105	12	12	6	90	1	.....	68	63	12	.....	68
96	96	92	105	106	34	....	65	.....	83	3	51	51	5	105	.....	51
1	9,125	9,208	11,814	12,083	9,974	697	6,639	922	8,955	183	2,595	5,871	4,956	9,038	165	6,192
2	9,368	10,429	13,435	13,060	10,545	1,062	9,400	2,352	10,454	454	2,169	5,592	4,082	8,799	21	6,964
3	18,493	19,632	25,249	25,143	20,519	1,759	16,039	3,274	19,409	637	4,764	11,463	9,038	17,837	186	13,156
4	15,290	17,530	23,246	23,840	17,873	1,618	14,522	3,229	18,831	602	298	9,442	6,214	14,240	.....	11,296
5	3,203	2,102	2,003	1,303	2,646	141	1,517	45	578	35	4,466	2,021	2,824	3,597	.....	1,860
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7	66.74	70.85	91.12	90.74	74.05	6.35	57.88	11.81	70.04	2.3	17.19	41.37	32.61	64.37	.67	47.47

COLLEGIATE INSTITUTES AND

II.—Table I.—Attendance, Pupils in the various

Number of pupils in the various branches of Instruction.—*Concluded.*

High Schools.	Bookkeeping.	Stenography.	Typewriting.	Art.	Physical Education.	Special Courses. Commercial.	Manual Training.	Household Science.	Arithmetic and English Grammar.	Art.
58 Omemee	20								24	
59 Orangeville	76			76					43	
60 Oshawa	139	36	72	123					41	
61 Paris	85	40	20	65		20			5	
62 Parkhill	87	36	80	77	165	33			38	
63 Pembroke	78								30	
64 Petrolea	88	88	44	96	72	88			70	88
65 Picton	84	37	33	107		37			51	
66 Port Arthur	62			62					15	
67 Port Dover	37		37	37					35	
68 Port Elgin	50			50					10	
69 Port Hope	65	57	57	54		57			89	
70 Port Perry	67	45			101	16			73	
71 Port Rowan	37	9							12	
72 Prescott	50	36	22	56		12			24	
73 Rat Portage (Kenora)	55			55						
74 Richmond Hill	58		16	55		10			15	
75 Sault Ste. Marie	114	50		93					31	
76 Simcoe	101	20		101	60				32	
77 Smith's Falls	177	28	37	128					49	
78 Smithville	27	6		27		6			30	
79 Stirling	24								15	
80 Streetsville	10			32					14	
81 Sydenham	70			70					45	
82 Thorold	47	45	22	44					17	
83 Tillsonburg	71			71					17	
84 Toronto Technical	370	370	185	190		370		120		190
85 Trenton	112			112					11	
86 Uxbridge	90	25		99	158				48	
87 Vienna	22					2			2	
88 Walkerton	72	23	9	72		23			23	
89 Wardsville	31								19	
90 Waterdown	45								42	
91 Waterford	61			61					26	
92 Watford	60	55	50		176				48	
93 Welland	77			107					26	
94 Weston	25	13	15	41					17	
95 Wiarton	42			42					25	
96 Williamstown	51			51					29	
1 Totals, High Schools	6,428	1,896	1,169	5,227	2,989	898	120	120	2,913	278
2 Totals, Collegiate Institutes	6,906	2,908	2,009	6,369	1,640	2,108	1,180	997	2,204	147
3 Grand Totals, 1904	13,334	4,804	3,178	11,596	4,629	3,006	1,300	1,117	5,117	425
4 Grand Totals, 1903	12,264	4,347	2,654	11,619						
5 Increases	1,070	457	524							
6 Decreases				23						
7 Percentages	48.12	17.33	11.47	41.85	16.70	10.85	4.69	4.03	18.46	1.53

HIGH SCHOOLS.—*Continued.*

subjects and Examination Results.—*Concluded.*

Examination Results.

Number present District Certificate Examination.	Number passed Junior Examination.	Number of Honors obtained by such pupils.	Number awarded Middle School Graduation Diplomas.	Number passed Senior Examination.	Number of Honors obtained by such pupils.	Number awarded Upper School Graduation Diplomas.	Number passed the full Departmental Matriculation Examination.	Number passed the Junior Matriculation Examination held by any University.	Number of first-class Junior Matriculation Honors taken by Matriculation candidates.	Number of second-class Junior Matriculation Honors taken by Matriculation candidates.	Number passed the Senior Matriculation Examination held by any University.	Number passed the Entrance Examination other than the Departmental, for any profession.
	7						2					1
	12		17	9	2	6	12	3	9	8	1	2
	5		6	6	1	4	5					
	6			2			3			6		
1	9		9	9		4	6					
1	1			5			9		3			
2	8						6	1	3	4	1	
	5		5	2		1	2	1				
10	2		2				1	1				
1	6		6									
	9	1	10				5					
	8		8	7		7	8					1
3			7				2	2			1	4
	2											
	4			3			1				1	
	1						1					
	6		8				2					
2	2						2					1
	9			5		5	3	1				
	10		10	5	1		3	4	5	3		2
	5			1			1					
	8		3	5			4					
	2											
	9						2					
	4		4	2		2	4					
	4						5					
	3			1			4			3		
1	6			3			2					
	1											
1	11		20	5	2	2	8					2
	2							1				1
	2		2	1		1	5	3				
	9			4			8					1
	12		4	2		2		2				
	7		11	4		4	9					
	2			1			2	2	2			
	7	1		3			5	5	6	4		
1	8	2					2	1				
47	653	9	343	201	21	95	309	48	53	72	24	30
23	577	18	304	278	15	75	402	140	160	150	14	48
70	1,230	27	647	479	36	170	711	188	213	222	38	78
28							689	121	272	268	41	84
42							22	67				
									59	46	3	6
.25	4.44	.1	2.33	1.72	.13	.61	2.56	.67	.77	.8	.13	.28

COLLEGIATE INSTITUTES AND

III.—Table K.—

Collegiate Institutes.	Brick, stone or frame school house.	Number of acres in playground.	Schools under United Board.	Equipment.								Religious and other exercises.				
				Value of Library.	Value of Typewriters.	Value of Scientific Apparatus.	Value of Charts, Maps and Globes.	Value of Models for Drawing.	Value of Gymnasium, not including equipment.	Value of Equipment.	Value of Museum, Aquarium, etc.	Schools using authorized Scripture Readings.	Schools opened with prayer.	Schools closed with prayer.	Schools using Bible.	Commencement exercises.
				$	$	$	$	$	$	$	$					
1 Aylmer	B	4	..	664	.....	703	140	33	680	85	400	....	1	..	..	1
2 Barrie	B	3	..	618	250	726	136	5	1,730	90	.....	....	1	1	..	..
3 Berlin	B	4	..	668	835	1,312	115	20	*	480	200	1	1	..	1	1
4 Brantford	B	¼	..	637	215	878	108	27	1,000	.....	.....	....	1	..	1	..
5 Brockville	S	2½	..	818	100	1,074	187	10	.....	.....	.....	....	1	..	..	1
6 Chatham	B	1½	..	786	500	1,541	201	12	600	154	.....	1	1	1	1	1
7 Clinton	B	3¼	..	681	120	818	128	5	765	63	21	1	1	..	1	1
8 Cobourg	B	1	..	770	480	723	123	....	*	110	.....	1	1	1	1	..
9 Collingwood	B	½	..	643	150	581	96	8	1,200	35	.....	....	1	1	..	..
10 Galt	S	8½	..	1,103	180	1,147	67	9	1,200	231	35	1	1	..	..	1
11 Goderich	B	¼	..	708	100	683	71	20	2,500	200	.....	1	1	..	..	1
12 Guelph	S	4	1	994	285	882	164	12	2,500	557	175	....	1	..	..	1
13 Hamilton	B & S	3½	1	1,012	90	1,546	209	25	*	909	50	1	1	..	1	1
14 Ingersoll	B	2	1	695	180	769	121	4	811	231	.....	1	1	..	..	1
15 Kingston	B	2	1	690	390	689	75	25	.....	.....	100	1	1	1	1	..
16 Lindsay	B	2	1	1,238	250	1,092	149	10	600	126	46	....	1	..	..	1
17 London	B	3	1	945	560	2,900	173	43	*	299	700	....	1	..	..	..
18 Morrisburg	B	1	1	657	185	1,265	157	17	980	187	140	1	1	..	..	1
19 Napanee	B	3½	1	944	245	931	126	18	800	251	.....	1	1	..	1	1
20 Niagara Falls	B	5¾	..	753	315	622	87	25	1,063	118	.....	....	1	..	1	1
21 Orillia	B	2	..	608	270	753	109	68	1,890	278	.....	....	1	..	1	..
22 Ottawa	S	½	..	1,370	.....	1,638	280	150	.....	184	100	1	1	1	1	1
23 Owen Sound	B	1	1	1,401	90	1,825	122	20	.....	25	35	....	1	1	..	1
24 Perth	B	4	1	737	.....	821	155	10	560	267	500	1	1	..	1	1
25 Peterborough	B	1½	1	613	320	886	149	25	600	160	.....	....	1	1	..	..
26 ‡Renfrew	B	3	1	435	.....	581	70	12	.....	.....	.....	....	..	..	..	1
27 Ridgetown	B	1¾	..	653	180	1,099	143	47	900	90	10	....	1	1	..	1
28 St. Catharines	B	1 2-5	..	631	270	815	135	18	700	75	25	1	1	..	..	1
29 St. Mary's	B	2	..	710	140	692	120	25	700	84	.....	1	1	..	..	1
30 St. Thomas	B	2¼	1	871	450	1,106	110	18	983	374	.....	....	1	..	..	..
31 Sarnia	B	3	1	765	270	716	127	12	1,380	248	.....	....	1	1	..	1
32 Seaforth	B	2¾	..	765	180	776	138	2	600	66	.....	1	1	..	..	..
33 Stratford	B	8	..	995	450	1,154	220	26	.....	117	.....	1	1	..	..	1
34 Strathroy	B	1¼	..	976	180	931	116	28	380	106	.....	1	1	..	1	1
35 Toronto (Harbord)	B	1½	1	1,210	.....	2,176	175	28	4,000	710	.....	....	1	..	..	1
36 Toronto (Jameson)	B	1½	1	1,632	.....	2,293	155	15	4,000	790	.....	1	1	..	1	1
37 Toronto (Jarvis)	B	1½	1	1,352	140	1,176	181	35	8,000	200	.....	....	1	1	1	1
38 Toronto Junction	B	3	..	842	270	884	107	32	.....	.....	.....	1	1	..	..	1
39 Vankleek Hill	B	2½	..	623	180	731	46	3	3,000	236	.....	....	1	..	..	1
40 Whitby	B	1	1	631	.....	568	115	10	850	209	.....	....	1	1	1	1
41 Windsor	B	2½	1	984	881	990	130	35	3,000	200	200	....	..	..	..	1
42 Woodstock	B	1	..	1,088	270	1,585	161	15	2,000	180	80	1	1	..	..	1
Totals	.....	.....	19	35,916	9,971	45,078	5,697	962	49,882	8,725	2,817	21	40	12	16	32

*Gymnasium is part of the main building. † Estimated. ‡ Statistics of preceding year.

HIGH SCHOOLS.—*Continued.*

Miscellaneous Information.

Number of pupils in—			Number of pupils from—			Destination of Pupils.						Occupation of Parents.				
Lower School.	Middle School.	Upper School.	Municipalities composing the High School District.	Municipalities within the County.	Other Counties.	Number who entered Mercantile life.	Number who became occupied with Agriculture.	Number who entered the professions of Law, Medicine and the Church.	Number who became teachers	Number who entered any other profession.	Number who left for other occupations.	Commerce.	Agriculture.	Mechanical Occupations.	Professions.	
98	64	25	66	121	....	8	15	2	11	2	15	23	112	33	19	....
139	125	24	169	111	8	20	.....	2	37	3	30	87	88	62	39	
155	75	17	138	109	....	28	8	4	12	8	8	101	27	60	39	
226	123	35	297	84	3	18	3	1	12	3	10	98	100	156	26	
207	89	38	254	80	....	15	5	6	15	4	40	82	78	131	26	
275	163	17	304	151	....	58	7	4	13	7	28	154	148	98	49	
109	58	19	96	87	3	13	5	4	16	2	14	37	73	50	19	
124	28	11	102	61	....	25	11	10	21	8	.....	52	61	42	8	....
143	80	20	153	53	37	13	6	3	19	5	38	67	79	66	12	
182	91	14	164	98	25	18	10	2	14	5	37	73	60	122	22	
147	94	27	169	96	3	13	5	3	17	.....	46	39	105	87	32	
222	72	28	252	61	9	21	3	1	13	9	26	130	68	78	27	
497	240	116	699	96	58	90	35	12	50	10	27	292	119	246	95	
120	26	14	75	60	25	7	4	.....	2	.....	15	40	63	45	10	
347	207	19	480	83	10	30	5	5	6	70	.....	177	72	202	85	
159	120	26	178	97	30	12	10	1	11	10	12	84	103	67	26	
628	257	97	794	174	14	100	16	12	30	10	102	359	174	308	110	
113	117	38	103	158	7	13	8	4	22	1	30	42	133	43	24	
182	88	21	155	131	5	8	29	3	14	5	21	60	119	41	35	
202	58	29	226	42	21	3	2	1	8	5	31	90	56	93	29	
169	97	24	150	74	66	16	2	4	17	2	31	92	75	59	39	
555	115	33	609	72	22	38	9	11	15	21	101	382	32	131	85	
276	141	63	250	157	73	20	10	11	32	7	64	122	172	109	44	
161	44	14	145	72	2	13	1	1	11	2	29	43	66	78	31	
283	58	23	304	56	4	40	20	3	14	16	7	81	52	140	52	
160	92	8	130	122	8	17	4	5	21	6	18	81	73	75	11	
139	59	20	80	129	9	12	10	7	13	5	8	45	95	28	16	
250	64	23	211	116	10	34	20	4	13	3	8	110	54	87	17	
116	96	34	124	55	69	5	14	1	17	1	27	56	108	60	20	
352	129	18	360	139	....	87	25	8	7	5	20	180	139	135	21	
244	67	19	250	72	8	25	4	.....	10	3	36	96	46	103	27	
138	51	25	98	98	18	16	6	2	22	4	21	45	96	51	8	
236	111	36	281	84	18	23	7	3	12	3	40	114	80	107	49	
123	55	6	101	81	2	10	10	3	10	5	20	44	86	32	22	....
453	185	49	637	.....	.....	54	.....	2	5	.....	133	291	.....	148	113	
340	71	30	428	8	5	35	2	5	6	.....	98	152	20	163	45	
446	135	47	565	44	19	92	12	36	12	21	30	301	26	170	96	
193	89	22	177	39	88	14	4	2	10	2	16	109	44	89	30	
134	63	14	72	107	32	9	2	.....	23	3	24	15	131	35	9	
80	51	16	97	48	2	11	8	2	10	3	25	30	48	41	20	
301	39	17	280	74	3	27	4	2	10	7	33	105	70	143	27	
247	65	26	204	125	9	†29	†7	†6	†11	†5	†35	108	99	54	27	
9,671	4,004	1,202	10,427	3,725	725	1,135	368	198	644	291	1,349	4,689	3,450	4,068	1,541	1,

COLLEGIATE INSTITUTES AN

III.—Table K.—Miscellaneou

High Schools.	Brick, stone or frame school house.	Number of acres in play ground.	Schools under United Board.	Equipment. Value of Library.	Value of Typewriters.	Value of Scientific Apparatus.	Value of Charts, Maps and Globes.	Value of Models for Drawing.	Value of Gymnasium (not including Equipment).	Value of Equipment.	Value of Museum, Aquarium, etc.	Religious and other exercises. Schools using authorized Scripture Readings.	Schools opened with Prayer.	Schools closed with Prayer.	Schools using Bible.	Commencement exercises.
				$	$	$	$	$	$	$	$					
1 Alexandria	B	1 1/6	1	322		453	85						1			
2 Almonte	S	1	1	952	135	449	78	12		9			1		1	
3 Arnprior	B	1	1	308		351	89	16		38			1			
4 Arthur	B	2 1/2		325		655	88	31		6			1			
5 Athens	S	2		516		477	69	10		4		1	1			
6 Aurora	B	3		420		459	69	8					1		1	
7 Beamsville	B	1 1/2	1	310		287	70						1			
8 Belleville	B	1 1/2	1	304		564	174	21					1	1	1	
9 Bowmanville	B	2 5/8		554		514	60	8				1	1		1	
10 Bradford	B	3		329		330	90	41		43	25		1	1	1	
11 Brampton	B	5		456	65	616	67	34		10			1			
12 Brighton	B	2-5	1	296		319	42					1	1			
13 Caledonia	B	2	1	448		553	33	4					1			
14 Campbellford	B	1/2	1	311		472	29				50	1	1			
15 Carleton Place	S	1	1	698		315	65	8					1			
16 Cayuga	B	1		218		340	24			40			1			
17 Chesley	B	5		124		244	72						1	1	1	
18 Colborne	B	3/4	1	259		369	109	5				1	1			
19 Cornwall	B	1/2		518	315	385	126	12				1	1	1		
20 Deseronto	B	3		346		394	86	4	300	210	55					
21 Dundas	B	2	1	470	95	548	109	20		39		1	1	1		
22 Dunnville	B	1 1/4		393		589	64	23			50		1			
23 Dutton	B	1		205		525	31						1			
24 East Toronto	B		1	289		279	25	6					1			
25 Elora	S	1/2		233	45	358	43	2				1	1	1	1	
26 Essex	B	3 1/4		380		492	69	28	700	220	30	1	1			
27 Fergus	S	3/4	1	274		244	76	9				1	1			
28 Forest	B	2		305		451	94	21					1			
29 Fort William	B	1		180		214	57	3					1			
30 Gananoque	B	1	1	573		140	508	114				1	1			
31 Georgetown	B	4		258		371	76	10		5		1	1			
32 Glencoe	B	2		373		547	55	28			15		1	1	1	
33 Gravenhurst	B	7 1/2		251		387	59	60				1	1			
34 Grimsby	F	1		208		290	29	10				1	1			
35 Hagersville	B	1 1/2		341		531	54	28					1		1	
36 Harriston	B	3		14	35	336	22						1	1		
37 Hawkesbury	B	1	1	133		14							1			
38 Iroquois	B	1/4		644	50	1,211	142	18		24	250	1	1			
39 Kemptville	B	2	1	309		424	68						1			
40 Kincardine	B	4	1	625	520	646	92	34				1	1		1	
41 Leamington	B	1 1/4		323		419	92	32		15		1	1			
42 Listowel	B	2 1/2		333		507	55		250	42			1			
43 Lucan	B	3		315	90	605	73	18					1	1		
44 Madoc	B	1		165		387	90					1	1		1	
45 Markham	B	2		244		770	55	38		13		1	1	1	1	
46 Meaford	B	3 1/2		366	270	513	81	7	1,250	239		1	1			
47 Midland	B	4		803		192										
48 Mitchell	B	1/4		234		429	64	21	566	233		1	1			
49 Mount Forest	B	2 1/2		433		548	38			10		1	1			
50 Newburgh	S	1 1/2	1	441		338	85						1	1		
51 Newcastle	B	1	1	219		378	46	2				1	1			
52 Newmarket	B	1 1/2		224	177	583	74	23	350	97			1		1	
53 Niagara	B	1		148	100	176	80	16					1			
54 Niagara Falls South	B	2		268	35	344	41	3		30			1			
55 North Bay	B	2			360	316				1,200		1	1		1	
56 Norwood	B	10	1	359		290	21						1		1	
57 Oakville	B	1 1/2	1	288	120	271	64	3		14		1	1			

HIGH SCHOOLS.—*Continued.*

Information.—*Continued.*

Number of pupils in			Number of pupils from			Destination of Pupils.						Occupation of Par			
Lower School.	Middle School.	Upper School.	Municipalities comprising the High School District.	Municipalities within the County.	Other Counties.	Number who entered Mercantile life.	Number who became occupied with Agriculture.	Number who entered the professions of Law, Medicine and the Church.	Number who became teachers.	Number who entered any other profession.	Number who left for other occupations.	Commerce.	Agriculture.	Mechanical Occupations.	Professions.
111	37		9	3	2	2	1	10	1	10	4	80	35	
100	31	5	38	7	7		2	3		18	26	50	42	
97	40	4	20	15	5	6	1	3		25	5	24	100	
56	30	12	73	1	7	11	3	5	1	4	40	78	11	
70	85	8	124		2	2	6	17	1	12	40	101	32	1
51	26	8	50	2	5	10	2	4		9	22	44	19	
29	21		29		5	3				5	13	24	15	
220	36	11	36	3	24	6	1	10	1	28	84	36	121	1
81	46	14	58	1	3	7	1	5		17	15	60	32	
55	49	2	77	11	8	17		6		1	18	81	29	1
87	48	29	96	4	12	10	5	12	4	6	35	98	40	
31	15	33	38		3	9		5	1	2	14	33	14	
34	40	8	58	16	6	4		5	3	6	20	64	11	
100	37	9	49	9	13	7		8	1	20	36	68	31	1
132	57	9	17	12	13	3		5	2	18	49	30	66	1
35	23	4	58		5	5	1	3		21	17	48	20	
54	16	5	11	5							18	18	21	1
48	32		28		10	4		4		5	20	30	10	
150	69	14	120	22	28	9	1	12	2	24	110	98	48	2
91	34	11	19	12	14	1		8		16	40	34	39	
90	45		48	1	22	6	7	7	2	2	45	39	34	1
91	34	5	45	11	12	2		2	2	14	48	47	32	1
75	77	42	134	7	3	10	3	21		9	14	169	19	1
62	16		16	7	10		2		7	11	28	5	40	
51	41	7	44		3	4	1	10	1	9	24	33	26	
58	35	17	77	3	11	3	3	8	1	19	32	77	15	1
73	58	11	65	4	2	5	1	6		20	18	82	24	1
62	34	8	63		10	9	1	13	3	5	18	51	38	
77	13	2			7	1			1		27	3	41	
116	50	2	21	13	11	2	2	6	3	19	33	43	62	1
44	31	11	51	39		7		9		9	33	59	26	1
40	34	10	59	3	5	4	1	3	2	11	15	54	18	1
63	17			1	5	1		6		9	16	9	31	
30	13		17	20	4	4		2		8	12	39	6	
61	32	6	54	5	8	5		5	2	4	25	58	26	1
71	63	19	28	37	4	3	4	7	2	13	30	43	24	1
38	12	8	26		6	1	1	1	2	10	27	16	17	
57	36	12	80	27	5	16	1	6	1	6	22	97	33	1
76	83	20	72	97	15	15	12	25		5	65	90	60	3
95	58	10	92	2	15	1	1	18		8	65	78	36	1
59	51	9	83	11	6	10	3	8	3	11	20	71	33	1
85	82	18	53	24	14	5	4	7	1	20	48	61	25	1
59	55	21	98					8	3	3	21	118	10	
47	38	4	52			4	1	9		1	30	30	10	
33	57	33	166	24	5	6	3	5		29	34	119	27	2
73	52	15	80	8	8	7	1	10	4	21	32	78	22	2
41	5	3	7	2							16	7	23	
68	54		67	4	6	7	2	5	4	10	21	62	46	
90	54	8	24	42	8	4	2	8		20	37	56	28	1
39	62		112	4		2	1	14	2		15	100	30	
23	20	1	45	2	7	4		3		6	10	42	6	
68	49		66	14	10	1	2	6		23	41	63	35	
37	20		20		1	4			1	3	4	19	16	
42	16		29	1	7	5		1		17	15	36	16	
106	24				4			3	2	7	12	4	83	
50	60	1	75	25	10	12		10	2	3	17	106	20	
56	40		44	12	5	5		2	2	10	17	52	26	

COLLEGIATE INSTITUTES AND

III—Table K.—Miscellaneous

High Schools.	Brick, stone or frame school house.	Number of acres in playground.	Schools under United Board.	Equipment.								Religious and other Exercises.				
				Value of Library.	Value of Typewriters.	Value of Scientific Apparatus.	Value of Charts, Maps and Globes.	Value of Models for Drawing.	Value of Gymnasium (not including Equipment.)	Value of Equipment.	Value of Museum, Aquarium, etc.	Schools using authorized Scripture Readings.	Schools opened with prayer.	Schools closed with prayer.	Schools using Bible.	Commencement Exercises.
				$	$	$	$	$	$	$	$					
58 Omemee	B	2	1			182							1	1		1
59 Orangeville	B	2½		646		591	57	26					1	1		1
60 Oshawa	B	3	1	260	200	482	98	14			50	1	1		1	
61 Paris	B	3	1	358	142	559	108	9				1	1	1		1
62 Parkhill	B	3	1	316	140	500	98	9		44	50		1	1		1
63 Pembroke	B	¾	1	256		496	92	15			50		1			1
64 Petrolea	B	2⅛		403	90	507	44	5			100	1	1	1	1	
65 Picton	B	3		665	500	663	118	45					1			
66 Port Arthur	B	3	1	297		434	73						1			1
67 Port Dover	B	1¼	1	389	50	443	23	20		7		1	1			1
68 Port Elgin	B	1½		241		350	43	30					1		1	1
69 Port Hope	B	1½		583	350	584	95	8		10		1	1			1
70 Port Perry	B	3	1	288		457	45	8	200				1			1
71 Port Rowan	B	2	1	93		229	44	6		8		1	1			
72 Prescott	B	1⅛	1	270	108	367	112						1			1
73 Rat Portage(Kenora)	B	1	1	204		411	58						1	1		1
74 Richmond Hill	B	1	1	189	65	299	54	35		3		1	1		1	1
75 Sault Ste. Marie	B			113		224	35	18					1			1
76 Simcoe	B	5	1	314		688	140	29				1	1	1	1	1
77 Smith's Falls	B	¾	1	554	110	495	67	5					1	1		1
78 Smithville	B	1¼		123		278	40					1	1	1		
79 Stirling	B	1	1	195		291	42						1		1	
80 Streetsville	B	1¼		179		225	71	2			25	1	1			
81 Sydenham	S	1½		354		316	37						1		1	
82 Thorold	B	2¼		270	180	424	69	3					1		1	1
83 Tillsonburg	B	2½		235		530	84	2		11	120		1			
84 Toronto Technical	B	⅔	1	150	1,700	6,200	25	350					1			1
85 Trenton	B	4-5	1	570		354	76	7				1	1			1
86 Uxbridge	B	¾	1	349	84	4						1	1	1		1
87 Vienna	B	2	1	276		269	121	10				1	1	1		
88 Walkerton	B	1¼		334	180	457	54	3		7		1				1
89 Wardsville	B	1	1	228		223	74	33					1			
90 Waterdown	S	3¼	1	205		320	58	15					1			1
91 Waterford	B	3		342		410	64					1	1	1		
92 Watford	B	2		334	100	405	110	47					1	1		1
93 Welland	B	1		238		598	32						1		1	1
94 Weston	B	½		274	6	434	105	15					1	1	1	1
95 Wiarton	B	2		326		308	58						1			1
96 Williamstown	S & B	3		311		358	87	10					1	1		
1 Totals, High Schools			42	31,367	6,417	45,533	6,698	1,560	3,616	2,631	870	40	93	26	25	63
2 Totals, Col. Institutes			19	35,916	9,971	45,078	5,697	962	49,882	8,725	2,817	21	40	12	16	32
3 Grand totals, 1904			61	67,283	16,388	90,611	12,395	2,522	53,498	11,356	3,687	61	133	38	41	95
4 Grand totals, 1903			55	60,479		83,145	11,560	1,942	55,314	10,216	3,338	62	130	36	42	91
5 Increases			6	6,804		7,466	835	580		1,140	349		3	2		4
6 Decreases									1,816			1			1	
7 Percentages			44.2									44	96	27	30	69

HIGH SCHOOLS.—*Concluded.*

Information.—*Concluded.*

Number of pupils in			Number of pupils from			Destination of Pupils.						Occupation of Parents			
Lower School.	Middle School.	Upper School.	Municipalities composing the High School District.	Municipalities within the County.	Other Counties.	Number who entered Mercantile life.	Number who became occupied with Agriculture.	Number who entered the professions of Law, Medicine and the Church.	Number who became Teachers.	Number who entered any other profession.	Number who left for other occupations.	Commerce.	Agriculture.	Mechanical Occupations.	Professions.
7	53	.....	32	24	4	3	.....	1	8	1	9	6	30	5	4
110	74	22	83	74	49	15	7	2	12	8	34	53	107	22	20
125	43	11	111	51	17	18	9	.....	5	.....	16	47	56	60	14
101	22	7	91	36	3	11	4	.....	2	2	13	32	38	48	11
87	56	22	93	61	11	13	4	2	9	2	11	34	80	15	11
99	64	13	140	34	2	12	2	5	6	3	16	66	18	49	34
88	70	7	94	69	2	16	4	3	3	.....	16	38	33	70	10
150	51	14	103	108	4	.....	.....	1	9	.....	.....	41	120	29	16
65	15	.....	80	.....	.....	5	3	.....	5	.....	12	31	5	10	32
42	35	.....	49	22	13	7	2	1	4	.....	6	8	35	20	2
56	29	.....	39	46	.....	6	7	.....	4	.....	7	17	42	9	10
123	89	17	135	92	2	15	1	.....	12	.....	14	60	101	39	9
22	73	6	54	43	14	6	8	6	12	2	3	31	42	24	10
37	12	.....	24	25	.....	4	1	.....	2	...	2	15	21	5	1
33	24	4	74	37	.....	4	2	.....	5	.....	11	30	25	35	7
84	12	.....	94	2	.....	6	.....	.....	3	7	18	22	6	38	11
55	46	5	105	.....	1	4	5	1	2	2	10	18	57	15	6
113	34	.....	125	20	2	8	.....	2	7	1	21	44	9	58	27
101	54	15	76	91	3	15	10	3	12	2	20	36	65	40	16
128	49	14	122	39	38	15	12	.....	7	5	22	34	55	74	15
48	30	2	45	33	2	2	4	1	4	.....	7	3	64	9	3
24	26	9	21	38	.....	1	.....	1	9	.....	11	7	36	6	10
32	17	.....	15	26	8	.....	.....	.....	.....	.....	4	7	28	8	5
70	55	.....	123	.....	2	8	4	1	8	.....	18	12	83	10	2
47	24	2	50	23	.....	5	3	.....	4	.....	5	15	20	25	4
76	32	.....	60	26	22	7	3	.....	2	.....	19	20	41	19	9
580	40	.....	580	15	5	.....	.....	.....	.....	.....	.....	300	6	210	60
112	30	18	104	15	41	14	9	3	4	.....	11	60	56	28	12
99	52	9	87	70	3	9	5	.....	8	1	3	40	68	35	17
22	16	.....	38	.....	.....	1	2	.....	.....	.....	2	4	26	4	4
94	45	17	99	54	3	9	16	10	15	3	7	34	44	38	22
21	19	.....	23	14	3	.....	5	2	2	.....	2	3	17	15	5
72	42	8	70	24	28	4	3	.....	4	.....	16	12	65	20	15
61	45	13	36	70	13	7	3	.....	6	1	7	20	67	15	11
110	48	13	61	10	105	6	10	3	6	3	20	28	90	14	7
107	80	16	76	123	4	7	..	.....	9	2	17	61	55	55	32
56	18	3	51	20	6	.....	2	1	2	2	18	20	25	17	9
68	25	12	65	36	4	14	2	.....	4	.....	5	33	35	25	9
76	29	.....	101	.....	4	1	.....	1	6	.....	2	6	80	13	5
8,206	3,851	773	7,357	4,492	983	699	443	133	596	117	1,057	2,956	5,066	3,031	1,063
9,671	4,004	1,202	10,427	3,725	725	1,135	368	198	644	291	1,349	4,689	3,450	4,068	1,541
17,879	7,855	1,975	17,784	8,217	1,708	1,834	811	331	1,240	408	2,406	7,645	8,516	7,099	2,604
*16,647	†7,250	‡1,825	16,328	7,896	1,498	1,805	844	372	1,216	312	2,291	6,941	8,004	6,491	2,504
1,232	605	150	1,456	321	210	29	.....	.....	24	96	115	704	512	608	100
.....	.....	.....	.....	.....	.....	.....	33	41	.....	.....	.....	.....	.....	.....	.....
64.52	28.35	7.13	64.18	29.65	6.16	26.09	11.53	4.71	17.64	5.8	34.22	27.59	30.73	25.62	9.4

* In Forms I and II. † In Form III. ‡ In Form IV.

Table L.—Protestant Separate Schools.

Statistics.	No. 9 Cambridge.	No. 6 North Plantagenet.	No. 1, N. Tilbury.	L'Orignal Village.	Penetanguishene Town.	Totals.
Number of Schools	1	1	1	1	1	5
Receipts:	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Balances from 1903	6 13	122 63	83 08	519 07	3 53	734 44
Government grants	3 50	2 65	10 23	18 35	140 69	175 42
Municipal grants & assessmts.	80 24	350 00	561 06	300 63	2,152 85	3,444 78
Other sources	75	195 96	80 00	16 06	3 50	296 27
Totals	90 62	671 24	734 37	854 11	2,300 57	4,650 91
Expenditure:						
Teachers' salaries	81 50	250 00	300 00	300 00	1,647 38	2,578 88
School sites and buildings	.....	.....	129 50	.....	258 50	388 00
Libraries, maps, etc	.....	.....	.....	35 25	5 00	40 25
Other expenses	2 90	211 44	251 08	70 72	375 50	911 64
Totals	84 40	461 44	680 58	405 97	2,286 38	3,918 77
Balances on hand	6 22	209 80	53 79	448 14	14 19	732 14
Teachers:						
Male	.....	.....	.....	.....	1	1
Female	1	1	1	1	3	7
Certificates	Temp.	II	III	III	1, I; 3, II	1, I; 4, II; 2, III; 1 Temp.
Salaries	$156 00	$250 00	$300 00	$300 00	Male, $675 00 Female. $333 00	Av. Male. $675 00 Av. Female, $286 00
Pupils:						
Total number attending	9	8	34	36	232	319
Boys	5	4	20	18	132	179
Girls	4	4	14	18	100	140
Average attendance	3	3	22	19	145	192
No. in 1st Reader, Part I	4	3	6	8	61	82
" 1st " Part II	.....	2	7	5	30	44
" 2nd "	.....	.....	8	3	40	51
" 3rd "	3	1	10	3	55	72
" 4th "	2	.....	3	17	43	65
" 5th "	.....	2	.....	.....	3	5
" Writing	6	8	34	36	232	316
" Arithmetic	5	8	34	36	232	315
" Drawing	5	8	34	36	232	315
" Geography	5	5	21	24	232	287
" Music	.....	8	34	.....	74	116
" Grammar & Compsitn.	4	8	21	23	168	224
" English History	2	3	3	6	46	60
" Canadian History	2	3	13	17	101	136
" Physiology & Tmprce.	2	8	34	17	46	107
" Drill & Calisthenics	.....	8	34	36	131	209
" Bookkeeping	1	2	.....	.....	3	6
" Algebra	.....	2	.....	.....	3	5
" Geometry	.....	2	.....	.....	3	5
" Botany	.....	2	.....	.....	3	5
" Agriculture	.....	2	21	15	.....	38
School houses (bck. frame or log)	Log	Frame	Brick	Brick	Brick	3 B., 1 F., 1 L.,
Number of maps	7	8	5	12	10	42
Number of globes	.....	.....	1	1	.....	2

Table M.—Report on Truancy

Cities.	No. of children otherwise employed during school hours.	No. of cases of truancy reported to the Truant Officer.	No. of Notices sent by Truant Officer to parents or guardians.	No. of complaints made before Police Magistrates or J.P.'s.	No. of convictions.	No. of children not attending any school.
Belleville	4	35	17	3	....	....
Brantford	10	30	25	6	....	10
Chatham	....	48	10	....	....	....
Guelph	5	22	22	2	....	....
Hamilton	....	160	375	67	7	....
Niagara Falls	6	36	51	2	....	....
St. Catharines	195	163	49	1	1	....
St. Thomas	2	105	59	8	6	....
Stratford	....	49	34	5	5	....
Toronto	119	623	57	16	9	....
Windsor	....	267	3	....	....	....
Woodstock	....	2	80	4	....	....
Towns.						
Almonte	....	14	25	....	....	14
Amprior	....	5	5	....	....	2
Aylmer	....	23	23	....	....	3
Barrie	....	15	3	....	....	....
Berlin	....	6	2	....	....	....
Bowmanville	6	20	8	....	....	20
Brockville	....	13	13	....	....	....
Carleton Place	....	15	10	....	....	3
Clinton	....	2	....	....	....	....
Cornwall	14	6	6	17	14	6
Deseronto	4	75	50	....	....	12
Dundas	....	.....	37	2	2	42
Durham	....	11	11	....	....	....
Fergus	....	1	1	....	....	....
Forest	2	3	2	....	....	....
Galt	....	7	3	....	....	2
Hespeler	....	4	4	....	....	....
Huntsville	....	10	10	....	....	....
Lindsay	1	101	101	8	7	....
Mitchell	2	.....	.....	....	....	....
Niagara	....	5	3	....	....	....
Orillia	....	.....	5	4	4	....

Towns.—*Con.*	No. of children otherwise employed during school hours.	No. of cases of truancy reported to Truant Officer.	No. of Notices sent by Truant Officer to parents or guardians.	No. of complaints made before Police Magistrates or J.P.'s.	No. of convictions.	No. of children not attending any school.
Peterborough	.....	52	38	3	....	....
Petrolea	7	28	15	....	....	5
Port Arthur	....	6	6	....	....	6
Port Hope	....	10	10	....	....	....
Prescott	.....	.....	10	....	....	....
Preston	....	10	10	....	....	10
Ridgetown	....	2	2	1	1	....
St. Mary's	....	8	4	....	....	....
Sarnia	....	11	11	1	....	5
Simcoe	....	20	8	3	3	....
Seaforth	....	14	.....	1	....	....
Smith's Falls	....	81	79	2	2	....
Thorold	....	7	5	....	....	....
Toronto Jnen	....	27	.....	....	....	....
Villages.						
Ailsa Craig	....	4	4	....	....	....
Bayfield	....	2	.....	....	....	....
Bradford	4	.....	1	....	....	4
Campbellford	1	12	10	3	1	....
Delhi	....	3	2	....	....	....
Drayton	4	4	.....	....	....	4
Elora	....	8	8	....	....	....
Exeter	....	4	.....	....	....	....
Fort Erie	....	30	5	....	....	....
Georgetown	....	.....	4	....	....	....
Glencoe	....	3	3	....	....	....
Point Edward	....	2	2	....	....	....
Shelburne	....	1	5	....	....	....
Tara	....	10	12	....	....	....
Tweed	....	.....	4	....	....	....
Waterford	....	7	10	....	....	....
Winchester	....	8	15	....	....	....
Totals	386	2,250	1,387	159	62	148

*Statistics of preceding year.

Table N.—Report on Kindergartens.

Municipality.	No. of Kindergartens.	No. of Teachers.	No. of Pupils attending.	Average daily attendance.
Cities :				
Brantford	4	9	471	169
Chatham	2	7	306	122
Guelph	1	1	45	13
Hamilton	14	18	1,261	503
Kingston	4	4	226	132
London	15	30	1,160	385
Ottawa	15	27	1,270	444
Stratford	3	4	340	114
Toronto	47	122	5,088	1,865
Towns :				
Aylmer	1	2	61	39
Berlin	5	5	216	177
Cobourg	1	1	87	34
Dundas	1	1	129	49
Galt	1	1	54	39
Hespeler	1	1	56	34
Ingersoll	1	1	82	25
Listowel	1	1	104	33
Owen Sound	1	2	148	47
Peterborough	3	7	262	93
Picton	1	1	77	29
Preston	1	1	63	43
Simcoe	1	1	90	22
Tillsonburg	1	1	89	31
Toronto Junction	2	4	202	61
Waterloo	1	2	66	42
Welland	1	1	68	28
Totals	129	255	12,021	4,573

Table O.—Report on Night Schools.

Municipality.	No. of Night Schools.	Teachers.	Pupils attending.	Average daily attendance.
Merritton	1	1	18	4
St. Catharines	1	1	36	9
Toronto	9	17	648	260
Totals	11	19	702	273

TABLE P.—GENERAL STATISTICAL ABSTRACT.

A General Statistical Abstract, exhibiting the comparative state and progress of Education in Ontario, as connected with Public, Separate and High Schools (including Collegiate Institutes), also Normal College and Normal and Model Schools, from the year 1867 to 1904, compiled from Returns in the Education Department.

No.	Subjects compared.	1867.	1872.	1877.	1882.	1887.	1892	1897.	1902.	1904.
1	Population	.....	1,620,851	.....	1,926,922	.....	2,114,321	.....	2,167,978	.....
2	School population between the ages of five and sixteen years, up to 1884 (and five to twenty-one subsequently)	447,726	495,756	494,804	483,817	611,212	595,238	590,055	584,512	576,537
3	High Schools (including Collegiate Institutes)	102	104	104	104	112	128	130	134	138
4	Normal College and Normal and Model Schools	3	3	4	6	6	6	7	8	8
5	Total Public Schools in operation	4,261	4,490	4,955	5,013	5,277	5,577	5,574	5,671	5,758
6	Total Roman Catholic Separate Schools	161	171	185	190	229	312	340	391	419
7	Grand total of all schools in operation	4,527	4,768	5,248	5,313	5,624	6,023	6,051	6,204	6,323
8	Total pupils attending High Schools (including Collegiate Institutes)	5,696	7,968	9,229	12,348	17,459	22,837	24,390	24,472	27,709
9	Total students and pupils attending Normal College, Normal and Model Schools	800	800	900	1,059	1,204	1,270	1,492	1,709	1,452
10	Total pupils attending Public Schools	382,719	433,256	465,908	445,364	462,839	448,204	441,157	420,094	409,537
11	Total pupils attending Roman Catholic Separate Schools	18,924	21,406	24,952	26,148	30,373	37,466	41,620	45,964	47,807
12	Grand total, students and pupils attending High, Public, Separate Schools, Normal College, and Normal and Model Schools	408,139	463,430	500,989	484,919	511,875	509,777	508,659	492,239	486,505
13	Total amount paid for the salaries of Public and Separate School Teachers	$1,093,516	1,371,594	2,038,099	2,144,448	2,458,540	2,752,628	2,886,061	3,198,132	3,473,710
14	Total amount paid for the erection and repairs of Public and Separate School houses, and for libraries, apparatus, books, fuel, stationery, etc	$379,672	835,770	1,035,390	882,526	1,283,565	1,301,289	1,329,609	1,627,028	1,985,783
15	Grand total paid for Public and Separate School Teachers' salaries, the erection and repairs to School houses, and for libraries, apparatus, etc	$1,473,188	2,207,364	3,073,489	3,026,974	3,742,105	4,053,917	4,215,670	4,825,160	5,459,493
16	Total amount paid for High School (and Collegiate Institute) Teachers' salaries	$94,820	141,812	211,607	253,864	327,452	470,828	532,837	547,402	620,710
17	Total amount paid for erection and repair of High School (and Collegiate Institute) houses, maps, apparatus, prizes, fuel, books, etc	$19,190	31,360	51,417	89,857	168,160	215,871	183,139	222,278	256,377
18	Grand total paid for educational purposes as above	$1,587,198	2,380,536	3,336,513	3,370,695	4,237,717	4,740,616	4,931,646	5,594,840	6,336,580
19	Total Public and Separate School Teachers	4,890	5,476	6,468	6,857	7,594	8,480	9,128	9,631	9,828
20	Total Male Teachers	2,849	2,626	3,020	3,062	2,718	2,770	2,784	2,311	2,094
21	Total Female Teachers	2,041	2,850	3,448	3,795	4,876	5,710	6,344	7,320	7,734

APPENDIX B.—*TEACHERS' INSTITUTES.*

FINANCIAL STATEMENT, 1904.

Name of Institute.	Number of Institutes.	Number of Members.	Receipts.					Expenditure.				Balances.
			Government Grant.	Municipal Grant.	Members' Fees.	Balances and other sources.	Total Receipts.	Printing, postage, etc.	Libraries, Educational Journals, etc.	Miscellaneous.	Total Expenditure.	
			$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1 Algoma	1	93	25 00	.....	.....	44 08	69 08	7 30	6 60	23 75	37 65	31 43
2 Brant	1	150	25 00	25 00	.....	117 50	167 50	7 60	.....	17 65	25 25	142 25
3 Bruce, East	1	132	25 00	25 00	.....	22 58	72 58	8 58	18 50	45 50	72 58	.....
4 Bruce, West	1	82	25 00	25 00	20 50	169 07	239 57	10 75	16 00	69 15	95 90	143 67
5 Carleton	1	150	25 00	25 00	.....	29 06	79 06	7 20	.....	38 20	45 40	33 66
6 Dufferin	1	118	25 00	25 00	10 80	78 49	139 29	4 77	63 75	42 55	111 07	28 22
7 Dundas	1	87	25 00	25 00	21 75	145 77	217 52	21 94	.....	65 25	87 19	130 33
8 Durham	1	120	25 00	25 00	.....	11 77	61 77	4 22	.....	24 70	28 92	32 85
9 Elgin	1	150	25 00	25 00	.....	192 20	242 20	3 50	.....	36 30	39 80	202 40
10 Essex, North	1	80	25 00	50 00	.....	25 00	100 00	14 87	.....	47 00	61 87	38 13
11 Essex, South	1	123	25 00	50 00	.....	135 43	210 43	56 55	.....	22 75	79 30	131 13
12 Frontenac	1	155	25 00	25 00	.....	67 20	117 20	8 36	.....	58 15	66 51	50 69
13 Glengarry	1	94	25 00	25 00	.....	6 25	56 25	17 24	.....	18 60	35 84	20 41
14 Grenville	1	105	25 00	25 00	.....	80 06	130 06	15 82	5 55	43 00	64 37	65 69
15 Grey, East	1	11	25 00	25 00	2 75	22 78	75 53	7 00	.....	29 00	36 00	39 53
16 Grey, South	1	76	25 00	25 00	19 00	252 04	321 04	14 41	84 50	64 75	163 66	157 38
17 Grey, West	1	100	25 00	25 00	8 25	69 19	127 44	11 10	8 20	57 80	77 10	50 34
18 Haldimand	1	115	25 00	25 00	.....	244 54	294 54	2 00	.....	34 35	36 35	258 19
19 Halton	1	94	25 00	25 00	.....	71 57	121 57	10 65	14 00	33 00	57 65	63 92
20 Hastings, North	1	120	25 00	25 00	.....	123 68	173 68	23 85	15 25	79 60	118 70	54 98
21 Hastings, South	1	138	25 00	25 00	.....	184 98	234 98	11 00	.....	32 00	43 00	191 98
22 Huron, West	1	44	25 00	25 00	10 75	84 14	144 89	13 68	6 00	42 40	62 08	82 81
23 Huron, East	1	138	25 00	25 00	.....	24 49	74 49	4 09	18 00	34 50	56 59	17 90
24 Kent, East	1	89	25 00	25 00	.....	51 25	101 25	7 15	.....	46 02	53 17	48 08
25 Kent, West	1	140	25 00	25 00	26 50	35 43	111 93	13 12	30	65 80	79 22	32 71

26 Lambton, East	1	139	25 00	25 00	24 00	130 05	219 05	30 03		66 01	103 23	107 42		
27 Lambton, West	1	123	25 00	25 00		103 11	153 11	33 00		33 80	76 50	76 61		
28 Lanark	1	212	25 00	25 00	14 65	148 65	218 30	10 85	24 75	58 00	97 60	115 70		
29 Leeds, East (2)	1	90	25 00	25 00	14 75	108 86	173 61	8 37	36 41	58 50	103 28	70 33		
30 Leeds, West (1)	1	100	25 00	25 00	8 50	94 82	153 32	11 10	33 75	35 25	80 10	73 22		
31 Lennox and Addington	1	134	25 00	25 00		49 19	99 19	7 40		74 50	81 90	17 29		
32 Lincoln	1	88	25 00	25 00		125 81	175 81	4 83		61 50	66 33	109 48		
33 Manitoulin	1	48	*50 00			13 20	63 20	6 70	1 50	5 00	13 20	50 00		
34 Middlesex, East	1	106	25 00	241 45	26 50	33 04	325 99	46 90	31 40	40 75	119 05	206 94		
35 Middlesex, West	1	106	25 00	100 00	53 50	133 01	311 51	46 40		156 90	203 30	108 21		
36 Muskoka	1	31	25 00			138 60	163 60	7 00	18 75	37 85	63 60	100 00		
37 Norfolk	1	140	25 00	60 00	21 50	9 06	115 56	47 34	25 50	39 75	112 59	2 97		
38 Northumberland	1	150	25 00	25 00		186 86	236 86	20 30		88 20	108 50	128 36		
39 Ontario, North	1	80	25 00	25 00	16 00	103 31	169 31	7 45		98 99	106 44	62 87		
40 Ontario, South	1	75	25 00	25 00		117 40	167 40	8 83		60 60	69 43	97 97		
41 Oxford	1	72	25 00	25 00	18 00	75 07	143 07	10 22		53 10	63 32	79 75		
42 Parry Sound, West	1	40	25 00		7 25	7 24	39 49	5 39		11 25	16 64	22 85		
43 Peel	1	96	25 00	25 00		12 51	62 51	7 50		38 90	46 40	16 11		
44 Perth	1	140	25 00	25 00	51 50	95 83	197 33	8 10		157 75	165 85	31 48		
45 Peterborough	1	110	25 00	25 00		20 87	70 87	10 48		27 45	37 93	32 94		
46 Prescott and Russell	1	105	25 00	25 00		112 26	162 26	30 58		42 15	72 73	89 53		
47 Prescott and Russell Bilingual	1	120	25 00	25 00		62 16	112 16	7 75		42 00	49 75	62 41		
48 Prince Edward	1	90	25 00	25 00		74 43	124 43	5 60	28 87	24 20	58 67	65 76		
49 Rainy River	1	50	25 00			46 30	71 30	4 05		43 30	47 35	23 95		
50 Renfrew	1	80	25 00	25 00		17 32	67 32	7 05		51 20	58 25	9 07		
51 Simcoe, East and West Muskoka	1	60	25 00	25 00		60 78	110 78	7 35	1 75	61 55	70 65	40 13		
52 Simcoe, North	1	124	25 00	25 00	18 25	71 05	139 30	12 25		96 80	109 05	30 25		
53 Simcoe, South West	1	32	25 00	25 00	8 00	136 60	194 60	9 95	27 50	61 00	98 45	96 15		
54 Stormont	1	71	25 00	25 00	17 75	72 34	140 09	16 09		87 00	103 09	37 00		
55 Thunder Bay	1	40	25 00			42 79	67 79	4 50	89	18 75	24 14	43 65		
56 Victoria, East	1	84	25 00	25 00	10 75	61 06	121 81	30 30		37 25	67 55	54 26		
57 Victoria, West	1	50	25 00	25 00		54 62	104 62	5 50	6 00	43 65	55 15	49 47		
58 Waterloo	1	225	25 00	25 00	75 25	35 15	160 40	20 60		72 15	92 75	67 65		
59 Welland	1	140	25 00	25 00		127 56	177 56	8 95		120 95	129 90	47 66		
60 Wellington, North	1	106	25 00	25 00	18 00	111 03	179 03	6 57	46 50	39 70	92 77	86 26		
61 Wellington, South	1	83	25 00	25 00		86 81	136 81	8 14		51 90	60 04	76 77		
62 Wentworth	1	107	25 00	25 00	45 50	2 94	98 44	10 22	99	35 00	46 21	52 23		
63 York, North	1	110	25 00	50 00	6 75	65 08	146 83	9 42	33 00	19 25	61 67	85 16		
64 York, South	1	52	25 00	50 00	13 00	123 32	211 32	40 90	14 00	33 10	88 00	123 32		
65 †Ontario Educational Association	1	844	600 00		422 00	499 73	1,521 73	897 51		363 70	1,261 21	260 52		

* 2 years' grant.

† Statement for 1904-5.

APPENDIX B.—*TEACHERS' INSTITUTES.—Concluded.*

FINANCIAL STATEMENT, 1904.

Name of Institute.	Number of Institutes.	Number of Members.	Receipts.					Expenditure.				Balances.
			Government Grant.	Municipal Grant.	Members' Fees.	Balances and other sources.	Total Receipts.	Printing, postage, etc.	Libraries, Educational Journals, etc.	Miscellaneous.	Total Expenditure.	
Cities and Towns.			$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
66 Guelph	1	37	25 00	25 00	.....	49 31	99 31	49	59 30	3 00	62 79	36 52
67 Hamilton	1	191	25 00	25 00	45 25	125 99	221 24	24 35	104 10	.....	128 45	92 79
68 Kingston	1	68	25 00	25 00	15 75	32 99	98 74	6 27	25 50	45 20	76 97	21 77
69 London	1	165	25 00	25 00	45 25	81 42	176 67	14 34	87 00	15 00	116 34	60 33
70 London R. C. Separate Schools	1	.....	25 00	.....	.....	.....	25 00	.....	.....	25 00	25 00	.....
71 Ottawa	1	284	25 00	25 00	.....	49 39	99 39	3 50	.....	69 25	72 75	26 64
72 Ottawa Bi-lingual	1	.....	25 00	.....	.....	.....	25 00	.....	.....	25 00	25 00	.....
73 St. Catharines	1	25	25 00	25 00	.....	86 81	136 81	.....	8 54	39 04	47 58	89 23
74 St. Thomas	1	41	25 00	25 00	.....	36 80	86 80	4 35	23 35	13 30	41 00	45 80
75 Stratford	1	38	25 00	33 00	32 00	71 96	161 96	12 93	85 60	14 35	112 88	49 08
76 Toronto	1	681	25 00	25 00	170 25	689 88	910 13	40 46	37 40	185 60	263 46	646 67
77 Toronto R. C. Separate Schools	1	.....	25 00	.....	.....	.....	25 00	.....	.....	25 00	25 00	.....
78 Windsor and Walkerville	1	69	25 00	25 00	.....	33 25	83 25	47	.....	17 00	17 47	65 78
79 Brockville	1	33	25 00	.....	8 25	181 44	214 69	29 96	31 22	135 45	196 63	18 06
Totals, 1904	79	8,979	2,575 00	2,134 45	1,328 45	7,304 21	13,342 11	1,940 93	1,050 22	4,237 91	7,229 06	6,113 05
Totals, 1903	80	8,783	2,450 00	1,834 00	1,296 85	6,940 65	12,521 50	1,869 00	1,095 55	3,772 08	6,736 63	5,784 87
Increases	....	196	125 00	300 45	31 60	363 56	820 61	71 93	.....	465 83	492 43	328 18
Decreases	1	.....	.....	.....	.....	.....	.....	.....	45 33	.....	.....	.....

APPENDIX C.—*INSPECTION OF SCHOOLS.*

I.—List of Inspectors, 1905.

Public School Inspectors.	Jurisdiction.	Post Office.	Salary (travelling expenses included in some cases) for 1904.
			$ c.
L. A. Green, B.A.	Algoma District; Towns of Bruce Mines, Massey, Sault Ste. Marie, Steelton, Thessalon	S. Ste. Marie	1,500 00
T. W. Standing, B.A.	Brant; Town of Paris	Brantford	1,395 00
W. S. Clendenning	Bruce, East; Towns of Walkerton, Wiarton; Villages of Chesley, Tara	Walkerton	1,643 37
W. L. Chisholm, M.A.	Bruce, West; Town of Kincardine; Villages of Lucknow, Paisley, Port Elgin, Southampton, Teeswater, Tiverton	Kincardine	1,630 00
Robert H. Cowley, B.A.	Carleton; Villages of Hintonburg, Ottawa East, Richmond	Ottawa	1,740 00
Nathaniel Gordon	Dufferin; Town of Orangeville; Villages of Grand Valley, Shelburne	Orangeville	1,536 92
Arthur Brown	Dundas; Villages of Chesterville, Iroquois, Morrisburg, Winchester	Morrisburg	1,308 00
W. E. Tilley, M.A., Ph.D.	Durham and S. Monaghan Tp.; Towns of Bowmanville, Port Hope; Villages of Millbrook, Newcastle	Bowmanville	1,640 00
Wesborn Atkin	Elgin; Town of Aylmer; Villages of Dutton, Port Stanley, Springfield, Vienna	St. Thomas	1,798 50
[illegible]henay	Essex, North (No. 1); Town of Sandwich: Village of Belle River	Windsor	656 00
J. A. Maxwell, B.A., LL.B., Ph.D.	Essex, South (No. 2); Towns of Amherstburg, Essex, Kingsville, Leamington	Windsor	1,550 84
W. Spankie, M.D.	Frontenac; Villages of Garden Island, Portsmouth	Kingston	1,862 50
David McDiarmid, M.D.	Glengarry; Town of Alexandria; Villages of Lancaster, Maxville	Maxville	1,165 75
Samuel Huff	Grey, East; Town of Thornbury	Meaford	1,219 00
E. H. Burgess, B.A.	Grey, West; Town of Owen Sound; Village of Chatsworth	Owen Sound	1,581 33
J. W. Campbell	Grey, South; Towns of Durham, Meaford; Villages of Dundalk, Hanover, Markdale	Durham	1,436 00
[illegible]ke Moses	Haldimand; Town of Dunnville; Villages of Caledonia, Cayuga, Hagersville	Caledonia	1,358 90
[illegible]anus Phillips, B.A.	Haliburton, North-East Muskoka; South Nipissing, East Parry Sound; Towns of Huntsville, Powassan	Minden	1,775 50
[illegible]s. Deacon	Halton; Towns of Milton, Oakville; Villages of Acton, Burlington, Georgetown	Milton	1,528 08
William Mackintosh	Hastings, North; Villages of Madoc, Marmora, Stirling	Madoc	1,712 99
[illegible]n Johnston	Hastings, South; City of Belleville; Towns of Deseronto, Trenton; Village of Tweed	Belleville	1,253 00
David Robb	Huron, East; Towns of Clinton, Seaforth, Wingham; Villages of Blyth, Brussels, Wroxeter	Brussels	1,633 09
J. Elgin Tom	Huron, West; Town of Goderich; Villages of Bayfield, Exeter, Hensall	Goderich	1,667 29
Rev. W. H. G. Colles	Kent, East; Towns of Blenheim, Bothwell, Ridgetown; Village of Thamesville	Chatham	1,087 50
Robert Park	Kent, West; City of Chatham; Towns of Dresden, Wallaceburg; Village of Tilbury	Chatham	1,728 33
C. A. Barnes, M.A.	Lambton, East (No. 2); Town of Petrolea; Villages of Alvinston, Arkona, Oil Springs, Watford	Petrolea	1,708 50

* Also Inspector of R. C. Bilingual Schools in Essex and Kent.

† Appointed in 1905.

LIST OF INSPECTORS, 1905.—*Continued.*

Public School Inspectors.	Jurisdiction.	Post Office.	Salary (travelling expenses included in some cases)
			$
D. D. Moshier, B.A., B. Paed	Lambton, West (No. 1); Towns of Forest, Sarnia; Villages of Point Edward, Thedford, Wyoming	Sarnia	1,440
F. L. Michell, M.A.	Lanark; Towns of Almonte, Carleton Place,		
Wm Johnston, M.A., LL.B.	Perth, Smith's Falls; Village of Lanark. Leeds and Grenville (No. 1); Town of Gananoque; Villages of Newboro, Westport	Perth Athens	1,900 1,425
Robert Kinney, M.D.	Leeds and Grenville (No. 2); Village of Athens	Brockville	1,302
T. A. Craig	Leeds and Grenville (No. 3); Town of Prescott; Villages of Cardinal, Kemptville, Merrickville	Kemptville	1,29
Frederick Burrows	Lennox and Addington; Town of Napanee; Villages of Bath, Newburgh	Napanee	1,575
W. W. Ireland, B.A.	Lincoln; Town of Niagara; Villages of Beamsville, Grimsby, Merritton, Port Dalhousie	St. Catharines.	1,460
*John McLaughlin	Manitoulin Island, etc.; Towns of Gore Bay, Little Current	Gore Bay	†1,767
P. J. Thompson, B.A.	Middlesex, East; Village of Lucan	London	1,513
H. D. Johnson	Middlesex, West; Towns of Parkhill, Strathroy; Villages of Ailsa Craig, Glencoe, Newbury, Wardsville	Strathroy	1,453
J. B. McDougall, B.A.	Nipissing District, etc.; Towns of Cache Bay, Copper Cliff, Haileybury, Mattawa, New Liskeard, North Bay, Sturgeon Falls, Sudbury	North Bay	1,500
H. Frank Cook, B.A.	Norfolk; Town of Simcoe; Villages of Delhi, Port Dover, Port Rowan, Waterford	Simcoe	1,695
Albert Odell	Northumberland; Town of Cobourg; Villages of Brighton, Campbellford, Colborne, Hastings	Cobourg	1,722
James McBrien	Ontario, North; Town of Uxbridge; Villages of Beaverton, Cannington, Port Perry	Prince Albert.	1,304
John Waugh, B.A., D. Paed.	Ontario, South; Towns of Oshawa, Whitby	Whitby	1,293
William Carlyle	Oxford; City of Woodstock; Towns of Ingersoll, Tillsonburg; Villages of Embro, Norwich	Woodstock	1,750
Rev. Geo. Grant, B.A.	Parry Sound West, District; Town of Parry Sound; Villages of Burk's Falls, Sundridge	Orillia	1,806
Allan Embury	Peel; Town of Brampton; Villages of Bolton, Streetsville	Brampton	1,411
William Irwin, B.A.	Perth; Towns of Listowel, Mitchell, St. Mary's; Village of Milverton	Stratford	1,712
J. Coyle Brown and *Richard Lees, M.A.	Peterborough; Villages of Havelock, Lakefield, Norwood	Peterboro	1,425
W. J. Summerby	Prescott and Russell; Towns of Hawkesbury, Vankleek Hill; Villages of Casselman, L'Orignal, Rockland	Russell	1,336
G. D. Platt, B.A.	Prince Edward; Town of Picton; Village of Wellington	Picton	1,317
R. G. Scott, B.A.	Renfrew; Towns of Arnprior, Pembroke, Renfrew; Villages of Cobden, Eganville	P	2,135

* Appointed in 1905. † Salary, etc., of former Inspector.

I.—List of Inspectors, 1905—*Continued.*

Public School Inspectors.	Jurisdiction.	Post Office.	Salary (travelling expenses included in some cases) for 1904.
			$ c.
J. C. Morgan, M.A.	Simcoe, North; Towns of Barrie, Midland, Orillia, Penetanguishene; Village of Creemore	Barrie	1,719 00
Rev. Thos. McKee	Simcoe, Southwest; Towns of Alliston, Stayner; Villages of Beeton, Bradford, Tottenham	Barrie	1,690 00
Isaac Day, B.A.	Simcoe, East, and West Muskoka; Town of Gravenhurst; Village of Port Carling	Orillia	1,691 75
Alexander McNaughton.	Stormont; Town of Cornwall	Cornwall	1,144 66
John Ritchie	Thunder Bay and Rainy River Districts; Towns of Fort Frances, Fort William, Kenora, Port Arthur, Rainy River	Port Arthur	1,500 00
J. H. Knight	Victoria, East; Town of Lindsay; Villages of Bobcaygeon, Omemee	Lindsay	1,011 00
W. H. Stevens, B.A.	Victoria, West, and Southeast Muskoka; Town of Bracebridge; Villages of Fenelon Falls, Woodville	Lindsay	1,737 32
Thomas Pearce	Waterloo No. 1; Towns of Berlin, Hespeler, Preston, Waterloo; Village of Elmira	Berlin	* 1,980 00
F. W. Sheppard	Waterloo No. 2; Town of Galt; Villages of Ayr, New Hamburg	Berlin	‡ 645 00
J. H. Ball, M.A.	Welland; City of Niagara Falls; Towns of Thorold, Welland; Villages of Bridgeburg, Chippawa, Fort Erie, Port Colborne	Welland	1,430 66
Peter Galbraith	Wellington, North; Towns of Harriston, Mount Forest, Palmerston; Villages of Arthur, Clifford, Drayton	Mt. Forest	†1,250 00
J. J. Craig, B.A.	Wellington, South; Villages of Elora, Erin, Fergus	Fergus	1,250 00
J. H. Smith	Wentworth; Town of Dundas; Village of Waterdown	Hamilton	1,463 50
A. B. Davidson, B.A.	York, North; Towns of Aurora, Newmarket; Villages of Holland Landing, Richmond Hill, Sutton	Newmarket	1,328 00
Israel Fotheringham	York, South; Towns of East Toronto, North Toronto, Toronto Junction; Villages of Markham, Stouffville, Weston, Woodbridge	Toronto	1,627 40
C. P. Hoag, B.A.	City of	Brantford	‖1,400 00
Wm. Tytler, B.A.	do	Guelph	600 00
T. H. Ballard, M.A.	do	Hamilton	2,200 00
W. G. Kidd	do	Kingston	1,400 00
C. B. Edwards, B.A.	do	London	1,735 00
John C. Glashan, LL.D	do	Ottawa	2,400 00
Duncan Walker, B.A.	do	Peterboro'	1,350 00
D. C. Hetherington	do	St. Catharines	†500 00
S. Sinclair, B.A., D. Paed.	Prin. Co. Model School, City of	St. Thomas	1,200 00
J. Russell Stuart	do do do	Stratford	1,200 00
James L. Hughes	City of	Toronto	3,500 00
W. F. Chapman	do	Toronto	2,250 00
R. Ht. Mead, M.A.	City of Windsor and Town of Walkerville	Windsor	1,000 00
John Connolly	Town of	Brockville	1,000 00
		Total	117,896 67

* Appointed in 1905.
† Salary of former Inspector.
‡ For 2nd half of 1904.
‖ Salary of former Inspector and Principal of Public Schools.

LIST OF INSPECTORS, 1905—*Concluded.*

Other Inspectors.	Post Office.	Salary, 1904.	Travelling expenses paid, 1904.	Total.	—
Separate School Inspectors:		$ c.	$ c.	$ c.	$ c.
Wm. Prendergast, B A.....	Toronto.....	1,700 00	206 15	1,906 15	
Michael O'Brien	Peterborough .	1,700 00	515 55	2,215 55	
John F. Power, M.A	London	1,700 00	425 85	2,125 85	
Inspector of Bilingual Separate Schools:					
Telesphore Rochon, B.A., (East).	Clarence Creek	1,700 00	272 55	1,972 55	
*D. Chenay, (West).....	Windsor.....	†625 00	.....	625 00	
Inspector of Technical Education:					
Albert H. Leake	Toronto	1,600 00	510 63	2,110 63	
County Model School Inspector:					
John J. Tilley	Toronto	1,850 00	650 40	2,500 40	
High School Inspectors:					
John E. Hodgson, M.A.....	Toronto	2,750 00	440 00	3,190 00	
John Seath, M.A., LL.D..	Toronto	2,750 00	540 05	3,290 05	
Total	.....	.....	.....	.....	19,936 18
Grand total (all Inspectors)....	.....	.....	.....	.....	137,832 85

* Also Inspector of Public Schools, Essex North. † $125, arrears of salary.

II. DIPLOMAS FOR SCHOOL PREMISES, 1905.

Name of Inspector.	Jurisdiction.	No. of schools reported as receiving diplomas in 1905.	Name of Inspector.	Jurisdiction.	No. of schools reported as receiving diplomas in 1905.
L. A. Green	Algoma.....	2	Chas. A. Barnes ..	Lambton, E.....	20
T. W. Standing...	Brant	11	D. D. Moshier	Lambton, W.....	18
R. W. Cowley	Carleton.....	‡23	R. Kinney.....	Leeds & Gren. No.2	10
Arthur Brown	Dundas.....	‡18	F. Burrows.....	Lennox and Add..	1
W. E. Tilley.....	Durham	6	P. J. Thompson...	Middlesex, E.....	44
H. H. Burgess	Grey, W.....	17	H. D. Johnson....	Middlesex, W.....	8
J. S. Deacon	Halton	22	H. Frank Cook ...	Norfolk.....	1
D. Robb.....	Huron, E.....	26	Geo. Grant	Parry Sound W ..	10
J. Elgin Tom.....	Huron, W.....	7	T. Pearce.....	Waterloo No. 1....	10
Robt. Park	Kent, W	49	F. W. Sheppard...	Waterloo No. 2 ...	12
W. H. G. Colles...	Kent, E.....	54	J. H. Smith	Wentworth	27
			D. Fotheringham .	York, S....	7

‡ In 1904.

APPENDIX D.—*RURAL PUBLIC SCHOOL LIBRARIES, 1904-5.*

Every rural school board that has established a Library under the conditions of the regulations receives a grant, equivalent to half the amount expended for the year, but not exceeding $10.

Inspectorate.	Name of school (section number and township) and amount expended for books recommended, during the academic year.	No. of public school libraries in inspectorate.	Number of libraries established during year.	Total amount expended during the year for books recommended.	Total Government grant.
				$ c.	$ c.
Brant	1A Brantford, 20.82; 9 Brantford, 24.55; U. 10 Brantford, 20.00; 12 Brantford, 30.00; 16 Brantford, 20.00; 9 Burford, 20.00; 11 Burford, 14.25; 13 Burford, 20.01; 8 S. Dumfries, 3.89; 13 S. Dumfries, 15.00; U. 1 Oakland, 20.00; 6 Onondaga, 2.80.	25	5	211 32	97 97
Bruce E		2			
Bruce W	7 Bruce, 22.18; 7 Culross, 22.19; 8 Culross, 20.00; 9 Culross, 30.07; 5 Greenock, 10.00; 1 Huron, 12.60; 5 Huron, 21.45; 8 Huron, 20.46; 11 Huron, 20.00; 15 Huron, 24.91; 5 Kincardine, 20.00; 8 Kinloss, 30.00; 4 Saugeen, 30.00	25	11	283 86	121 30
Carleton	8 Fitzroy, 20.00; 3 Gloucester, 6.25; 4 Gloucester, 20.00; 9 Gloucester, 27.12; 20 Gloucester, 10.35; 25 Gloucester, 10.00; 12 Goulburn, 13.50; 4 N. Gower, 20.00; 1 Huntley, 33.00; 5 Huntley, 23.00; 1 March, 20.00; 1 Marlborough, 20.00; 6 Marlborough, 20.00; 11 Osgoode, 20.00; 12 Osgoode, 20.00; 1 Torbolton, 12.00; 3 Torbolton, 20.00; 3 Nepean, 18.25	37	6	333 47	155 17
Dufferin	3 Melancthon, 18.50; 13 Melancthon, 21.66; 14 Melancthon, 18.97; 17 Mono, 15.00; 1 Mulmur, 20.25	16	3	94 38	46 23
Dundas	3 Williamsburg, 20.00; 16 and 1 Williamsburg, 21.01; 10 Matilda, 20.00; 18 Matilda, 10.00; 2 Winchester, 20.00; 5 Winchester, 30.00; 8 Winchester, 18.00; 20 Winchester, 10.00; 1 Mountain, 20.00; 6 Mountain, 6.45; 12 Mountain, 5.00; 14 Matilda, 10.00; 17 and 24 Williamsburgh, 20.00	16	11	210 46	99 72
Durham	3 Darlington, 7.00; 16 Darlington, 8.00; 18 Darlington, 10.00	6	2	25 00	12 50
Elgin	2 Aldborough, 20.00; 3 Aldborough, 25.00; 4 Aldborough, 20.00; 5 Aldborough, 25.00; 6 Aldborough, 25.00; 8 Aldborough, 15.00; 9 Aldborough, 20.00; 10 Aldborough, 5.20; 11 Aldborough, 23.00; 12 Aldborough, 15.00; 14 Aldborough, 20.00; 1 Bayham, 16.16; 2 Bayham, 50.00; 4 Bayham, 15.18; 5 Bayham, 10.35; 9 Bayham, 4.05; 11 Bayham,				

APPENDIX D.—*Continued.*

Inspectorate.	Name of school (section number and township) and amount expended for books recommended, during the academic year.	No. of public school libraries in inspectorate.	Number of libraries established during year.	Total amount expended during the year for books recommended.	Total Government grant.
				$ c.	$
Elgin.—*Con.*.....	12.80: 12 Bayham, 7.75; 14 Bayham, 22.52; 16 Bayham, 14.53; 17 Bayham, 10.00; 18 Bayham, 10.00; 23 Bayham, 31.39; 1 Dunwich, 15.04; 2 Dunwich, 20.00; 3 Dunwich, 10.36; 4 Dunwich, 15.00; 5 Dunwich, 8.00; 6 Dunwich, 20.00; 7 Dunwich, 11.48; 9 Dunwich, 10.00; 10 Dunwich, 11.85; 13 Dunwich, 26.03; 14 Dunwich, 15.00; 15 Dunwich, 7.50; 16 Dunwich, 10.00; 5 Dorchester S., 20.05; 7 Dorchester S., 11.20; 8 Dorchester S., 20.00; 10 Dorchester S., 7.60; 11 Dorchester S., 20.00; 1 Malahide, 3.88; 3 Malahide, 20.00; 5 Malahide, 20.00; 6 Malahide, 29.63; 7 Malahide, 20.20; 8 Malahide, 1.62; 9 Malahide, 15.00; 13 Malahide, 9.08; 14 Malahide, 8.00; 15 Malahide, 15.00; 16 Malahide, 6.10; 18 Malahide, 20.00; 21 Malahide, 1.38; 22 Malahide, 21.32; 23 Malahide, 10.00; 1 Southwold, 3.00; 2 Southwold, 8.60; 3 Southwold, 20.00; 4 Southwold, 4.60; 6 Southwold, 9.00; 7 Southwold, 20.00; 8 Southwold, 20.00; 9 Southwold, 10.00; 11 Southwold, 2.11; 12 Southwold, 7.62; 13 Southwold, 5.15; 14 Southwold, 3.30; 15 Southwold, 15.00; 17 Southwold, 2.66; 19 Southwold, 3.70; 20 Southwold, 20.00; 3 Yarmouth, 6.35; 4 Yarmouth, 12.58; 6 Yarmouth, 20.90; 7 Yarmouth, 20.00; 8 Yarmouth, 11.00; 9 Yarmouth, 5.32; 13 Yarmouth, 12.00; 17 Yarmouth, 10.10; W. 18 Yarmouth, 20.00; E. 18 Yarmouth, 20.00; N. 18 Yarmouth, 20.00; 23 Yarmouth, 11.00; 24 Yarmouth, 11.00; 25 Yarmouth, 21.60; 27 Yarmouth, 16.50.....	105	50	1,250 44	584
Essex N.....	3 Maidstone, 34.21; 6 Sandwich S., 27.07 ..	3	1	61 28	20
Essex S	11 Colchester S., 4.29; 5 Gosfield S., 11.97; 2 Mersea, 10.52	5	1	26 78	13
Frontenac	2 Bedford, 20.00; 9 Bedford, 20.00; 1 Clarendon & Miller, 20.00; 13 Clarendon & Miller, 20.00; 1 Hinchinbrook, 20.00; 1 Kingston, 20.00: 3 Kingston, 10.00; 11 Kingston, 20.00; 14 Kingston, 30.00; 7 Loughboro, 20.00; 1 Olden, 20.00; 4 Oso, 10.00; 5 Oso, 20.00; 6 Oso, 28.00; 7 Oso, 20.00; 4 Palmerston & Canonto, 20.00; 5 Palmerston and Canonto, 20.00; 4 Pittsburg, 20.00; 9 Pittsburg, 26.80; 3 Portland, 10.00; 5 Portland, 20.00; 11				

APPENDIX D.—*Continued.*

Inspectorate.	Name of school (section number and township) and amount expended for books recommended, during the academic year.	No. of public school libraries in inspectorate.	Number of libraries established during year.	Total amount expended during the year for books recommended.	Total Government grant.
				$ c.	$ c.
Frontenac.—*Con.*	Portland, 20.00; 12 Portland, 28.00; 6 Storrington, 20.00; 8 Wolfe Island, 20.00; 9 Wolfe Island, 20.00; 4 Wolfe Island, 10.00	75	21	532 80	250 00
Grey, E.	12 Euphrasia	3	1	26 00	10 00
Grey, W.	1 Derby, 20.00; 3 Derby, 8. 93; U. 2 Derby & Sydenham, 14.90; U. 10 Sydenham, 12.00; U. 15 Sydenham, 20.00	9	2	75 83	37 91
Grey, S.	5 Egremont, 18.55; 6 Egremont, 20.20; 7 Egremont, 10.00; 10 Egremont, 20.00; 10 Glenelg, 27.00; 4 Normanby, 21.55; 9 Normanby, 20.00; 14 Proton, 8,75	14	5	146 05	68 66
Haldimand	3 Walpole, 20.56; 11 Walpole, 11.91; 3 Rainham, 10.00; 7 N. Cayuga, 10.29; 11 N. Cayuga, 15,00; 5 S. Cayuga, 10.00	11	4	77 76	38 59
Haliburton, etc.	3 Minden, 19.87; 1 Harburn, 49.00; 6 Monmouth, 8 00; U. 2 Stisted, 21.87; 2 Stisted, 39.55; 4 Brunel, 30.10; 7 Chaffey, 14.00; 2 Laurier, 28.25; 4 Stisted, 9.45	24	4	220 09	75 65
Halton	4 Nelson, 6.83; 10 Esquesing, 21.53; 9 Trafalgar, 20 00	11	2	48 36	23 41
Hastings, N.	13 Madoc, 12.27; 14 Madoc, 14.00; 2 Madoc, 18.00; 7 Madoc, 14.15; 16 Rawdon, 21.05; 7 Rawdon, 18.17; 13 Rawdon, 21.83; 8 Rawdon, 20.00; 14 Rawdon, 20.18; 4 Rawdon, 23.50; 6 Rawdon, 20.55; 3 Rawdon, 23.00; 20 Rawdon, 20.00; 17 Rawdon, 20.00; 6 Monteagle, 15.08; 1 Tudor, 20.03; 8 Tudor. 21.00; 5 Tudor, 16.83; 1 Carlow, 17.46; 2 Carlow, 17.33; 5 Carlow, 20.00; 1 & 3 Huntingdon, 29.00; 2 & 5 Huntingdon, 18.00; 4 Huntingdon, 15.00; 10 Huntingdon, 20.00; 4 Dungannon, 16.00; 3 Elzevir, 20.00; 3 Marmora, 17.01; 5 Marmora, 20.00; 10 Marmora, 10.40	34	29	559 84	269 86
Hastings, S.		1			
Huron, E.	3 Grey, 5.50; 4 Grey, 18.10; 9 Grey, 4.25; 11 Grey, 9.00; U. 4 Grey, 10.00; 7 Howick, 8.00; 1 Hullett, 8.00; 3 Hullett, 23.02; 8 Hullett, 20.00; 1 Morris, 14.90; 5 Morris, 20.60; 6 Morris, 10.00; 4 Tuckersmith, 20.00; 9 Tuckersmith, 10.00; 2 Turnberry, 15.58	25	11	196 95	96 66

APPENDIX D.—*Continued.*

Inspectorate.	Name of school (section number and township) and amount expended for books recommended, during the academic year.	No. of public school libraries in inspectorate.	Number of libraries established during year.	Total amount expended during the year for books recommended.	Total Government grant.
				$ c.	$
Huron, W.....	4 Ashfield, 20.00; 6 Stanley, 13.00; 14 Stanley, 20.00; 5 Usborne, 10.00; 6 Usborne, 20.60; 7 Usborne, 20.60; 11 E. Wawanosh, 20.59	17	3	124 79	61
Kent, E.....	12 Camden, 15.00; 2 Harwich, 20.00; 3 Harwich, 22.50; 6 Harwich, 20.00; 7 Harwich, 12.00; 10 Harwich, 25.00; 11 Harwich, 20.00; 12 Harwich, 10.00; 16 Harwich, 20.00; 1 Howard, 20.00; 2 Howard, 10.00; 3 Howard, 20.00; 11 Howard, 6.50; 12 Howard, 5.00; 14 Howard, 7.00; 2 Orford, 20.00; 2 Orford, (1904) 20.00; 5 Orford, 15.00; 7 Orford, 25.00; 9 Orford, 20.00: 10 Orford, 22.50; 3 Zone, 10.00; 4 Zone, 10.00; 5 Zone, 18.00.....	37	14	393 50	189
Kent, W.....	1 Chatham, 21.10; 7 Chatham, 10.00; 8 Chatham, 20.00; 10 Chatham, 20.00; 13 Dover, 25.00; 10 Raleigh, 5.00; 14 Raleigh, 14.00; 12 Raleigh, 10.00; 2 Romney, 5.00	49	5	130 10	62
Lambton, E.....	5 Dawn, 30.03; 7 Dawn, 14.92; 10 Dawn, 7.61; 11 Dawn, 25.69; 13 Dawn, 2.75; 14 Dawn, 28.74; 17 Dawn, 24.58; 19 Dawn, 28.75; 3 Brooke, 30.10; 7 Brooke, 30.00; 8 Brooke, 11.52; 9 Brooke, 15.97; 12 Brooke, 20.00; 13 Brooke, 27.35; 15 Brooke, 20.10; 18 Brooke, 15.05; 23 Brooke, 30.15; 1 Warwick, 5.00; 2 Warwick, 17.38; 5 Warwick, 15.47; 6 Warwick, 15.04; 8 Warwick, 20.10; 10 Warwick, 15.44; 16 Warwick, 19.00; 20 Warwick, 15.06; 4 Enniskillen, 28.14; 5 Enniskillen, 20.86; 8 Enniskillen, 24.66; 11 Enniskillen, 14.04; 17 Enniskillen, 20.00; 18 Enniskillen, 30.07; 23 Enniskillen, 17.06; 2 Euphemia, 31.56; 3 Euphemia, 14.96; 4 Euphemia, 21.90; 5 Euphemia, 73.00; 10 Euphemia, 20.23..	37	37	802 28	318
Lambton, W....	24 Sombra, 13.10; 3 Moore, 7.60; 7 Plympton, 5.75; 11 Plympton, 10.00; 8 Bosanquet, 19.80; 9 Bosanquet, 11.00; 13 Bosanquet, 10.58.....	10	7	77 83	38
Lanark	4 Bathurst, 12.00; 5 Bathurst 10.00; 12 Bathurst, 10.00; 5 Beckwith, 30.00; 6 Beckwith, 4.00; 2 Dalhousie, 10.00; 11 Drummond, 20.00; 13 Drummond, 20.00; 10 Lanark, 10.00; 8 Montague,				

APPENDIX D.—*Continued.*

Inspectorate.	Name of school (section number and township) and amount expended for books recommended, during the academic year.	No. of public school libraries in inspectorate.	Number of libraries established during year.	Total amount expended during the year for books recommended.	Total Government grant.
				$ c.	$ c.
Lanark.—*Con*...	8.00; 10 Ramsay, 12.00; 11 Ramsay, 11.00; 15 Ramsay, 20.00; 1 N. Sherbrooke, 19.00; 2 S. Sherbrooke, 10.00..	23	7	206 00	98 00
Leeds and Grenville, No. 1...	1 Leeds and Lansdowne Rear, 10.00.....	12	1	10 00	5 00
Leeds and Grenville No. 2....	7 Front of Yonge & Escott, 20.00; 2 Elizabethtown, 20.05; 4 Elizabethtown, 10.00; 5 Elizabethtown, 21.00; 7 Elizabethtown, 10.50; 20 Elizabethtown, 20.00; 21 Elizabethtown, 10.00; 8 Kitley, 6.47; 10 Kitley, 10.00; 11 Kitley, 20.00; 15 Kitley, 10.00; 4 Wolford, 22.00.....	19	6	180 02	88 48
Leeds and Grenville, No. 3...	24 Augusta, 11.52; 27 Edwardsburg, 5.90; 8 Oxford, 10.00.....	10	1	27 42	13 71
Lennox and Addington.....	2 Kaladar, Anglesea & Effingham, 37.85; 18 N. Fredericksburg, 15.88.....	15	1	53 73	17 94
Lincoln	1 Louth, 20.00; 2 Louth, 20.00; 3 Louth, 20.00; 6 Louth, 20.00; 7 Louth, 20.00; U. 2 Clinton & 3 Louth, 20.00; U. 3 Clinton & 4 Louth, 20.00; 1 Grantham, 20.22; 4 Grantham, 20.00; 5 Grantham, 20.15; 8 Grantham, 20.00; 2 Grantham & 8 Louth, 20.00; U. 3 Caistor, 20.00; 6 Caistor, 20.00; 8 Caistor, 20.00; 2 Gainsboro' 20.00; 3 Gainsboro' 21.35; 6 Gainsboro' 19.64; 7 Gainsboro' 20.00; 4 N. Grimsby, 18.40; U. 5 N. Grimsby, 31.60; 13 N. Grimsby, 20.00; 9 S. Grimsby, 21.00; 12 S. Grimsby, 20.00; 10 S. Grimbsy, 20.52; 1 Clinton, 20.00; 4 Clinton, 20.00; 5 Clinton, 20.00; 6 Clinton, 20.37; 2 Louth & 1 Clinton, 20.00; U. 5 Clinton, 20.00	42	22	633 25	309 02
Middlesex, E...	12 Biddulph, 20.00; 2 Dorchester, 20.00; 12 Dorchester, 15.00; 1 McGillivray, 14.00; 18 McGillivray, 16.00; 10 Nissouri W., 22.23; 5 Nissouri W., 13.54; 7 Westminster, 15.61; 10 Westminster, 20.00; 19 Westminster, 10.48; 23 Westminster, 29.53.....	24	10	190 39	89 31
Middlesex, W...	U. 1 & 2 Adelaide and W. Williams, 15.85; 4 Ekfrid, 16.60; 11 Ekfrid, 10.00; 5 Lobo, 10.00; 7 E. Williams, 11.07; 4 Metcalf, 10.00.....	13	3	73 52	36 75
Norfolk	3 Townsend, 8.00; 4 Townsend, 4.50; 8 Townsend, (1904), 10.24; 2 Windham, 14.00; 12 Windham, 7.00; 1 Middleton,				

APPENDIX D.—*Continued.*

Inspectorate.	Name of school (section number and township) and amount expended for books recommended, during the academic year.	No. of public school libraries in inspectorate.	Number of libraries established during year.	Total amount expended during the year for books recommended.	Total Government grant.
				$ c.	$ c.
Norfolk.—*Con.*..	14.35; 2 Middleton, 5.84; 3 Middleton, 16.00; 8 Houghton, 11.00; 11 Houghton, 10.14; 2 Walsingham, 20.00; East 19 Walsingham, 5.00; 6 Charlotteville, 8.90; 8 Charlotteville, 16.00; 14 Charlotteville, 8.40; 18 Charlotteville, 10.00	26	9	169 37	84 68
Northumberland	7 Hamilton, 30.00; 11 Hamilton, 20.00; 2 & 3 Brighton and Cramahe, 20.00	9	3	70 00	30 00
Ontario, N.....	1 Brock, 20.00; U. 4 Brock, 20.00; U. 5 Brock, 20.00; 5 Brock, 20.00; 6 Brock, 20.00; 7 Brock, 20.00; 13 Brock, 20.00; 1 Mara, 20.00; 2 Mara, 20.00; 3 Mara, 20.00; 4 Mara, 20.00: 6 Mara, 10.00; 8 Mara, 20.00; 10 Mara, 20.00; 1 Rama, 20.00; 2 Rama, 20.00; 4 Scott, 29.13; 5 Scott, 20.00; 6 Scott, 20.00; 8 Scott, 20.00; 9 Scott, 10.00; 5 Thorah, 20.00; 2 Uxbridge, 20.00; 8 Uxbridge, 20.00; 7 Uxbridge, 20.00.....	59	6	489 13	240 00
Ontario, S.....	7 Reach, 10.00; 10 Reach, 4.53; U. 5 E. Whitby, 12.22; U. 4 E. Whitby, 10.00; 4 E. Whitby, 20.00; 6 Whitby, 6.43	8	6	63 18	31 59
Oxford	U. 4 Blandford, 20.50; 12 Dereham, 52.00; 11 E Nissouri, 12.08; 9 S. Norwich, 30.00; 13 S. Norwich, 28.10; 2 N. Oxford, 20.00; 3 E. Zorra, 10.03; 7 E. Zorra, 75.00; 9 E. Zorra, 30.00; 13 E. Zorra, 31.15; 8 E. Zorra, 28.75; 4 E. Zorra, 7.50.....	14	8	345 11	104 80
Peel.....	3 Caledon, 19.20; 6 Caledon, 20.00; 12 Caledon, 21.40; 14 Caledon, 20.00; 5 Chinguacousy, 23.60; 26 Chinguacousy 24.00; 5 Toronto, 27.20; 6 Toronto, 20.25; 15 Toronto, 39.50.....	14	8	215 15	89 60
Perth	4 Blanshard, 20.13; U. 15 Blanshard, 20.00; 3 Downie, 20.00; 4 Downie, 50.00; 6 Downie, 25.00; U. 1 N. Easthope, 10.00; 4 N. Easthope 24.80; U. 6 N. Easthope, 25.00; 8 Ellice, 20.00; 9 Ellice, 20.00; 1 Elma, 20.00; U. 1 Elma, 23.50; 3 Fullarton, 20.00; 6 Fullarton, 20.00; 8 Logan, 20.45; 4 Mornington, 20.19; 12 Mornington, 32.00; U. 13 Mornington, 20.00; 3 Wallace, 20.00; 4 Wallace, 20.00.....	44	15	451 07	195 00
Peterboro'.....	2 Smith, 13.23.....	5	....	13 23	6 61

APPENDIX D.—*Continued.*

Inspectorate.	Name of school (section number and township) and amount expended or books recommended, during the academic year.	No. of public school libraries in inspectorate.	Number of libraries established during year.	Total amount expended during the year for books recommended.	Total Government grant.
				$ c.	$ c.
Prescott and Russell.....	1 Caledonia, 11.65 ; 5 Caledonia, 20.00 ; 8 Caledonia, 1.54 ; 10 E. Hawkesbury, 20.00 ; 2 W. Hawkesbury, 10.00 ; 5 W. Hawkesbury, 10.25 ; 7 W. Hawkesbury, 10.00 ; 3 Longueuil, 20.00 ; 1 N. Plantagenet, 17.50 ; 4 S. Plantagenet, 20.00 ; 9 Clarence, 20.00 ; 15 Clarence, 10.00 ; 2 Cumberland, 3.10 ; 3 Cumberland 20.36. 7 Cumberland, 18.65 ; 12 Cumberland, 5.00 ; 3 Russell, 19.50.....	27	16	237 85	118 73
Prince Edward..	4 Athol, 20.00 ; 5 Hallowell, 23.00 ; 5 N. Marysburgh, 20.00 ; 6 N. Marysburgh, 20.00 ; 1 Sophiasburgh, 20.30 ; 8 Sophiasburgh, 39.85 ; 10 Sophiasburgh, 9.00 ; 11 Sophiasburgh, 20.00.....	20	5	172 15	74 50
Renfrew.....	1 Admaston, 6.88 ; 5 Admaston, 14.33 ; 11 Admaston, 10.30 ; 8 Bromley, 10.15 ; 2 Brudenell, 26.00 ; 3 Pembroke, 20.00 ; 1 Ross, 20.00 ; 8 Ross, 20.93 ; 2 Westmeath, 21.18 ; 11 Westmeath, 40 00....	14	7	189 77	80 82
Simcoe E. & W. Muskoka.....	3 Medonte, 20.00 ; 10 Oro, 46.93 ; 4 Oro, 10.00 ; 1 Orillia, 33.00 ; 5 Orillia, 10.56 15 Orillia, 20.00 ; 3 Medora, 40.00.....	33	3	180 49	60 28
Simcoe, N.....	5 Tiny, 37.14 ; 3 Flos, 30.87 ; 8 Sunnidale, 20.00 ; 3 Vespra, 20.00.....	8	4	108 01	40 00
Simcoe, S.W....	10 Innisfil, 32,50 ; 6 Tecumseth, 31.75 ; 8 Tecumseth, 35.25 ; 11 Tecumseth, 33.50 19 Tecumseth, 30.00.....	5	3	163 00	50 00
Stormont.....	4 Osnabruck, 23.04 ; 12 Osnabruck, 5.35....	3	2	28 39	12 67
Victoria E.....	3 Emily, 19.45 ; 13 Emily, 20.00 ; 1 Ops, 5.25 ; 9 Ops, 20.00.....	5	3	64 70	32 34
Victoria W. and N.E.Muskoka..	1 Mariposa, 20.00 ; U. 4 Mariposa, 19.90 ; 5 Mariposa, 17.00 ; 6 Mariposa, 20.00 ; 16 Mariposa, 25.84 ; 17 Mariposa, 8.30 ; 21 Mariposa, 10.00 ; 1 Eldon, 18.54 ; 4 Eldon, 10.00 ; 5 Eldon, 30.00 ; 8 Eldon, 20.00 ; 6 Fenelon, 20.28 ; U. 1 Laxton & Sommerville, 20.00 ; U. 1 Bexley & Sommerville, 1.80 ; 2 Draper, 15.00....	16	12	256 66	120 27
Waterloo No. 1..	.....	1	0	.....	.....
Waterloo No. 2..	20 N. Dumfries, 10.04 ; 4 Wellesley, 8.00; 16 Wellesly 17.18.....	6	1	35 22	17 61

APPENDIX D.—*Continued.*

Inspectorate.	Name of school (section number and township) and amount expended for books recommended during the academic year.	No. of public schol libraries in inspectorate.	Number of libraries established during year	Total amount expended during the year for books recommended.	Total Government grant.
				$ c.	$
Welland.....	.....	1	....	.....	.....
Wellington, N...	1 Minto, 23.04 ; 13 Peel, 355.....	5	1	26 59	11
Wellington S....	1. W. Garafraxa, 15.00 ; 6 W. Garafraxa, 20.00.....	25	....	35 00	17
Wentworth.....	5 Ancaster, 12.16 ; 10 Ancaster, 20.00 ; 13 Ancaster, 20.00 ; 18 Ancaster, 10.00 ; 3 Barton, 15.00 ; 5 Beverly, 2.90 : 8 Beverly, 20.05 ; 13 Beverly, 5.60 ; 15 Beverly, 20.32 ; 1 Binbrook, 1.00 : 6 Flamboro E., 26.00 ; 2 Flamboro W., 14.00 ; 4 Flamboro W., 10.00 ; 6 Flamboro W. 10.14 ; 9 Flamboro W, 24.15 ; 1 Glanford, 20.30 ; 3 Glanford, 11.50 ; 4 Glanford, 5.50 ; 5 Saltfleet, 20.00 ; 9 Saltfleet, 11.00.....	32	12	279 62	134
York, N.....	2 Georgina, 13.50 ; 3 Georgina, 14.05 : 4 Georgina, 10.05 ; 5 Georgina, 20.00 ; 5 N. Gwillimbury, 6.45 ; 6 N. Gwillimbury, 6.58 : 7 N. Gwillimbury, 10.00 ; 7 E. Gwillimbury, 8.76 ; 5 King, 5.00 ; 6 King 7.60 ; 7 King, 11.74 ; 9 King, 10.35 ; 10 King, 7.00 ; 11 King, 5.12 ; 16 King, 20.00 ; 3 Vaughan, 5.00 ; 5 Vaughan, 7.30 ; 6 Vaughan, 12.47 ; 15 Vaughan, 3.76 ; 18 Vaughan, 10.00 ; 19 Vaughan, 15.80 ; 20 Vaughan, 11.80 ; 1 Whitchurch, 10.10 ; 4 Whitchurch, 9.50 ; 7 Whitchurch, 6.00 ; 9 Whitchurch, 5.60	31	22	253 53	126
York S.....	3 and 24 Etobicoke and York, 10.00 ; 5 Scarboro, 13.00 ; 9 Scarboro, 15.40.....	20	1	38 40	19
Manitoulin.....	.....	2	....	.....	.....
Nipissing N.....	1 Snider and Creighton, 10.00.....	1	1	10 00	5
Parry Sound....	4. Chapman, 11.00 ; 1 Humphrey, 20.00 ; 1 Lount, 12.00 ; 1 Mills, 36.87 ; 3 McDougall, 10 00 ; 6 McDougall, 20.03 : 1 McKellar, 20.00 : 6 McKellar, 20.00 ; 3 McMurrich, 12 00; 4 McMurrich, 12.00; U. 2 Pringle, 30.00 : 1 Wallbridge, 20.00 ; U. 1 Wilson, 20.12.....	17	13	244 02	108
Rainy River and Thunder Bay..	5 Lash, 20.19.....	1	1	20 19	10
R. C. Separate Schools, West.	12 Peel, 10.00 ; 1 W. Wawanosh, 2.40 ; 7 Sandwich S., 10.00 ; 5 Raleigh, 6.48 ; 4 Biddulph, 4.52 ; 4 Maidstone and 2 Rochester, 31.80; 1 Hay, 20.00; 1 Carrick				

APPENDIX D.—*Concluded.*

Inspectorate.	Name of school (section number and township) and amount expended for books recommended, during the academic year.	No. of public school libraries in inspectorate.	Number of libraries established during year.	Total amount expended during the year for books recommended.	Total Government grant.
				$ c.	$ c.
	and Culross, 18.00 ; 7 Sydenham, 5.25 ; 2 Maidstone, 13.37 ; 14 Carrick, 20.00 ; 1 McKillop, 6.13 ; 6 Raleigh, 10.00 : 9 Downie, 18.00	20	9	175 95	82 06
R. C. Separate Schools, Central	4 Asphodel, 6.40; 5 Percy, 6.17; 1 York 10.00	3	1	22 57	11 28
R. C. Separate Schools, East		1	....	.....	.....
	Totals, 1904-5	1,231	458	11,641 85	5,265 80
	Totals, 1903-4	.....	....	8,195 70	3,656 41
	Increases	.....	....	3,446 15	1,609 39

APPENDIX E.—*CONTINUATION CLASSES, 1904-5.*

Inspectorate.	Name of Principal and Degree; also Assistant when he gives full time to Continuation Class work.	Professional Certificate.	No. of Teachers.	Name of School.	No. of Pupils.	Class of School. A	B	C
Brant	Arthur E. Green	I	4	8 S. Dumfries	16	1		
	D. A. Welsh	III	1	7 Brantford	3			
	W. J. Jolly	I	1	16 Brantford	8			
	Miss A. A. Langs	II	1	20 Brantford	4			
	Margery Amy	II	1	14 S. Dumfries	5			
	K. Cora Misener	II	1	6 Onondaga	4			
Bruce E.	Alton M. Sheppard	I	3	14 Carrick	8			
Bruce W.	Royden J. Fuller	I	7	Paisley Village	47	1		
	Truman W. Kidd	I		"				
	Donald Ross	I	8	Southampton Village	26	1		
	D. L. Strachan	I	5	Teeswater Village	44	1		
	Jos. Stalker	II	5	Lucknow Village	48		1	
	Thos. Keenan	I	3	Tiverton Village	11			1
	Jno. Thos. Kidd	II	1	7 Bruce	6			1
	Elgin F. Collins	III	1	12 Culross	6			1
	Bruce F. Howson	I	3	10 Huron	11			1
	Winifred E. Milne	II	1	8 Kinloss	5			1
	Minnie McNaughton	II	1	4 Culross	4			
	H. Stanley Sanderson	II	1	5 Greenock	5			
	Margaret McCharles	III	1	1 Huron	4			
	Margaret H. Welsh	II	1	8 Huron	4			
	Wm. H. Sharp	II	1	10 Kinloss	7			
Carleton	Muriel Payne	I	2	8 Fitzroy	23	1		
	Mary Ardley, B.A	I	2	7 Goulburn	18	1		
	Marion White	I	3	3 N. Gower	16	1		
	Lila Macdougall	I	4	1 Nepean	18	1		
	Clara Parr	I	4	11 Osgoode	48	1		
	Nellie Croskery	I		"				
	H. W. Brownlee, B.A	III	8	Hintonburgh	13	1		
	Samuel Acheson	II	2	12 Goulburn	21	1		
	A. J. Kerr	III	3	Richmond Village	17	1		
	Margaret Taylor	II	2	9 Gloucester	7			1
	Wallace Pettapiece	II	2	6 N. Gower	7			1
	Ernest Worley	II	3	3 Huntley	10			1
	John B. Wallace	III	2	15 Osgoode	8			1
	Ernest Howes	II	2	5 Gloucester	6			
	Miss M. Ellis	II	2	18 Osgoode	5			
Dufferin	T. E. Langford, M.A	I	7	Shelburne Village	35	1		
	Miss De Cou, B.A	I		"				
	B. E. Thackeray, B.A	I	5	Grand Valley Village	20	1		
	W. G. Bain	II	2	2 Melancthon	4			
	Marjorie McNichol	II	1	5 Melancthon	3			
	Wm. Heath	II	2	17 Mono	4			
Dundas	Burton C. Taggart	I	7	Winchester Village	46	1		
	Geo. H. Steer	I	4	Chesterville Village	25	1		
	Horatio Loucks	I	4	12 Winchester	35	1		
	Frank Anderson	II	2	U.18 & 1 Williamsburg	4			
	Gideon O. Barclay	III	1	2 Winchester	4			
	Eli Robinson	II	2	6 Mountain	5			
	Esther Bates	II	2	22 Mountain	5			
Durham	D. Hampton	II	4	Millbrook Village	33	1		
	Edward Mitchell	II	1	5 Manvers	5			1
	Hanna Staples	II	2	15 Manvers	3			
Elgin	E. S. Williams	I	4	5 Aldborough	25	1		
	Henry Wing	I	4	6 Aldborough	25	1		
	Geo. Stewart	II	4	Springfield Village	24	1		
	E. W. McKone	III	2	10 Aldborough	10		1	
	J. W. Brown	II	2	9 Southwold	10		1	

APPENDIX E.—*Continued.*

Inspectorate.	Name of Principal and Degree; also Assistant when he gives full time to Continuation Class work.	Professional Certificate.	No. of Teachers.	Name of School.	No. of Pupils.	Class of School. A	B	C	D
Elgin.—*Con.*	R. A. Catherwood...	II	2	Port Stanley Village..	6	...	...	1	...
	J. C. McLennan	III	1	11 Southwold	5	...	...	1	...
	Geo. Dale.	II	3	11 S. Dorchester.....	9	...	...	1	...
	E. P. Lewis	III	2	7 Yarmouth	6	...	...	1	...
	Geo. Priddle.....	II	2	18 Bayham	4	...	...	...	1
	Libbie McLennan...	III	1	14 Dunwich	4	...	...	...	1
	Frank Amoss	III	1	21 Malahide	3	...	...	...	1
	Mamie Sanders	II	1	18 Yarmouth	4	...	...	...	1
	D. Clunas	III	1	21 Malahide	4	...	...	...	1
Essex N.....	Nellie Moynahan ...	II	1	6 Sandwich, S	11	...	...	1	...
Essex S.....	Isabella Butterworth, B.A	I	5	4 Tilbury, W	31	1	...	...	...
	Maud McLay	I		"					
	J. W. Rymal, B.A...	I	7	Amherstburg Town...	25	1	...	...	...
	Fred. J. Voaden	II	7	Kingsville "	6	...	...	1	...
	J. H. Madill.....	II	1	2 Colchester, S.....	6	...	...	1	...
	W. J. Elliott.....	I	3	9 Colchester, S.....	13	...	...	1	...
Frontenac.....	M. Aylesworth, B.A.	III	2	3 Portland.....	6	...	...	1	...
	Mrs. Revelle.....	II	1	7 Portland	3	...	...	...	1
Glengarry.....	Elizabeth McLennan, B.A	I	4	Maxville Village	32	1	...	...	...
	Wm. B. McEwan...	II	3	12 Charlottenburg.....	11	...	...	1	...
	R. A. A. McConnell.	II	3	Lancaster Village.....	4	...	...	...	1
Grey E.....	Thomas Gowan	I	4	Thornbury Town.....	6	...	...	1	...
	Chas. E. Stuart	III	2	3 Euphrasia.....	5	...	...	1	...
	J. Ashley Bailie.....	II	2	13 Collingwood.....	3	...	...	...	1
Grey S.....	Thos. Allan	I	9	Durham Town.....	81	1	...	...	...
	Lena M. Forfar, B.A.	I	...	Durham Town.....					
	Agnes Johnston.....	I	..	Durham Town.....					
	J. A. Magee.....	I	8	Hanover Village.....	24	1	...	...	...
	Jas. S. Rowe.....	II	4	Markdale "	24	...	1	...	...
	N. C. Mansell.....	II	3	5 Artemesia.....	16	...	...	1	...
	A. D. Carmichael..	III	2	U. 12 Artemesia.....	7	...	...	1	...
	W. J. Blakeston.....	II	4	Dundalk Village.....	8	...	...	...	1
	Robt. A. Thompson.	II	1	2 Bentinck.....	3	...	...	...	1
	Mary Spence	II	1	14 Egremont.....	3	...	...	...	1
Grey W.....	A. B. Cooper.....	I	3	Chatsworth Village...	9	...	...	...	1
Haldimand.....	Dawson F. Aiken...	I	4	10 Walpole	28	1	...	...	...
	J. L. Mitchener, B.A.	I	2	3 Walpole	18	...	1	...	...
	Margaret Kenney ...	II	2	1 Walpole	6	...	...	1	...
	Alice Martin.....	II	1	2 Walpole	3	...	...	...	1
	Letta Curtis.....	III	1	1 Rainham.....	3	...	...	...	1
	Margaret Johnston..	III	1	10 Seneca.....	3	...	...	...	1
Haliburton, etc....	A. C. Bernath.....	I	8	Huntsville Town	20	1	...	...	...
	Geo. R. Coombs....	II	4	Powassan Town.....	10	...	1	...	...
	Geo. W. Dominey ..	I	2	2 Machar.....	6	...	...	1	...
	W. I. Hodges.....	II	2	6 S. Himsworth.....	4	...	...	...	1
Halton.....	W. F. Inman.....	I	7	Milton Town.....	43	1	...	...	...
	Daisy Taylor.....	I		"					
	W. H. Stewart	I	7	Acton Village	31	1	...	...	...
	Milly Dingman	I		"					
	F. T. Richardson...	I	4	Burlington Village....	4	...	...	...	1
	W. J. McClenahan..	II	1	3 Nelson.....	3	...	...	...	1
	Miss M. Murray	II	1	2 Esquesing	5	...	...	...	1
	Miss M. Chapman..	II	1	1 Nassagaweya.....	8	...	...	...	1
	Miss G. Featherstone	II	1	9 Trafalgar	5	...	...	...	1
	J. D. Williamson...	III	1	15 Trafalgar.....	5	...	...	...	1

APPENDIX E.—*Continued.*

Inspectorate.	Name of Principal and Degree; also Assistant when he gives full time to Continuation Class work.	Professional Certificate.	No. of Teachers.	Name of School.	No. of Pupils.	Class of School.			
						A	B	C	D
Hastings N.	Robt. Weir	I	4	Marmora Village	7	...	...	1	...
	Lilly Moffat	II	1	2 Carlow	3	...	...	...	1
Hastings S	A. E. Thrasher	II	1	7 Sidney	6	...	...	1	...
	Arthur M. Ward	III	1	18 Hungerford	6	...	...	1	...
	Adam Kiernan	II	1	29 Tyendinaga	9	...	...	1	...
	John M. Bell	II	5	Tweed Village	18	...	.	1	...
	M. W. Mott	II	2	12 and 14 Thurlow	6	...	...	...	1
	Ethel Gowsel	II	1	15 Thurlow	4	...	...	...	1
	Bernard Collins	III	1	16 Hungerford	4	...	...	...	1
	Wm. O'Brien	III	1	20 Hungerford	5	...	...	...	1
Huron E	I. H. Cameron	I	6	Brussels Village	64	1	...	...	...
	Ethel O. Scott	III		"					
	A. H. Musgrove	II	9	Wingham Town	103	1	...	...	...
	Gordon Manning	III		"					
	Gilbert Summers	I	4	Blyth Village	31	1	...	...	...
	John Hartley	II	2	Wroxeter Village	7	...	...	1	...
	Chester L. Edy	III	2	7 Howick	5	...	...	1	...
	Thos. G. Shillinglaw	II	1	9 Tuckersmith	8	...	...	1	...
	Laura A. Shannon	II	2	11 Grey	6	...	...	...	1
	Wm. H. Downey	I	2	17 Howick	9	...	...	...	1
	A. McAllister	II	1	3 Hullett	5	...	...	...	1
	Ernest Robertson	II	2	8 Hullett	3	...	...	...	1
	Melvin Keys	III	1	6 McKillop	3	...	...	...	1
	F. T. Bryans	III	1	5 Morris	4	...	.	..	1
	Robt. J. Beatty	II	1	5 Tuckersmith	3	...	...	...	1
Huron W	Louis C. Fleming	I	8	Exeter Village	74	1	...	...	...
	Annie Dorrington	I		"					
	W. J. O'Brien	I		"					
	Wm. McKay	II	3	Hensall Village	15	...	1	...	...
	Chas. A. Tibbutt	II	2	8 Ashfield	12	...	...	1	...
	Fred. Ross	II	1	4 Ashfield	10	...	...	1	...
	R. F. Stelck	III	3	7 Hay	10	...	...	1	..
	Geo. W. Shore	II	1	6 Stanley	5	...	...	1	...
	Claude Bluett	II	3	5 Stephen	8	...	...	1	...
	Silvia Seel	III	1	7 Wawanosh	5	...	...	1	..
	Minnie J. Durnin	III	1	3 Ashfield	5	...	...	...	
	Nina Kilpatrick	III	1	6 Ashfield	4	...	...	...	
	T. M. Gordon	II	1	11 Ashfield	3	...	...	...	
	C. M. Augustine	II	1	16 Ashfield	5	...	...	.	
	G. Crawford	III	1	1 Colborne	6	...	...	...	
	J. C. Stothers	III	1	7 Colborne	3	...	...	...	
	H. R. Long	II	1	2 Colborne	5	...	...	...	
	Kathleen Swann	III	1	5 Goderich	3	...	..	...	
	Geo. Baird	I	1	1 Stanley	4	...	...	...	
	Jas. Cameron	III	1	4 Stanley (South)	3	...	...	...	
	Jas. Delgaty	II	1	4 Stanley (North)	9	...	...	...	
	Jennie Musterd	II	1	10 Stanley	6	...	...	...	
	W. H. Johnston	II	1	14 Stanley	4	...	...	...	
	M. Botterill	II	2	1 Stephen	7	...	...	...	
	R. M. McLennan	III	2	16 Stephen	4	...	...	...	
	Peter Gowans	II	1	5 Usborne	5	...	...	...	
	D. McDougall	II	2	6 Usborne	8	...	...	...	
	J. Elgin Currie	III	1	16 Wawanosh	3	...	...	...	
	W. J. Taylor	III	1	3 Wawanosh	3	...	...	...	
	J. M. Brown	III	1	4 Wawanosh	7	...	...	...	
	M. A. Bailie	I	1	17 Wawanosh	8	...	...	...	
	L. Milne	II	1	11 Wawanosh	4	...	...	...	

APPENDIX E.—*Continued.*

Inspectorate.	Name of Principal and Degree; also Assistant when he gives full time to Continuation Class work.	Professional Certificate.	No. of Teachers.	Name of School.	No. of Pupils.	Class of School. A	B	C	D
Kent E	A. A. Merritt	I	8	Blenheim Town	33	1			
	H. H. Kelly, B.A.	II	4	Bothwell Town	47	1			
	C. A. Milburn	I	4	6 Orford	31	1			
	J. G. Cameron	II	4	Thamesville Village	41	1			
	Milton McCordick	II	2	3 and 4 Orford	24		1		
	Lydia Broadbent	II	2	4 Harwich	7			1	
	Margaret Scurrah	II	1	8 Camden	5			1	
	Flora Campbell	II	1	6 Harwich	7			1	
	W. J. Fletcher	III	1	8 Harwich	7			1	
	Margaret Smith	III	1	10 Harwich	6			1	
	E. S. Stephenson	II	1	11 Harwich	12			1	
	Dougald Graham	III	1	12 Harwich	10			1	
	Lizzie Noack	II	1	13½ Harwich	6			1	
	Morley Wilkinson	III	1	10 Howard	6			1	
	J. C. Black	II	1	2 Orford	5			1	
	Rosa Lee	II	1	7 Orford	6			1	
	Richard Smith	I	1	9 Orford	9			1	
	Sara Armstrong	II	1	5 Camden	4				1
	Fred Dodson	II	1	10 Camden	3				1
	Florence Buchan	III	1	7 Howard	4				1
	Frank Ferguson	III	1	12 Howard	4				1
	Norma Wilson	III	1	13 Howard	4				1
	Frank White	III	1	2½ Harwich	3				1
	Mary McCully	II	1	3 Harwich	4				1
	Jas. Newkirk	II	1	9 Harwich	4				1
	Annie Blue	III	1	14 Harwich	4				1
	Lila Gregory	III	1	16 Harwich	4				1
Kent W	E. U. Dickenson, B.A.	I	10	Wallaceburg Town	70	1			
	Isabel Duff, B.A.	I		Wallaceburg Town					
	G. A. Miller	I	8	Dresden	45	1			
	Roberta Fox	I		Dresden					
	I. S. McAllum	II	3	Tilbury Village	30		1		
	Hattie Hutchinson	III	1	7 Chatham	5			1	
	Gordon Stewart	III	1	11 Dover	11			1	
	Cassie M. Hill	II	1	7 Raleigh	5			1	
	Berta Robinson	III	1	12 Raleigh	7			1	
	E. L. Elliott	II	2	U.5 Raleigh	10			1	
	Wm. S. Bell	II	1	U.6 Raleigh	8			1	
	Roger Hutchison	III	1	3 S. Tilbury, E.	6			1	
	Lizzie Wilson	II	2	5 E. Tilbury, E.	7			1	
	Kate B. McDonald	II	1	1 Romney	6			1	
	W. C. Dainty	II	4	4 Romney	9			1	
	Annie Hutchison	III	1	4 Chatham	3				1
	Margaret Rowe	II	1	6 N. Chatham	4				1
	Carrie Rowe	II	1	6 S. Chatham	5				1
	Jessie Hall	II	1	8 Chatham	3				1
	Ada Wrong	III	1	11 Chatham	3				1
	Jennie Richardson	III	1	18 Chatham	3				1
	Mae Quarrie	II	1	4 Dover	4				1
	Katha Johnston	II	1	12 Dover	3				1
	Jessie Ferguson	II	1	3 U. Raleigh	3				1
	J. W. Bennie	III	1	2 E. Tilbury E.	4				1
	Isabel Robertson	III	1	3 M. Tilbury E.	4				1
	Sue M. Lewis	III	1	4 Tilbury E.	4				1
Lambton, E	Carrie Lynch	III	1	3 Romney	3				1
	Libbie Cruickshank	I	7	Oil Springs Village	35	1			
	Ida Norton	I		Oil Springs Village					

APPENDIX E.—*Continued.*

Inspectorate.	Name of Principal and Degree; also Assistant when he gives full time to Continuation Class work.	Professional Certificate.	No. of Teachers.	Name of School.	No. of Pupils.	Class of School.			
						A	B	C	D
Lambton, E.—*Con.*	F. Tanton	I	6	Alvinston Village	32	1			
	Annie Eccles	I		Alvinston Village					
	Jas. J. Wilson	II	2	17 Enniskillen	11		1		
	D. H. Harrison	II	2	5 Euphemia	5			1	
	F. Casselman	III	1	8 Warwick	4				
	Mary C. Campbell	II	1	23 Brooke & Mosa	4				
Lambton, W	J. D. Williamson	II	2	18 Moore	13		1		
	Maud Brightwell	II	1	2 Sarnia	5			1	
	Neil McLean	II	3	Wyoming Village	5			1	
	Christena Gray	II	1	9 Moore	3				
	Geo. Cowie	II	2	7 Sombra	3				
	Robt. Dodds	III	1	17 Sombra	3				
	N. J. Kearney	II	2	Thedford Village	3				
Lanark	Robt. Beatty	II	5	Lanark Village	57	1			
	Mima Ellis	II	4	4 Pakenham	52	1			
	Mrs. E. J. Foley	II	2	12 Bathurst	4				
	J. W. Forrester	III	2	11 Drummond	4				
	Ida Paul	II	2	11 Ramsay	3				
	Anna Walker	III	1	U. 7 N. Elmsley	3				
Leeds & Grenville 1	W. E. Hume	I	4	Westport Village	20	1			
	A. Morton	II	3	Newboro Village	4				
	L. Earle	II	2	5 S. Crosby	3				
	B. Collinson	III	2	6 Bastard	3				
	Wm. Leadbeter	III	1	13 Leeds Rr.	3				
Leeds & Grenville 2	Mabel Greer	II	2	4 Front of Yonge	5			1	
	Geo. E. Scott	II	1	22 Kitley	5			1	
	Nina Buell	I	2	7 Elizabethtown	4				
	Hattie A. Holmes	II	1	26 Elizabethtown	3				
	Vina Cauley	II	2	11 Kitley	3				
Leeds & Grenville 3	Stanley Weightman	I	5	Merrickville Village	41	1			
	Geo. Weedmark	II	6	Cardinal Village	18		1		
	Robt. E. McLaughlin	II	2	15 Edwardsburg	8			1	
Lennox & Addng'tn	R. H. Hutchison	I	3	Bath Village	29	1			
	O. Mowat Perry	III	2	2 Kaladar	5				
Middlesex E.	Flora McColl	II	1	10 Westminster	7			1	
	Edith Stanley	II	1	5 Biddulph	3				
	Hughena Elliott	II	1	9 & 19 Dorchester	4				
	Minnie S. Molland	II	1	7 London	6				
	Lillian Braithwaite	III	1	8 London	5				
	Clarence Flint	II	1	6 McGillivray	5				
	Minnie Brown	II	1	1 W. Nissouri	6				
	Mary Bell	II	1	18 & 21 Westminster	4				
	Jno. A. McNaughton	II	2	4 N. Dorchester	5				
	Clark C. Warren	II	1	17 N. Dorchester	7				
Middlesex W.	W. G. Robinson	II	2	U. 16 Caradoc & Ekfrid	22		1		
	C. J. Bradley	II	2	15 Caradoc	10			1	
	Melvin Payne	II	1	10 Lobo	6			1	
	Carrie J. Lee	II	1	4 Ekfrid	5			1	
	Jennie McPherson	II	1	13 W. Williams	5			1	
	Lewis Payne	II	1	11 Caradoc	3				1
	Effie McEachren	I	1	U. 8 Ekfrid	4				1
	Geo. F. Copeland	II	1	8 Lobo	4				1
	Jas. E. Cowie	III	1	U. 9 Lobo	3				1
	Edna Stewart	II	1	1 E. Williams	4				1
	Jessie Blair	II	1	U. 7 E. Williams	4				1

APPENDIX E.—*Continued.*

Inspectorate.	Name of Principal and Degree; also Assistant when he gives full time to Continuation Class work.	Professional Certificate.	No. of Teachers.	Name of School.	No. of Pupils.	Class of School.			
						A	B	C	D
Norfolk	Thos. J. Hicks	II	2	6 Charlotteville	8	...	...	1	...
	Ida Christmas	II	1	W. 19 S. Walsingham	7	...	...	1	...
	L. E. Fierheller	II	2	11 Windham	9	...	...	1	...
	J. A. Irwin	I	4	Delhi Village	14	...	...	1	...
	Wm. Bowden	III	2	19 Townsend	7	...	...	...	1
	Miss J. Overbaugh	III	1	5 Houghton	5	...	...	...	1
	H. A. Marshall	II	1	5 Middleton	4	...	...	...	1
	Miss M. McCurdy	III	1	11 Houghton	3	...	...	...	1
	Mary Bain	III	1	9 Windham	5	...	...	...	1
Northumberland	E. J. Wethey, B.A.	I	4	2 Percy	42	1	...	...	...
	Arthur A. Mason	III	1	22 Cramahe	5	...	...	1	...
	Geo. Sharpe	III	1	12 Percy and Seymour	3	...	...	...	1
Ontario N.	R. J. Johnston	II	4	Cannington Village	11	...	1	...	...
	J. Givens	II	3	Beaverton Village	17	...	1	...	...
	Wm. Fallowdowne	II	3	13 Brock	9	...	...	1	...
	Clarisa Paterson	II	1	14 Brock	7	...	...	1	...
	Martha Cameron	II	1	2 Mara	7	...	...	1	...
	May Mitchell	III	1	8 Mara	6	...	...	1	...
	Minnie Chambers	III	1	1 Rama	6	...	...	1	...
	Jessie Walls	III	1	8 Scott	4	...	...	...	1
	Florence Shain	II	2	5 Scott	3	...	...	...	1
	Henry Hart	II	1	6 Brock	6	...	...	...	1
	Ernest Middleton	II	1	10 Brock	4	...	...	...	1
	Ida Arnott	III	1	1 Mara	5	...	...	...	1
	Alex. R. McDonald	III	1	6 Mara	4	...	...	...	1
Ontario S	W. Flummerfelt	II	2	15 Pickering	5	...	...	1	...
	Fannie Gray	II	2	6 E. Whitby	4	...	...	...	1
	Arvella Real	III	1	11 Reach	3	...	...	...	1
Oxford	H. E. Ricker	I	5	Norwich Village	42	1	...	...	...
	W. J. Dunlop	I	4	U. 13 E. Zorra	20	1	...	...	...
	M. A. Aldridge	I	3	Embro Village	10	...	1	...	...
	F. Robinson	II	3	24 Blenheim	10	...	1	...	...
	P. H. Hendershot	II	2	U. 3 N. Norwich	10	...	1	...	...
	M. Alberta Robinson	II	3	11 Blenheim	14	...	1	...	...
	C. W. Milburn	I	3	U. 21 Blenheim	24	...	1	...	...
	Chas. Garthwaite	II	3	6 S. Norwich	13	...	1	...	...
	M. B. Hugill	II	2	5 Dereham	5	...	...	1	...
	John M. Scott	II	3	U. 21 E. Nissouri	5	...	...	1	...
	H. C. Brannian	II	2	12 Dereham	5	...	...	1	...
	L. H. Woodrow	III	2	10 E. Zorra	6	...	...	1	...
	E. H. Damude	II	3	U. 3 W. Oxford	4	...	...	...	1
	Mary E. Ireton	II	1	6 E. Nissouri	4	...	...	...	1
	Evelyn Augustine	II	1	2 N. Oxford	4	...	...	...	1
Peel	A. M. Burchell	I	4	Bolton Village	39	1	...	...	...
	C. F. Ewers	II	2	15 Caledon	7	...	...	1	...
	W. E. Wilson	II	2	8 Caledon	5	...	...	...	1
Perth	Stella L. Gregory	I	1	15 Chinguacousy	4	...	...	...	1
	John A. Westman	II	3	Milverton Village	25	...	1	...	...
	Edith A. Oliver	III	1	8 Downie	4	...	...	...	1
	J. Edgar Christie	III	2	4 N. Easthope	7	...	...	...	1
	Donald A. Norris	II	2	10 Elma	7	...	...	...	1
	Samuel Sample	II	2	3 Fullarton	4	...	...	...	1
	R. Hall Cowie	II	2	U. 4 Fullarton	5	...	...	...	1
	Harvey Elliott	III	1	2 Logan	5	...	...	...	1
	Thos. Hutchison	II	1	4 Morningtou	3	...	...	...	1
Peterboro	Lawrence F. Brogden	III	1	8 Mornington	3	...	...	...	1
	Sidney W. E. Hill	I	5	Lakefield Village	12	...	1	...	...
	D. L. Somerville	II	5	Havelock Village	10	...	1	...	...

APPENDIX E.—*Continued.*

Inspectorate.	Name of Principal and Degree; also Assistant when he gives full time to Continuation Class work.	Professional Certificate.	No. of Teachers.	Name of School.	No. of Pupils.	Class of School.			
						A	B	C	D
Peterboro.—*Con.*	Wm. G. Armour	II	2	4 Otonabee	4				1
Prescott & Russell	Roy F. Fleming	II	3	2 Russell	8			1	
	A. May Sparling	II	2	2 Cumberland	6			1	
	C. M. Rowe	II	2	Rockland Village	10				1
	W. L. Summerby	III	2	5 Cumberland	3				1
	Evelyn F. Marston	III	1	1 E. Hawkesbury	4				1
Prince Edward	Miss H. MacSteven	II	2	Wellington Village	8			1	
	J. E. Benson	II	1	2 Ameliasburgh	7			1	
	Edgar Adams	II	1	6 Ameliasburgh	6			1	
	J. M. Roote	II	1	11 Ameliasburgh	9			1	
	Miss C. Clarke	II	1	3 Athol	7			1	
	F. B. Clarke	I	2	7 Hallowell	12			1	
	M. Y. Williams	III	2	17 Hillier	10			1	
	Miss M. Browne	II	1	7 Ameliasburgh	7				1
	J. K. Osborne	III	1	13 Ameliasburgh	5				1
	Jas. Hooper	III	1	10 S. Marysburgh	6				1
	Miss A. E. Collivier	III	1	12 Sophiasburgh	4				1
Renfrew	G. D. Ralston	I	4	Eganville Village	30	1			
	Walter A. Black	II	2	5 Bagot	13		1		
	Robt. Robinson	II	3	Cobden Village	12			1	
	A. A. McQuarrie	II	2	7 Westmeath	10			1	
	Ida Lacy	II	1	3 Admaston	5			1	
	Winifred Cull	III	1	1 Algona South	6				1
	Linnie Donegan	III	1	1 Bromley	3				1
	Chas. Gorman	III	1	3 Bromley	4				1
	Thos. Costello	Dist.	1	2 Brudenell	4				1
	Norman Bothwell	III	1	2 McNab	3				1
	Mary I. Lett	II	1	2 Wilberforce	4				1
	Wm. J. O'Dair	II	1	4 Ross	5				1
Simcoe, E	Miss S. Day	III	1	12 Medonte	5			1	
	J. A. Gillespie	II	4	7 Medonte	6			1	
	K. C. Morrison	I	2	4 Oro	7			1	
	Edmond Moon	III	2	6 Tay	6				1
	W. A. Spottswood	II	4	12 Tay	6				1
Simcoe, N	Kathryn McKee, B.A	I	4	Creemore Village	18	1			
	Ira E. Clark	I	4	5 Flos	14			1	
	Matthew Johnstone	II	1	3 Sunnidale	7			1	
	Thos. Hindle	II	2	9 Vespra	9				1
Simcoe, S.W	J. A. Speers, B.A	I	7	Alliston Town	96	1			
	Nellie Bell	II		Alliston Town					
	Walter L. Richardson	I	6	Stayner Town	39	1			
	Dora M. Richardson	II		Stayner Town					
	Wm. L. Kidd	I	4	Beeton Village	29	1			
	Albert Mills	II		Beeton Village					
	Thos. Elliott, M.A	I	4	Tottenham Village	54	1			
	Magdalene De La-Mater	I		Tottenham Village					
	George A. Clarke	I	4	5 Essa	32	1			
	John A. Gibb	III		Essa					
	J. P. Cowles	III	2	7 Essa	16		1		
	Herbert E. Johnson	II	2	10 W. Gwillimbury	11		1		
	Neil A. Christie	III	2	3 Nottawasaga	15		1		
	Geo. Sutherland	II	2	14 Nottawasaga	10		1		
	John M. McGuire	II	2	10 Essa	6			1	
	Bertha Rogerson	III	1	3 Innisfil	5			1	
	Robert Little	II	1	6 Innisfil	6			1	
	T. J. Colquette	III	2	5 Nottawasaga	5			1	
	Thos. Irwin	II	1	5 Tossorontio	7			1	
	Chas. Deering	II	2	10 Innisfil	6			1	

APPENDIX E.—*Continued.*

Inspectorate.	Name of Principal and Degree; also Assistant when he gives full time to Continuation Class work.	Professional Certificate.	No. of Teachers.		Name of School.	No. of Pupils.	Class of School.			
							A	B	C	D
Simcoe, S.W.—Con.	Kate O'Hara	II	1	4	Adjala	3	...	...	...	1
	Jennie Fife	II	1	1	Essa	3	...	...	...	1
	Robt. Campbell	III	1	2	Essa	4	...	...	...	1
	Mabel Steele	III	1	3	Essa	3	...	...	...	1
	Edward C. Ayerst	III	1	6	Essa	4	...	...	...	1
	Ismay Preston	III	1	1	W. Gwillimbury	3	...	...	...	1
	Ernest Selby	III	1	5	W. Gwillimbury	3	...	...	...	1
	Thos. Scott	II	1	4	Innisfil	4	...	...	...	1
	Chas. Asquith	III	1	7	Innisfil	3	...	...	...	1
	Annie McCutcheon	III	1	4	Nottawasaga	3	...	...	...	1
	Margaret Millichamp	III	1	19	Nottawasaga	3	...	...	...	1
	Nellie Taylor	II	1	26	Nottawasaga	4	...	...	...	1
	May L. Stewart	III	1	2	Tecumseth	3	...	...	...	1
	Wm. T. Baker	III	1	8	Tecumseth	4	...	...	...	1
	Arvella Williams	III	1	11	Tecumseth	4	...	...	...	1
	A. M. Murday	III	1	2	Tossorontio	3	...	...	...	1
	Geo. Wilson	II	1	5	Tossorontio	3	...	...	...	1
	Andrew R. Kidd	II	1	8	Tossorontio	4	...	...	...	1
Stormont	Jas. Froats	I	3	3	Finch	18	1	...	...	...
	Edith M. Adams	I	3	14	Roxborough	13	1	...	...	...
	Gertrude R. Bigelow	I	3	4	Osnabruck	14	1	...	...	...
	Willis Sheets	II	2	3	Osnabruck	18	...	...	1	...
	Margaret M. Robb	III	1	15	Osnabruck	7	...	...	1	...
	Ethel Skelton	III	2	1	Osnabruck	6	...	...	...	1
	Geo. S. Mattice	II	1	9	Osnabruck	7	...	...	...	1
Victoria, E.	Chas. Ramsay	I	5		Bobcaygeon Village	31	1	...	...	...
	Lillian McGeough	III	1	1	Ops	3	...	...	...	1
Victoria, W. and S. E. Muskoka.	H. J. Case	I	6		Fenelon Falls Village	23	1	...	...	...
	H. J. Scovell, B.A.	I	12		Bracebridge Town	53	1	...	...	...
	Miss J. M. Robertson	I			Bracebridge Town					
	C. H. Lapp	II	2	8	Mariposa	10	...	...	1	...
	J. A. McFadyen	III	1	5	Eldon	5	...	...	...	1
	T. C. Birchard	II	2		U. 1 Bexley	5	...	...	...	1
	M. Wilson	II	2		Woodville Village	10	...	...	...	1
Waterloo, No. 1	J. Corrigill	I	6		Elmira Village	10	...	...	1	...
	J. B. Pomeroy	II	2	7	Woolwich	6	...	...	1	...
Waterloo, No. 2	Elsie M. Allan	II	1	4	Wilmot	5	...	...	...	1
	David Harper	II	2	11	Wellesley	8	...	...	...	1
	Andrew T. Gillespie	III	1	22	N. Dumfries	5	...	...	...	1
Welland	D. W. McKay	I	5		Port Colborne Village	22	...	1	...	...
	C. E. Hansell	II	5		Bridgeburg Village	19	...	1	...	...
	E. W. Farr	II	2	9	Pelham	8	...	...	1	...
	F. T. Harry	II	3	11	Bertie	13	...	...	1	...
	Grace C. Barron	II	2		U. 3 Pelham	6	...	...	1	...
Wellington, N.	J. H. Cunningham	I	8		Palmerston Town	45	1	...	...	...
	V. W. Rutherford	I	..		Palmerston Town					
	J. M. Yoke	I	4		Drayton Village	33	1	...	...	...
	Jno. A. Gray	II	3		Clifford Village	10	...	1	...	...
	Lizzie C. Hawken	II	2	7	Peel	7	...	...	1	...
	J. T. Curtis	II	2	2	Peel	6	...	...	1	...
	T. O. McMahon	II	2	12	Maryboro'	8	...	...	1	...
	Robt. S. Smith	III	1	13	Peel	3	...	...	...	1
Wellington, S.	Ernest L. Fuller	I	3		Erin Village	26	1	...	...	...
	I. W. Hutson, M.A.	I	6		Consolidated School	14	1	...	...	...
	W. I. Greenaway	II	2	9	Eramosa	13	...	1	...	...
	Sarah Blythe	I	2	8	Puslinch	13	...	1	...	...
	W. L. Elvidge	II	2	6	W. Garafraxa	9	...	...	1	...
	Jas. Henry	II	2	6	Erin	4	...	...	...	1
	W. W. Smith	III	2	6	Puslinch	5	...	...	...	1
Wentworth	Charles H. Stuart	II	3	5	Ancaster	13	...	...	1	...

APPENDIX E.—*Concluded.*

Inspectorate.	Name of Principal and Degree; also Assistant when he gives full time to Continuation Class work.	Professional Certificate.	No. of Teachers.		Name of School.	No. of Pupils.	Class of School.			
							A	B	C	I
Wentworth.—*Con.*	Fanny A. Twiss	I	1	6	Flamboro, W.	6	...	...	1	...
	Jas. E. Stewart	II	2	7	Flamboro, W.	6	...	...	1	...
	Curtis Nelson	I	2	2	Glanford	9	...	...	1	...
	Allan E. Wilcox	II	4	3	Saltfleet	6	...	...	1	...
	V. Kenneth Greer	I	1	7	Beverly	3	...	...	...	
	Ernest Bartlett	III	2	3	Binbrook	4	...	...	...	
	Leonora Coughlin	I	2	9	Flamboro, W.	7	...	...	...	
York, N.	Waldon Lawr	I	3	13	E. Gwillimbury	27	1	...	...	...
	A. A. Cameron	I	3	14	King	19	1	...	...	...
	Wm. Thorburn	II	2	6	Vaughan	6	...	...	1	...
	Edgar Hollingshead	II	1	11	King	4	...	...	...	
	Walter Rolling	II	1	23	King	4	...	...	...	
	Marion Rannie	II	1	4	E. Gwillimbury	4	...	...	...	
York, S.	D. Hicks, B.A.	I	4		Woodbridge Village	30	1	...	...	...
	Jas Hand	II	4		Stouffville	7	...	...	1	...
	J. W. English	II	4	1	Etobicoke	4	...	...	...	
Algoma	D. M. Christie	I	4		Bruce Mines Town	36	1	...	...	...
	Wm. Argue	II	4		Thessalon Town	13	...	1	...	...
	Angus Cameron	I	2	1	Hallam	3	...	...	...	
Manitoulin, etc.	Robt. O. White	I	4		Gore Bay Town	25	1	...	...	...
	R. D. Fleming	II	4		Little Current Town	12	...	...	1	...
	Fred. H. Hurlburt	II	2	2	Assiginack	6	...	...	1	...
	Jane Lush	II	1	1	Hilton	5	...	...	...	
Nipissing, etc.	Jno. G. Lowe	I	4		Sudbury Town	15	1	...	...	...
	W. M. Bradley	I	7		Copper Cliff Town	14	...	1	...	...
	A. W. Smith	I	5		Sturgeon Falls Town	4	...	...	...	
Parry Sound, W.	A. M. Currie	I	13		Parry Sound Town	59	1	...	...	...
	W. R. Tracy	I	..		Parry Sound Town					
	John Hemphill	I	5		Burk's Falls Town	23	1	...	...	...
	P. F. McNaughton	II	2	1	Chapman	10	...	...	1	...
	John Maxwell	II	2		Sundridge Village	7	...	...	...	
Rainy River and Thunder Bay	John C. Laing	III	1	8	Perry	6	...	...	...	
	J. W. Walker	II	3		Fort Frances Town	7	...	...		...
Windsor and Walkerville	Hugh A. Beaton	II	8		Walkerville Town	15	...	1	...	...
R. C. Bi-lingual Schools, East	Sr. St. Radegoude	I	3	15	Gloucester	3	...	...	...	
R. C. Separate Schools, East	Sr. Ernestine	....	4		Eganville Village	16	1	...	...	...
	Sr. St. Andrew	....	3		Westport Village	32	...	1	...	...
	Florence Corkery	I	2		Chesterville Village	10	...	...	1	...
	Lillian O'Reilly	II	1	7	Wolfe Island	5	...	...	...	
R. C. Separate Schools, Central	Jas. E. Jones	I	5		Mattawa Town	8	...	..	1	...
R. C. Separate Schools, West	Thos. P. Hart	II	2	3	Mara	3	...	...	...	
	Sr. M. Ethelbert	....	7		Amherstburg Town	23	1	...	...	...
	Julia O'Connor	III	2	2	Ashfield	10	...	1	...	...
	And. M. Doyle	II	1	9	Biddulph and 1 McGillivray	5	...	..	1	
	Mary Troy	III	1	1	W. Wawanosh	3	...	...	...	
	Sr. M. Horteuse	....	3	13	Waterloo	3	...	...	...	
	Nellie McAsey	II	1	5	Glenelg	3	...	...	...	
	Margaret A. Lewis	III	1	6	Raleigh	3	...	...	...	
Totals, 1904-5						5,349	78	39	138	
Totals, 1903-4						4,598	68	45	118	
Increases						751	10	...	20	
Decrease						....	...	6	...	

APPENDIX F.—*PROCEEDINGS FOR THE YEAR 1905.*

I. REGULATIONS AND CIRCULARS.

Empire Day.

Circular to Inspectors.

Gentlemen,—This year "Empire Day," the day before "Victoria Day," falls on Tuesday, May 23rd, and I invite your co-operation in having the event duly celebrated in all our schools. See Regulation 11 (2). It is desirable that every suitable means should be adopted to foster among the youth of our country the best national sentiment. The subject is especially important at a time when the British nation is at peace with the world, and when Canada is enjoying a large measure of prosperity due, to a great extent, to the development of our resources and the growth of intellectual and moral aspirations among our people. The principles of patriotism fostered in the minds of our young people should be such as will cause them to have an intelligent knowledge of those forces which have made the British nation what it is to-day. The nation has attained its present proud position because of its spirit of freedom and tolerance, its legal enactments, its regard for truth and righteousness, and the strength it secures from its system of democratic government. The pupils in all our schools should know something of the traditions of the nation, its power as a great civilizing agency, the dangers it has had to surmount, its struggles for freedom, and the main sources of its present world-wide power. The patriotism to be cultivated in our schools should be marked by intelligence, high moral principle, the emphasis placed upon good citizenship, and the recognition of the truths of Christianity.

It might be well to follow some plan like the following in having "Empire Day" duly celebrated:—

In the forenoon part of the time might be occupied by the teacher in taking up as his subject the British Empire, and discussing in a general way its history, its extent and resources, its institutions, its literature, and its distinguished statesmen, authors, etc. The excellence of our responsible form of government, and the privileges which all British subjects enjoy should be brought before the pupils. Some account of the Canadian system of government might be given—Dominion, Provincial, Municipal, Educational, etc. Reference might be made to some of the more prominent Canadians of the past. Any lessons of the kind given should have in view the age and attainments of the pupils.

In the afternoon the exercises, commencing at 2.30, should be such as will be attended by the parents and friends of the children. The programme might embrace patriotic recitations, songs, readings by the pupils, and addresses by trustees, clergymen, and others. During the day the British flag, or Canadian ensign should be hoisted over the school building. With these objects in view I trust you will give the necessary directions to the teachers of schools in your inspectorate in order that "Empire Day" may be duly celebrated in all parts of the Province.

Toronto, April, 1905.

Summer Schools for Teachers, 1905.

The Education Department has made arrangements for Summer Schools to be held at the Normal Schools, Toronto, Ottawa and London. The main purpose of the Schools is to give instruction in the following departments:—

Manual Training,
Household Science,
Nature Study,
Art.

Classes will be organized so as to enable students (the preference being given to teachers) to take as many as convenient of these departments. Lectures will be given by specialists in the respective subjects. Any further information required will be obtained by students after the classes are organized. No fees will be required, and it may be presumed that the cost of books, etc., will be slight. The schools will be organized at 2 p.m., Monday, July 3rd, when all necessary information will be given. The session will continue for three weeks. Certificates of attendance will be awarded to those students who show satisfactory proficiency.

Persons who desire to avail themselves of the privileges offered should make application at an early date (not to this Department but) to the Principal of the Normal School they purpose attending. No special form of application will be needed. (A Summer School is also announced at the MacDonald Institute, Guelph, for which information may be obtained from the President).

Toronto, April, 1905.

Apportionment of the Legislative Public School Grant for 1905.

The apportionment of the Grant to the several municipalities is based upon the latest returns of population for the year 1904 and the division between the Public and Separate Schools on the average attendance of that year as reported by the Inspectors, Public School Boards, and the Separate School Trustees respectively.

While the Separate Schools will receive their portion of the Grant direct from the Department, that of the Public Schools will be paid, according to this schedule, through the respective county, city, town, and village treasurers.

Under the provisions of Section 5 of "An Act respecting the Education Department, 1901," the Education Department is empowered "to appropriate out of moneys voted by the Legislature for Public and Separate Schools a sum not exceeding $5.00 for every school in which the Regulations of the Department as to equipment, ventilation, heating, lighting and the care of the premises generally have been complied with."

Each County Inspector is therefor authorized to deduct from the apportionment of each township such an amount as will provide the sum of $5.00 to be paid on his order to each Trustee Board that has complied with the requirements mentioned.

Toronto, May, 1905.

Public School Apportionment to Counties for 1905.

1. COUNTY OF BRANT.

Municipalities.	Apportionment.
Brantford	$577 00
Burford	481 00
Dumfries, South	294 00
Oakland	85 00
Onondaga	120 00
Total	$1,557 00

2. COUNTY OF BRUCE.

Albemarle	$163 00
Amabel	330 00
Arran	284 00
Brant	469 00
Bruce	327 00
Carrick	296 00
Culross	220 00
Eastnor	182 00
Elderslie	237 00
Greenock	250 00
Huron	375 00
Kincardine	323 00
Kinloss	256 00
Lindsay	45 00
St. Edmunds	47 00
Saugeen	176 00
Total	$3,980 00

3. COUNTY OF CARLETON.

Fitzroy	$295 00
Gloucester	458 00
Goulbourn	291 00
Gower, North	222 00
Huntley	258 00
March	81 00
Marlborough	174 00
Nepean	487 00
Osgoode	458 00
Torbolton	114 00
Total	$2,838 00

4. COUNTY OF DUFFERIN.

Amaranth	$342 00
Garafraxa, East,	221 00
Luther, East	202 00
Melancthon	395 00
Mono	326 00
Mulmur	311 00
Total	$1,797 00

5. COUNTY OF ELGIN.

Aldborough	$548 00
Bayham	447 00
Dorchester, South	186 00
Dunwich	375 00
Malahide	424 00
Southwold	411 00
Yarmouth	548 00
Total	$2,939 00

6. COUNTY OF ESSEX.

Municipalities.	Apportionment.
Anderdon	$183 00
Colchester, North	225 00
Colchester, South	329 00
Gosfield, North	214 00
Gosfield, South	266 00
Maidstone	219 00
Malden	110 00
Mersea	479 00
Pelee Island	74 00
Rochester	48 00
Sandwich, East	73 00
Sandwich, West	205 00
Sandwich, South	132 00
Tilbury, North	44 00
Tilbury, West	194 00
Total	$2,795 00

7. COUNTY OF FRONTENAC.

Barrie	$ 63 00
Bedford	152 00
Clarendon and Miller	97 00
Hinchinbrooke	143 00
Howe Island	.....
Kennebec	137 00
Kingston	291 00
Loughborough	186 00
Olden	127 00
Oso	130 00
Palmerston and N. and S. Canonto	114 00
Pittsburg	254 00
Portland	232 00
Storrington	212 00
Wolfe Island	96 00
Total	$2,234 00

8. COUNTY OF GREY.

Artemesia	$382 00
Bentinck	374 00
Collingwood	384 00
Derby	207 00
Egremont	375 00
Euphrasia	343 00
Glenelg	264 00
Holland	281 00
Keppel	427 00
Normanby	412 00
Osprey	389 00
Proton	356 00
Sarawak	172 00
St. Vincent	333 00
Sullivan	359 00
Sydenham	383 00
Total	$5,441 00

9. COUNTY OF HALDIMAND.

Municipalities.	Apportionment.
Canborough	$109 00
Cayuga, North	182 00
Cayuga, South	89 00
Dunn	95 00
Moulton	206 00
Oneida	162 00
Rainham	199 00
Seneca	190 00
Sherbrooke	42 00
Walpole	453 00
Total	$1,727 00

10. COUNTY OF HALIBURTON.

Anson and Hindon	$33 00
Cardiff	73 00
Dudley, Dysart, Harcourt, Harburn, Guilford	117 00
Glamorgan	56 00
Livingstone	5 00
Lutterworth	52 00
McClintock	6 00
Minden	137 00
Monmouth	64 00
Nightingale	1 00
Sherbourne	33 00
Snowdon	84 00
Stanhope	55 00
Total	$716 00

11. COUNTY OF HALTON.

Esquesing	$394 00
Nassagaweya	249 00
Nelson	310 00
Trafalgar	396 00
Total	$1,349 00

12. COUNTY OF HASTINGS.

Carlow	$86 00
Dungannon	99 00
Elzevir and Grimsthorpe	161 00
Faraday	51 00
Hungerford	416 00
Huntingdon	277 00
McClure, Wicklow and Bangor	116 00
Herschell and Monteagle	202 00
Madoc	368 00
Marmora and Lake	173 00
Mayo	59 00
Rawdon	362 00
Sidney	461 00
Thurlow	410 00
Tudor and Cashel	104 00
Limerick	62 00
Wollaston	94 00
Tyendinaga	333 00
Total	$3,834 00

13. COUNTY OF HURON.

Municipalities.	Apportionmen
Ashfield	$295 (
Colborne	201 (
Goderich	270 (
Grey	382 (
Hay	375 (
Howick	440 (
Hullett	309 (
McKillop	252 (
Morris	277 (
Stanley	222 (
Stephen	432 (
Tuckersmith	261 (
Turnberry	238 (
Usborne	258 (
Wawanosh, East	215 (
Wawanosh, West	224 (
Total	$4,651 (

14. COUNTY OF KENT.

Camden	$280 (
Chatham	569 (
Dover	395 (
Harwich	539 (
Howard	324 (
Orford	323 (
Raleigh	483 (
Romney	221 (
Tilbury, East	356 (
Zone	128 (
Total	$3,618 (

15. COUNTY OF LAMBTON.

Rosanquet	$330 (
Brooke	351 (
Dawn	409 (
Enniskillen	515 (
Euphemia	244 (
Moore	504 (
Plympton	402 (
Sarnia	229 (
Sombra	396 (
Warwick	348 (
Total	$3,728 (

16. COUNTY OF LANARK.

Bathurst	$265 (
Beckwith	193 (
Burgess, North	37 (
Dalhousie and Sherbrooke, North	193 (
Darling	79 (
Drummond	227 (
Elmsley, North	105 (
Lanark	200 (
Lavant	62 (
Montague	227 (
Pakenham	236 (
Ramsay	250 (
Sherbrooke, South	97 (
Total	$2,171 (

17. COUNTY OF LEEDS.

Municipalities.	Apportionment.
Bastard and Burgess, South...	$316 00
Crosby, North	122 00
Crosby, South	166 00
Elizabethtown	459 00
Emsley, South	84 00
Kitley	224 00
Leeds and Lansdowne, Front...	315 00
Leeds and Lansdowne, Rear ...	254 00
Yonge and Escott, Rear	139 00
Yonge, Front, and Escott	274 00
Total	$2,353 00

17. (a) COUNTY OF GRENVILLE.

Augusta	$425 00
Edwardsburg	404 00
Gower, South	90 00
Oxford, Rideau	303 00
Wolford	183 00
Total	$1,405 00

18. COUNTY OF LENNOX AND ADDINGTON.

Adolphustown	$63 00
Amherst Island	91 00
Anglesea, Effingham and Kaladar	155 00
Camden, East	478 00
Denbigh Abinger and Ashley...	125 00
Ernestown	250 00
Fredericksburgh, North	170 00
Fredericksburgh, South	107 00
Richmond	264 00
Sheffield	213 00
Total	$1,916 00

19. COUNTY OF LINCOLN.

Caistor	$193 00
Clinton	218 00
Gainsborough (including $84 arrears)	333 00
Grantham	224 00
Grimsby, North	141 00
Grimsby, South	155 00
Louth	173 00
Niagara	202 00
Total	$1,639 00

20. COUNTY OF MIDDLESEX.

Adelaide	$224 00
Biddulph	187 00
Caradoc	423 00
Delaware	176 00
Dorchester, North	410 00
Ekfrid	295 00
Lobo	305 00
London	944 00
McGillivray	318 00
Metcalfe	177 00
Mosa	242 00
Nissouri, West	312 00
Westminster	522 00
Williams, East	153 00
Williams, West	152 00
Total	$4,840 00

21. COUNTY OF NORFOLK.

Municipalities.	Apportionment.
Charlotteville	$353 00
Houghton	224 00
Middleton	298 00
Townsend	445 00
Walsingham, North	239 00
Walsingham, South	224 00
Windham	349 00
Woodhouse	232 00
Total	$2,364 00

22. COUNTY OF NORTHUMBERLAND.

Alnwick	$112 00
Brighton	260 00
Cramahe	273 00
Haldimand	400 00
Hamilton	435 00
Monaghan, South	108 00
Murray	311 00
Percy	301 00
Seymour	330 00
Total	$2,530 00

22. (a) COUNTY OF DURHAM.

Cartwright	$207 00
Cavan	290 00
Clarke	423 00
Darlington	449 00
Hope	346 00
Manvers	302 00
Total	$2,017 00

23. COUNTY OF ONTARIO.

Brock	$398 00
Mara	308 00
Pickering	599 00
Rama	149 00
Reach	388 00
Scott	247 00
Scugog Island	58 00
Thorah	144 00
Uxbridge	302 00
Whitby, East	310 00
Whitby	248 00
Total	$3,151 00

24. COUNTY OF OXFORD.

Blandford	$188 00
Blenheim	491 00
Dereham	426 00
Nissouri, East	300 00
Norwich, North	246 00
Norwich, South	256 00
Oxford, North	142 00
Oxford, East	240 00
Oxford, West	237 00
Zorra, East	426 00
Zorra, West	288 00
Total	$3,240 00

25. COUNTY OF PEEL.

Municipalities.	Apportionment.
Albion	$257 00
Caledon	454 00
Chinguacousy	442 00
Gore of Toronto	91 00
Toronto	592 00
Total	$1,836 00

26. COUNTY OF PERTH.

Blanchard	$279 00
Downie	282 00
Easthope, North	253 00
Easthope, South	232 00
Ellice	270 00
Elma	444 00
Fullarton	254 00
Hibbert	179 00
Logan	318 00
Mornington	325 00
Wallace	321 00
Total	$3,157 00

27. COUNTY OF PETERBOROUGH.

Anstruther	$33 00
Asphodel	191 00
Belmont	215 00
Burleigh	41 00
Cavendish	16 00
Chandos	94 00
Douro	197 00
Dummer	213 00
Ennismore	95 00
Galway	109 00
Harvey	117 00
Methuen	29 00
Monaghan, North	105 00
Otonabee	376 00
Smith	319 00
Total	$2,150 00

28. COUNTY OF PRESCOTT.

Alfred	$36 00
Caledonia	108 00
Hawkesbury, East	265 00
Hawkesbury, West	174 00
Longueuil	58 00
Plantagenet, North	309 00
Plantagenet, South	167 00
Total	$1,117 00

28. (a) COUNTY OF RUSSELL.

Cambridge	$151 00
Clarence	120 00
Cumberland	322 00
Russell	124 00
Total	$717 00

29. COUNTY OF PRINCE EDWARD.

Municipalities.	Apportionment.
Ameliasburg	$331
Athol	117
Hallowell	326
Hillier	164
Marysburg, North	117
Marysburg, South	146
Sophiasburg	202
Total	$1,403

30. COUNTY OF RENFREW.

Admaston	$246
Algona, South	113
Alice and Fraser	243
Bagot and Blythfield	185
Brougham	62
Bromley	146
Brudenell and Lyndoch	158
Grattan	217
Griffith and Matawatchan	47
Hagarty, Jones, Sherwood, Richards and Burns	226
Head, Clara and Maria	46
Horton	165
McNab	434
Pembroke	101
Petewawa	128
Radcliffe	43
Raglan	91
Rolph, Wylie, McKay, Buchanan	123
Ross	230
Sebastopol	79
Stafford	105
Westmeath	365
Wilberforce and Algona, North	284
Total	$3,837

31. COUNTY OF SIMCOE.

Adjala	$195
Essa	480
Flos	420
Gwillimbury, West	261
Innisfil	416
Matchedash	59
Medonte	461
Nottawasaga	553
Orillia	440
Oro	452
Sunnidale	265
Tay	640
Tiny	379
Tecumseth	361
Tossorontio	192
Vespra	308
Total	$5,882

32. COUNTY OF STORMONT.

Cornwall	$596
Finch	384
Osnabruck	564
Roxborough	390
Total	$1,934

32. (a) COUNTY OF DUNDAS.

Municipalities.	Apportionment.
Matilda	$401 00
Mountain	350 00
Williamsburg	436 00
Winchester	401 00
Total	$1,588 00

32. (b) COUNTY OF GLENGARRY.

Charlottenburg	$532 00
Kenyon	462 00
Lancaster	411 00
Lochiel	425 00
Total	$1,830 00

33. COUNTY OF VICTORIA.

Bexley	$103 00
Carden	82 00
Dalton	63 00
Eldon	331 00
Fenelon	242 00
Laxton, Digby and Longford	267 00
Mariposa	87 00
Ops	455 00
Somerville	263 00
Verulam	218 00
Total	219 00
	$2,330 00

34. COUNTY OF WATERLOO.

Dumfries, North	$225 00
Waterloo	720 00
Wellesley	433 00
Wilmot	519 00
Wolwich	462 00
Total	$2,359 00

35. COUNTY OF WELLAND.

Bertie	$384 00
Crowland	117 00
Humberstone	309 00
Pelham	293 00
Stamford	214 00
Thorold	207 00
Wainfleet	309 00
Willoughby	104 00
Total	$1,937 00

36. COUNTY OF WELLINGTON.

Municipalities.	Apportionment.
Arthur	$260 00
Eramosa	290 00
Erin	363 00
Garafraxa, West	252 00
Guelph	264 00
Luther, West	237 00
Maryborough	337 00
Minto	335 00
Nichol	178 00
Peel	379 00
Pilkington	150 00
Puslinch	340 00
Total	$3,385 00

37. COUNTY OF WENTWORTH.

Ancaster	$429 00
Barton	441 00
Beverly	456 00
Binbrook	142 00
Flamborough, East	291 00
Flamborough, West	341 00
Glanford	174 00
Saltfleet	401 00
Total	$2,675 00

38. COUNTY OF YORK.

Etobicoke	$479 00
Georgina	193 00
Gwillimbury, East	398 00
Gwillimbury, North	177 00
King	562 00
Markham	589 00
Scarborough	428 00
Vaughan	502 00
Whitchurch	388 00
York	1,377 00
Total	$5,093 00

39. DISTRICTS.

Algoma, Manitoulin, Muskoka, Nipissing, Parry Sound, Rainy River, and Thunder Bay, including rural public and separate schools, but not any town or village named in this list	$45,000 00
Total	$45,000 00

APPORTIONMENT TO ROMAN CATHOLIC SEPARATE SCHOOLS FOR 1905, PAYABLE THROUGH THIS DEPARTMENT.

School Sections.		Apportionment.
Arnala	10	$26 00
Alfred	3	21 00
"	6	21 00
"	7 (with 8, Plantagenet South)	9 00
"	7	26 00
"	8	50 00
"	9	26 00
"	10	79 00

School Sections.		Apportionment.
Alfred	11	20 00
"	12	24 00
"	13	19 00
"	14	14 00
"	15	24 00
Admaston	4	15 00
Anderdon, 2, 5 and 8 (with 6 and 9 Sandwich W.)		29 00
"	3 and 4	17 00

School Sections.		Apportionment	
Arthur		6	27 00
"		10	32 00
Ashfield		2	54 00
Asphodel		4	21 00
Augusta		15	16 00
Balfour, 1 with 1 Rayside (District of Algoma)			
Balfour, 2 (District of Algoma)			
Biddulph		3	8 00
"		4	31 00
"		6	19 00
"	9 (with 1 McGillivray)		11 00
Bonfield, 1A, 1B, 2 4 (District Nipissing)			
Brant (with 3 Greenock)		2	13 00
Brighton		1 (15)	15 00
Bromley		4	14 00
"		6	28 00
"		7	47 00
Brougham		1	7 00
Burgess, North		2	34 00
"		4	13 00
"		6	11 00
Caledonia	3, 4 and 10		14 00
"	6 (with 7 Plantagenet S.)		14 00
"		10	18 00
"		12	29 00
"		13	15 00
Cambridge		3	24 00
"		4	25 00
"		5	27 00
"	6 and 7		42 00
"		6	19 00
"		14P	19 00
Carrick		1	27 00
"	(with 1 Culross)	1	56 00
"		2	21 00
"	(with 2 Culross)	2	13 00
"		4	31 00
"		14	105 00
Charlottenburg		15	47 00
Chisholm and Boulter		1 (Nipissing)	
Chisholm		2 (Nipissing)	
Clarence		3	22 00
"		5	82 00
"		6	59 00
"		8	36 00
"		11	27 00
"		12	17 00
"		13	8 00
"		14	21 00
"		16	21 00
"		17	24 00
"		18	17 00
"		19	19 00
"		20	15 00
"		21	27 00
Cornwall		1	16 00
"		16	62 00
"		17	18 00
Crosby, North		7	3 00
Culross (with 1 Carrick)		1	68 00
"	(with 2 Carrick)	2	16 00
Cumberland		10	7 00
"		11	15 00
"		13	18 00
"		14	26 00

School Sections.		Apportionmen	
Dilke, 6 (District of Algoma)			
Downie		9	36 (
Dover		3	57 (
"		7	29 (
"		9	28 (
Dunnett and Rutter, 1 (District of Nipissing)			
Edwardsburg		2	5 (
Ellice		1	12 (
"		6	29 (
"		7	18 (
Ferris, 2 (District of Nipissing)			
"	3, "		
"	4, "		
Finch		5	58
Gibbons, 1 (District of Nipissing)			
Grant, 1 (District of Nipissing)			
Greenock, 3 (with 2 Brant)			67
Glenelg		5	18
"		7	24
Gloucester, 1 (with 3 Osgoode)			9
"	4, 5 and 12		7
"		14	28
"		15	71
"		17	16
"		20	16
"		22	8
"		25	96
"		26	21
Griffith, etc.		3	15
Hagarty		4	40
"		12	48
Haldimand		2	28
"		14	12
Harwich		9	26
Hawkesbury, East		2	63
"		4	17
"		6	14
"		7	99
"		10	50
"		11	30
"		12	12
"		15	25
"		16	13
"	19 (to be portioned).		
Hay		1	13
"		11	24
Hibbert (1)		3	25
"	2 (with McKillop and Logan)		43
"	3 (with McKillop, etc.)		3
Howe Island		1	10
"		2	17
"		3	14
Holland, etc.		3	11
Hullett		2	18
Hungerford	14 (to be portioned).		
Keewatin, 1 (District of Algoma)			
Kenyon		12	9
Kingston		8	2
Lancaster		14	3
Lochiel		11	2
"		12A	2
"		12B	7
Logan (re 6 Ellice)			

School Sections.		Apportionment.
Longueuil, West	2	21 00
"	4A	23 00
"	7	18 00
Loughboro'	2	9 00
"	10	11 00
Maidstone	1	43 00
"	2	25 00
" 4 (with 2 Rochester)		22 00
" 8 (with 5 Sandwich S)		26 00
Malden	3A	34 00
"	3B	24 00
Mara	3	55 00
March	3	49 00
Marmora and Lake	1	15 00
Matawatchan	3	29 00
Moore	3, 4 and 5	11 00
Mornington	4	31 00
McGillivray, 1 (with 9 Biddulph)		9 00
McKillop	1	24 00
" 3 (with Hibbert)..	...	7 00
" (2 Hibbert, etc.)...	...	13 00
McPherson and Kirkpatrick, 1 (District Nipissing).		
Nepean	7	26 00
"	15	86 00
Nichol	1	15 00
Normanby	5	11 00
"	10	14 00
Osgoode	1	14 00
"	2 (15)	12 00
" 3 (with 1 Gloucester)		11 00
Papineau, 1 (Dist. of Nipissing).		
" 2 " "		
" 2B " "		
Peel	8	22 00
"	12	15 00
Percy	5	12 00
" 12 (with 12 Seymour)	...	8 00
Plantagenet, North	4	24 00
" "	7	18 00
" "	8	57 00
" "	9	27 00
" "	12	14 00
Plantagenet, South	4	50 00
" "	7	41 00
" "	7 (with 6 Caledonia)	14 00
Plantagenet, South	8	19 00
" " 8 (with 7 Afred)		7 00
" "	11	36 00
" "	12 (to be apportioned).	
Portland	11	20 00
Preston	6	19 00
Raleigh	4	9 00
"	5	26 00
"	6	16 00
Ravside, 1 (with 1 Balfour) Algoma		...
Richmond	10 and 17	13 00
Rochester, 2 (with 4 Maidstone)		23 00
"	3	67 00
"	6	62 00
"	7	42 00
"	9 and 14	35 00
" 10 (with 11 Tilbury, N.)		11 00
Roxboro'	12	72 00
"	16	25 00

School Sections.		Apportionment.
Russell, 1 (with 12 Winchester)		10 00
"	4	18 00
"	6	92 00
"	7	20 00
"	8	32 00
"	13	21 00
"	14	21 00
Sandwich, East	1	123 00
"	2	18 00
"	3	19 00
"	4	86 00
Sandwich, West	1	46 00
"	4	23 00
" 6 and 9 (with 2, 5, 8 Anderdon)	...	25 00
Sandwich, South, 5 (with 8 Maidstone)	...	25 00
Sandwich, South	7	29 00
Seymour, 12 (with 12 Percy)...		11 00
Sheffield	5	26 00
Sherwood	6	52 00
Sombra	5	17 00
Stafford	2	26 00
Stephen	6	38 00
Springer, 1 (Dist. of Nipissing)		.....
" 2 " "		.....
" 3 " "		.....
" 5 " "		.....
Stanley	1	22 00
Sydenham	7	6 00
Tilbury, North	1	75 00
"	2	32 00
"	6	30 00
"	7	34 00
" 11 (with 10 Rochester)		22 00
Tilbury, West	11	23 00
Tilbury, East	1	11 00
"	3	15 00
Tiny	2	102 00
Toronto Gore	6	7 00
Tyendinaga	18	13 00
"	20	17 00
"	24	23 00
"	28	12 00
"	30	15 00
Vespra	7	4 00
Waterloo	13	65 00
Wawanosh, West	1	18 00
Wellesley	5	18 00
"	9 and 10	29 00
"	11	75 00
"	12	3 00
Westminster	13	9 00
Widdifield, 2 (Dist. of Nipissing)		.....
Williams, West	10	14 00
Wilmot	15½	54 00
Winchester 12 (with 1 Russell)		15 00
Windham	8	55 00
Wolfe Island	1	9 00
"	2	13 00
"	4	34 00
"	7	12 00
Woolwich	10	32 00
Yonge and Escott Rear	4	10 00
York	1	38 00
		$6,766 00

APPORTIONMENT TO CITIES, TOWNS AND VILLAGES FOR 1905.

CITIES.	Public Schools.	Separate Schools.	Total.
	$ c	$ c.	$ c.
Belleville	775 00	232 00	1,007 00
Brantford	2,087 00	253 00	2,340 00
Chatham	940 00	211 00	1,151 00
Guelph	1,190 00	278 00	1,468 00
Hamilton	5,772 00	1,135 00	6,907 00
Kingston	1,742 00	471 00	2,213 00
London	4,364 00	645 00	5,009 00
Niagara Falls	739 00	108 00	847 00
Ottawa	3,664 00	3,924 00	7,588 00
St. Catharines	1,041 00	265 00	1,306 00
St. Thomas	1,277 00	167 00	1,444 00
Stratford	1,211 00	258 00	1,469 00
Toronto	23,293 00	3,870 00	27,163 00
Windsor	1,159 00	501 00	1,660 00
Woodstock	1,065 00	66 00	1,131 00
Total	50,319 00	12,384 00	62,703 00
TOWNS.			
Alexandria	62 00	201 00	263 00
Alliston	156 00	.....	156 00
Almonte	262 00	87 00	349 00
Amherstburg	123 00	139 00	262 00
Arnprior	277 00	166 00	443 00
Aurora	203 00	.....	203 00
Aylmer	255 00	.....	255 00
Barrie	669 00	107 00	776 00
Berlin	992 00	310 00	1,302 00
Blenheim	182 00	.....	182 00
Bothwell	97 00	.....	97 00
Bowmanville	340 00	.....	340 00
Bracebridge	345 00	.....	345 00
Brampton	355 00	.....	355 00
Brockville	885 00	255 00	1,140 00
Bruce Mines	98 00	.....	98 00
Cache Bay	75 00	.....	75 00
Carleton Place	490 00	.....	490 00
Clinton	272 00	.....	272 00
Cobourg	368 00	142 00	510 00
Collingwood	821 00	.....	821 00
Copper Cliff	266 00	.....	266 00
Cornwall	303 00	399 00	702 00
Deseronto	418 00	.....	418 00
Dresden	222 00	.....	222 00
Dundas	343 00	72 00	415 00
Dunnville	264 00	.....	264 00
Durham	211 00	.....	211 00
East Toronto	377 00	.....	377 00
Essex	172 00	.....	172 00
Forest	192 00	.....	192 00
Fort Frances	101 00	7 00	108 00
Fort William	594 00	185 00	779 00
Galt	954 00	61 00	1,015 00
Gananoque	460 00	.....	460 00
Goderich	423 00	61 00	484 00
Gore Bay	87 00	.....	87 00
Gravenhurst	269 00	.....	269 00
Hanover	232 00	.....	232 00
Haileybury	60 00	.....	60 00

APPORTIONMENT TO CITIES, TOWNS, and VILLAGES, 1905.—*Continued.*

TOWNS.—*Continued.*	Public Schools.	Separate Schools.	Totals.
	$ c.	$ c.	$ c.
Harriston	210 00	.....	210 00
Hawkesbury	64 00	490 00	554 00
Hespeler	273 00	.....	273 00
Huntsville	265 00	.....	265 00
Ingersoll	529 00	53 00	582 00
Kincardine	294 00	.....	294 00
Kingsville	194 00	.....	194 00
Leamington	316 00	.....	316 00
Lindsay	638 00	214 00	852 00
Listowel	291 00	.....	291 00
Little Current	120 00	(in town gt.)	120 00
Massey	70 00	.....	70 00
Mattawa	.25 00	150 00	175 00
Meaford	276 00	.....	276 00
Midland	459 00	.....	459 00
Mitchell	229 00	.....	229 00
Milton	174 00	.....	174 00
Mount Forest	268 00	.....	268 00
Napanee	345 00	.....	345 00
New Liskeard	144 00	.....	144 00
Newmarket	261 00	29 00	290 00
Niagara	177 00	.....	177 00
North Bay	271 00	165 00	436 00
North Toronto	245 00	.....	245 00
Oakville	189 00	20 00	209 00
Orangeville	291 00	.....	291 00
Orillia	488 00	134 00	622 00
Oshawa	518 00	54 00	572 00
Owen Sound	1,099 00	67 00	1,166 00
Palmerston	222 00	.....	222 00
Parkhill	137 00	31 00	168 00
Paris	380 00	41 00	421 00
Parry Sound	332 00	.....	332 00
Pembroke	357 00	293 00	650 00
Penetanguishene	324 00	.....	324 00
Perth	299 00	142 00	441 00
Peterborough	1,192 00	509 00	1,701 00
Petrolea	456 00	.....	456 00
Picton	381 00	33 00	414 00
Port Arthur	569 00	172 00	741 00
Port Hope	498 00	.....	498 00
Prescott	259 00	117 00	376 00
Preston	243 00	58 00	301 00
Rainy River	171 00	69 00	240 00
Rat Portage	440 00	110 00	550 00
Renfrew	235 00	156 00	391 00
Ridgetown	279 00	.....	279 00
Sandwich	98 00	140 00	238 00
Sarnia	900 00	160 00	1,060 00
Sault Ste. Marie	734 00	126 00	860 00
Seaforth	211 00	51 00	262 00
Simcoe	369 00	.....	369 00
Smith's Falls	625 00	.....	625 00
Stayner	138 00	.....	138 00
Steelton	126 00	79 00	205 00
Sturgeon Falls	103 00	153 00	256 00
St. Mary's	368 00	46 00	414 00
Strathroy	368 00	.....	368 00
Sudbury	115 00	146 00	261 00
Thessalon	138 00	.....	138 00

APPORTIONMENT TO CITIES, TOWNS and VILLAGES, 1905.—*Continued.*

TOWNS.—*Con.*	Public Schools.	Separate Schools.	Total.
	$ c.	$ c.	$ c
Thornbury	102 00	.....	102 0
Thorold	175 00	71 00	246 0
Tillsonburg	253 00	.....	253 0
Toronto Junction	920 00	.....	920 0
Trenton	326 00	110 00	436 0
Uxbridge	188 00	.....	188 0
Vankleek Hill	89 00	113 00	202 0
Walkerton	261 00	114 00	375 0
Walkerville	274 00	(in town gt.)	274 0
Wallaceburg	309 00	58 00	367 0
Waterloo	373 00	83 00	456 0
Welland	211 00	.....	211 0
Whitby	248 00	32 00	280 0
Wiarton	314 00	.....	314 0
Wingham	265 00	.....	265 0
Total	$37,373 00	$6,781 00	$44,154 0
INCORPORATED VILLAGES.			
Acton	178 00	.....	178 0
Ailsa Craig	84 00	.....	84 0
Alvinston	95 00	.....	95 0
Arkona	69 00	.....	69 0
Arthur	83 00	64 00	147 0
Athens	107 00	.....	107 0
Ayr	104 00	.....	104 0
Bancroft	90 00	.....	90 0
Bath	44 00	.....	44 0
Bayfield	62 00	.....	62 0
Beamsville	92 00	.....	92 0
Beaverton	102 00	.....	102 0
Beeton	85 00	.....	85 0
Belle River	.....	65 00	65 0
Blyth	105 00	.....	105 0
Bobcaygeon	109 00	.....	109 0
Bolton	77 00	.....	77 0
Bradford	114 00	.....	114 0
Bridgeburg	158 00	.....	158 0
Brighton	164 00	.....	164 0
Brussels	147 00	.....	147 0
Burk's Falls	93 00	.....	93 0
Burlington	146 00	.....	146 0
Caledonia	96 00	.....	96 0
Campbellford	299 00	.....	299 0
Cannington	124 00	.....	124 0
Cardinal	142 00	.....	142 0
Casselman	20 00	92 00	112 0
Cayuga	106 00	.....	106 0
Chatsworth	42 00	.....	42 0
Chesley	209 00	.....	209 0
Chesterville	83 00	30 00	113 0
Chippawa	85 00	.....	85 0
Clifford	69 00	.....	69 0
Cobden	97 00	.....	97 0
Colborne	119 00	.....	119 0
Creemore	80 00	.....	80 0
Delhi	94 00	.....	94 0
Drayton	96 00	.....	96 0

APPORTIONMENT TO CITIES, TOWNS and VILLAGES, 1905.—*Continued.*

INCORPORATED VILLAGES.—*Con.*	Public Schools.	Separate Schools.	Total.
	$ c.	$ c.	$ c.
[illegible]dale	97 00	.....	97 00
[illegible]	105 00	.....	105 00
[illegible]ville	69 00	59 00	128 00
[illegible]	165 00	.....	165 00
[illegible]	126 00	21 00	147 00
[illegible]	71 00	.....	71 00
[illegible]	60 00	.....	60 00
Exeter	194 00	.....	194 00
Fenelon Falls	142 00	.....	142 00
Ferris	176 00	9 00	185 00
Fort Erie	101 00	.....	101 00
Garden Island	29 00	.....	29 00
Georgetown	157 00	.....	157 00
[illegible]	102 00	.....	102 00
Grand Valley	96 00	.....	96 00
Grassy	110 00	.....	110 00
Hagersville	112 00	.....	112 00
Hastings	53 00	42 00	95 00
Hemlock	119 00	.....	119 00
Howard	95 00	.....	95 00
Huntsburg	152 00	182 00	334 00
Inland Landing	48 00	.....	48 00
Ingersoll	122 00	.....	122 00
Jarvisville	146 00	.....	146 00
Lakefield	141 00	.....	141 00
Lanark	101 00	.....	101 00
Lancaster	63 00	.....	63 00
Longueuil	111 00	33 00	144 00
Lucan	97 00	.....	97 00
Lucknow	119 00	.....	119 00
Lyons	142 00	.....	142 00
Markdale	118 00	.....	118 00
Markham	127 00	.....	127 00
Marmora	96 00	.....	96 00
Marvile	100 00	.....	100 00
Merrickville	114 00	.....	114 00
Merritton	153 00	43 00	196 00
Millbrook	104 00	.....	104 00
Millerton	84 00	.....	84 00
Morrisburg	182 00	.....	182 00
Newboro'	52 00	.....	52 00
Newburgh	67 00	.....	67 00
Newbury	43 00	.....	43 00
Newcastle	57 00	.....	57 00
New Hamburg	154 00	.....	154 00
Newmarket	150 00	.....	150 00
Norwood	103 00	.....	103 00
Oil Springs	101 00	.....	101 00
Omemee	75 00	.....	75 00
Ottawa East	78 00	92 00	170 00
Oxley	113 00	.....	113 00
Point Edward	107 00	.....	107 00
Portsmouth	52 00	24 00	76 00
Port Carling	33 00	.....	33 00
Port Colborne	147 00	.....	147 00
Port Dalhousie	84 00	33 00	117 00
Port Dover	126 00	.....	126 00
Port Elgin	156 00	.....	156 00
Port Perry	160 00	.....	160 00
Port Rowan	72 00	.....	72 00

APPORTIONMENT TO CITIES, TOWNS and VILLAGES, 1905.—*Concluded.*

INCORPORATED VILLAGES.—*Con.*	Public Schools.	Separate Schools.	Totals
	$ c.	$ c.	$
Port Stanley	69 00	.....	69
Richmond	59 00	.....	59
Richmond Hill	77 00	.....	77
Rockland	15 00	142 00	157
Shelburne	144 00	.....	144
Southampton	202 00	.....	202
Springfield	52 00	.....	52
Stirling	95 00	.....	95
Stouffville	141 00	.....	141
Streetsville	58 00	.....	58
Sundridge	48 00	.....	48
Sutton	74 00	.....	74
Tara	82 00	.....	82
Teeswater	110 00	.....	110
Thamesville	96 00	.....	96
Thedford	74 00	.....	74
Tilbury	70 00	64 00	134
Tiverton	64 00	.....	64
Tottenham	66 00	.....	66
Tweed	131 00	30 00	161
Vienna	40 00	.....	40
Wardsville	37 00	.....	37
Waterdown	71 00	.....	71
Waterford	131 00	.....	131
Watford	154 00	.....	154
Wellington	78 00	.....	78
Weston	145 00	12 00	157
Westport	42 00	45 00	87
Winchester	147 00	.....	147
Woodbridge	61 00	.....	61
Woodville	59 00	.....	59
Wyoming	78 00	.....	78
Wroxeter	52 00	.....	52
Total	$13,320 00	$1,082 00	$14,402

SUMMARY OF APPORTIONMENT FOR 1905.

COUNTIES.	Public Schools.	Separate Schools.	Tota
	$ c.	$ c.	$
1. Brant	1,557 00	.....	1,5
2. Bruce	3,980 00	417 00	4,3
3. Carleton	2,838 00	470 00	3,3
4. Dufferin	1,797 00	.....	1,7
5. Elgin	2,939 00	.....	2,9
6. Essex	2,795 00	1,070 00	3,8
7. Frontenac	2,234 00	172 00	2,4
8. Grey	5,441 00	103 00	5,5
9. Haldimand	1,727 00	.....	1,7
10. Haliburton	716 00	.....	7
11. Halton	1,349 00	.....	1,3
12. Hastings	3,834 00	95 00	3,9

SUMMARY OF APPORTIONMENT FOR 1905.—*Concluded.*

COUNTIES.—*Con.*	Public Schools.	Separate Schools.	Totals.
	$ c.	$ c.	$ c.
3. Huron	4,651 00	231 00	4,882 00
4. Kent	3,618 00	217 00	3,835 00
5. Lambton	3,728 00	28 00	3,756 00
6. Lanark	2,171 00	58 00	2,229 00
7. Leeds and Grenville	3,758 00	34 00	3,792 00
8. Lennox and Addington	1,916 00	39 00	1,955 00
9. Lincoln (including arrears for Gainsboro)	1,639 00	.....	1,639 00
10. Middlesex	4,840 00	101 00	4,941 00
11. Norfolk	2,364 00	55 00	2,419 00
12. Northumberland and Durham	4,547 00	86 00	4,633 00
13. Ontario	3,151 00	55 00	3,206 00
14. Oxford	3,240 00	.....	3,240 00
15. Peel	1,836 00	7 00	1,843 00
16. Perth	3,157 00	200 00	3,357 00
17. Peterborough	2,150 00	21 00	2,171 00
18. Prescott and Russell	1,834 00	1,946 00	3,780 00
19. Prince Edward	1,403 00	.....	1,403 00
20. Renfrew	3,837 00	321 00	4,158 00
21. Simcoe	5,882 00	132 00	6,014 00
22. Stormont, Dundas and Glengarry	5,352 00	483 00	5,835 00
23. Victoria	2,330 00	.....	2,330 00
24. Waterloo	2,359 00	276 00	2,635 00
25. Welland	1,937 00	.....	1,937 00
26. Wellington	3,385 00	111 00	3,496 00
27. Wentworth	2,675 00	.....	2,675 00
28. York	5,093 00	38 00	5,131 00
Total	$114,060 00	$6,766 00	$120,826 00
29. Districts— 1. Algoma, 2. Manitoulin, 3. Muskoka, 4. Nipissing, 5. Parry Sound, 6. Rainy River, 7. Thunder Bay. Exclusive of the towns and villages, which appear in the general list.	43,000 00	2,000 00	45,000 00
Total	$43,000 00	$2,000 00	$45,000 00
GRAND TOTALS.	$ c.	$ c.	$ c.
[illegible]	114,060 00	6,766 00	120,826 00
[illegible]	50,319 00	12,384 00	62,703 00
[illegible]	37,373 00	6,781 00	44,154 00
[illegible]	13,320 00	1,082 00	14,402 00
[illegible]	43,000 00	2,000 00	45,000 00
Totals	$258,072 00	$29,013 00	$287,085 00

The Revised Regulations.

Memorandum.

The Revised Regulations which were approved August, 1904, will guide Inspectors and teachers regarding the courses of study and the requirements for the Departmental examinations. In order to avoid some misconceptions, and save enquiries, the following explanations are given:—

(1) Respecting the Senior Teachers' Examination, section 50 (4) governs for 1906, and section 47 thereafter. Sections 46 and 48 come into force for the Junior Teachers' and District Examinations of 1906.

(2) No examination will be held in 1906 in the subjects of Part I. of the Junior Teachers' or District Certificate course, but no candidate will be admitted to any County Model School, or other training school, who does not furnish a statement from the Principal of the school attended, to the effect that the holder has satisfactorily completed the course prescribed for Part I.

(3) For Part II., Junior Teachers' Examination, the course in Geometry will be Books 1, 2 and 3 with easy deductions; and the course in Geography will be that given in Appendix "A" of the Regulations.

(4) Candidates who divide the Senior Teachers' Examination in 1906—as provided by Regulation 50 (4)—if they take Part I. must take Physics either with Part I. in 1906 or with Part II. at a subsequent examination. The course in Chemistry will be that given on page 72 of the Regulations. There will not be an examination in the subject of Mineralogy until 1907.

Last year, copies of the Revised Regulations were furnished, on application, to all High, Public and Separate Schools for the use of the Principals. The Department has not a sufficient supply to furnish duplicate copies.

Toronto, August, 1905.

Departmental Regulations

(Approved August, 1905.)

Text-Books Authorized for Use in Public Schools, High Schools, and Training Schools.

(Except for Geometry, where the revised curriculum renders an additional work necessary, no change is made for the Schools from the books authorized in 1904.)

1. The text-books named in Schedule "A" shall be the authorized text-books for Public Schools. Pupils taking any optional subject in the Public School course may use the text-book authorized in such optional subject. The text-books in French and German are authorized only for schools where the French or German language prevails and where the Trustees, with the approval of the Inspector, require French or German to be taught in addition to English. Text-books marked "optional" shall be introduced into the Public Schools only by resolution of the Board of Trustees. Books authorized in the Lower School of the High School course may be used by pupils taking the corresponding subjects of Continuation classes.

2. The text-books named in Schedule "B" shall be the only authorized text-books in High Schools and Collegiate Institutes for the course of study prescribed in the Lower and Middle Schools. *Books authorized for use in the Public Schools may be used in the Lower School and it is recommended*

but so far as the Principal may deem desirable, these books be used for the first year instead of the corresponding High School books. For the second special course or more advanced work in the Commercial department or for technical courses any books recommended by the Principal may be used, with the approval of the High School Board.

3. The text-books named in Schedule "C" shall be the authorized text-books for Model Schools, Normal Schools and the Ontario Normal College. Only such books shall be used by the teachers-in-training as may be ordered by the Principal.

4. Any text-book used in any school before the 1st July, in 1905, and recommended by resolution of the Trustees to be continued in use, shall be deemed as authorized in such school until further notice. The vertical or slanting copy books heretofore authorized, and published by the Rose Printing Company, may be used in any Public School.

5. For religious instruction, either the Sacred Scriptures, or the Scripture Readings adopted by the Education Department, shall be used as prescribed by the Regulations of the Education Department.

Public Schools. (Schedule A.)

First Reader, Part I., or A Modern Phonic Primer, Part I. (Morang) or The Public School Phonic Reader, Part I.	$0 10
First Reader, Part II., or Public School Phonic Primer, Part II., or A Modern Phonic Primer, Part II. (Morang)	0 15
Second Reader	0 20
Third Reader	0 30
Fourth Reader	0 40
High School Reader	0 50
Public School Arithmetic	0 25
Public School Algebra and Euclid	0 25
Public School Geography, or Morang's Modern Geography	0 75
Our Home and its Surroundings (for Junior Classes)	0 40
Rose's Public School Geography	0 75
Public School Grammar	0 25
Morang's Modern English Grammar	0 60
Public School History of England and Canada	0 30
History of Dominion of Canada (Fifth Form)	0 50
Duncan's Story of the Canadian People	0 50
Weaver's Canadian History	0 50
Public School Drawing Course, each number	0 05
Public School Physiology and Temperance	0 25
Public School Copy Book	0 07
Practical Speller	0 25
Public School Bookkeeping	0 25
Public School Agriculture	0 30
Public School Domestic Science (optional)	0 50

French-English Readers.

First Reader, Part I.	0 10
First Reader, Part II.	0 15
Second Reader	0 25
Third Reader	0 35

German-English Readers.

Ahn's First German Book	0 25
Ahn's Second German Book	0 45
Ahn's Third German Book	0 45
Ahn's Fourth German Book	0 50
Ahn's First German Reader	0 50

High Schools and Collegiate Institutes. (Schedule B.)

English.

High School Reader	0 50
The Principles and Practice of Oral Reading	0 50
High School English Grammar	0 75
High School English Composition	0 50
Elementary English Composition (Sykes)	0 40
High School Composition from Models	0 75

History and Geography.

High School Geography (Chase)	$1 00
Morang's Modern Geography	0 75
High School History of England and Canada	0 65
Wrong's "The British Nation"	1 00
Myers' Ancient History—Greece and Rome—Canadian Edition	0 75
Botsford's Ancient History for Beginners (Morang)	1 00
History of the Dominion of Canada—Clement	0 50

Mathematics.

High School Arithmetic	0 60
Arithmetic for High Schools, De Lury	0 60
High School Algebra	0 75
Elements of Algebra, McLellan	0 75
Elementary Plane Geometry, Baker	0 50
Geometry for Schools, Theoretical, Baker	0 75
High School Euclid, J. S. McKay, or by A. C. McKay and R. A. Thompson (Books I., II., III., 50 cents)	0 75

Classics.

First Latin Book and Reader	1 00
Primary Latin Book and Reader	1 00
Hagarty's Latin Grammar	1 00
White's First Greek Book	1 25
High School Beginner's Greek Book	1 50

Moderns.

High School French Grammar and Reader	1 00
High School German Grammar and Reader	1 00

Science.

High School Physical Science, Part I., 50 cents; Part II.	0 75
High School Botany, Part II.	0 60
High School Chemistry	0 50

Bookkeeping and Drawing.

High School Bookkeeping	0 60
Commercial Course in Practical Bookkeeping (Dickinson and Young)	0 40
High School Drawing Course, each number	0 10

Cadet Drill.

High School Cadet Drill Manual (optional)	0 40

Training Schools. (Schedule C.)

County Model Schools.

School Management, Millar	1 00
Methods in Teaching, Edited by Tilley	1 50
Public School Physiology and Temperance	0 25
New Psychology (Chapters 4, 5, and 6 omitted), Gordy	1 25
Steps in the Phonic System, Cullin & Niven	0 50
Elementary Phonetics, Burt	0 35
Elementary Treatise on Arithmetic, Taylor	0 50
Mental Arithmetic, McLellan & Ames	0 30
Algebraical Exercises, Barnes	0 30
Introductory Geometry, McLean	0 50
A Guide to Nature Study, Crawford	0 90

Normal Schools.

Lectures on Teaching, Fitch	1 00
School Management, Millar	1 00
Educational Reformers, Quick	1 50
Applied Psychology, McLellan	1 00
First Year at School, Sinclair	0 50
High School Cadet Drill Manual	0 40
Hints on Teaching Arithmetic, McLean	0 50
Public School Domestic Science	0 50

Ontario Normal College.

Applied Psychology, McLellan	1 00
Education, Spencer	0 50
School Management, Millar	1 00
School Management, Landon	1 50
Educational Reformers, Quick	1 50
High School Cadet Drill Manual	0 40
Physical Culture, Houghton	0 50
Physical Education, MacLaren, Part II., sections II. and III.	2 00

Teachers' Reading Course for 1906. (Schedule D.)

History of Education, Kemp	1 25
School Management, Dutton	1 25
Birds and Poets, Burroughs	0 35

EXAMINATIONS, 1906.

Prescribed Texts.

District Certificate.

English:—

Goldsmith: The Deserted Village.

Longfellow: The Old Clock on the Stairs, The Warden of the Cinque Ports, The Birds of Killingworth, King Robert of Sicily, The Skeleton in Armour, The Ladder of St. Augustine, The Bridge.

Part II.—Junior Teachers.

English.

Coleridge: The Ancient Mariner.

Wordsworth: Michael, Influence of Natural Objects, Nutting, Expostulation and Reply, The Tables Turned, The Solitary Reaper, Ode to Duty, Elegiac Stanzas, To the Rev. Dr. Wordsworth, "She was a Phantom of Delight," To the Cuckoo, The Green Linnet, "Bright Flower! whose home," To a Skylark, ("Ethereal minstrel! pilgrim of the sky!") Reverie of Poor Susan, To my Sister, "Three years she grew in sun and shade," September, 1819, Upon the same Occasion.

The following twelve sonnets: "Two voices are there," "Scorn not the Sonnet," "A flock of sheep that leisurely," "Earth hath not anything," "It is not to be thought of," "Fair Star of evening," "O Friend! I know not," "Milton, thou shouldst," "When I have borne in memory," "Brook! whose society," "Tax not the royal Saint," "They dreamt not of a perishable home."

Shakespeare: Merchant of Venice.

Latin:—

Cornelius Nepos, Lives of Themistocles and Aristides; Cæsar, Bellum Gallicum, Bk. IV. (omitting Chap. 17), and Bk. V., Chaps. 1-23; Virgil, Æneid, Bk. II. (1-505).

Greek:—

1906: Selections from Xenophon, Anabasis I., in White's First Greek Book, with the exercises thereon; Homer, Iliad VI.

French:—

Lamennais, Paroles d'un croyant, Chaps. VII. and XVII.; Perrault, le Maître Chat ou le Chat Botté; Dumas, Un nez gelé, and la Pipe de Jean Bart; Alphonse Daudet, la Dernière classe, and la Chèvre de M. Sequin; Legouvé, la Patte de dindon; Pouvillon, Hortibus; Loti, Chagrin d'un vieux forcat; Moliére, l'Avare, Acte III. sc. 5 (Est-ce à votre cocher . . . sous la mienne); Victor Hugo, Waterloo, Chap. IX.; Rouget de L'Isle, la Marsellaise; Arnault, la Feuille: Chateaubriand, l'Exilé; Théophile Gautier, la Chimère; Victor Hugo, Extase; Lamartine, l'Automne; De Musset, Tristesse; Sully Prudhomme, le Vase brisé; La Fontaine, le Chêne et le Roseau.

Labiche, le Voyage de Monsieur Perrichon.

German:—

Grimm, Rotkäppchen; Andersen, Wie's der Alte macht, Das neue Kleid, Venedig, Rothchild, Der Bär; Ertl, Himmelsschlüssel; Frommel, Des eiserne Kreuz; Baumbach, Nicotiana, Der Goldbaum; Heine Lorelei, Du bist wie eine Blume; Uhland, Schäfer's Sonntagslied, Das Schloss am Meer; Chamisso, Das Schloss Boncourt; Claudius, Die Sterne, Der Riese Goliath; Goethe, Mignon, Erlkönig. Der Sänger; Schiller, Der Jüngling am Bache.

Baunmbach, Waldnovellen.

Senior Teachers.

English:—

Coleridge: The Ancient Mariner.

Wordsworth: Michael, Influence of Natural Objects, Nutting, Expostulation and Reply, The Tables Turned, The Solitary Reaper, Ode to Duty, Elegiac Stanzas, To the Rev. Dr. Wordsworth, "She was a Phantom of Delight," To the Cuckoo, The Green Linnet, "Bright Flower! whose home," To a Skylark, ("Ethereal minstrel! pilgrim of the sky!") Reverie of Poor Susan, To my Sister, "Three years she grew in sun and shade," September, 1819, Upon the same Occasion.

The following twelve sonnets: "Two Voices are there," "Scorn not the Sonnet," "A flock of sheep that leisurely," "Earth hath not anything," "It is not to be thought of," "Fair Star of evening," "O Friend! I know not," "Milton! thou shouldst," "When I have borne in memory," "Brook! whose society," "Tax not the royal Saint," "They dreamt not of a perishable home."

Shakespeare: Merchant of Venice, Henry V.

Latin:—

Cornelius Nepos, Lives of Themistocles and Aristides; Cæsar, Bellum Gallicum, Bk. IV. (omitting Chap. 17), and Bk. V., Chaps. 1-23; Virgil, Æneid II., lines 1-505; Horace, Odes I. and II.; Cicero Pro Lege Manilla. Pro Marcello.

Greek:—

Xenophon, Anabasis I. (Chaps. I.-VIII.); Homer, Iliad VI., Odyssey XXI.; Lucian, Charon; Lysias, Contra Eratosthenem.

French:—

Lamennais, Paroles d'un croyant, Chaps. VII. and XVII.; Perrault, le Maître Chat ou le Chat Botté; Dumas, Un nez gelé, and la Pipe de Jean Bart; Alphonse Daudet, la Dernière classe, and la Chèvre de M. Sequin; Legouvé, la Patte de dindon; Pouvillon, Hortibus; Loti, Chagrin d'un vieux forçat; Molière, l'Avare, Acte III. sc. 5 (Est-ce à votre cocher . . . sous la mienne); Victor Hugo, Waterloo, Chap. IX.; Rouget de L'Isle, la Marseillaise; Arnault, la Feuille; Chateaubriand, l'Exilé; Théophile Gautier, la Chimère; Victor Hugo, Extase; Lamartine, l'Automne; De Musset, Tristesse: Sully Prudhomme, le Vase brisé; La Fontaine, le Chêne et le Roseau.

Labiche, le Voyage de Monsieur Perrichon; Mérimée, Quatre Contes, ed. by F. C. L. Steenderen (Holt & Co.).

German:—

Grimm, Rotkäppchen; Andersen, Wie's der Alte macht, Das neue Kleid, Venedig, Rothchild, Der Bär; Ertl, Himmelsschlüssel; Frommel, Des eiserne Kreuz; Baumbach, Nicotiana, Der Goldbaum; Heine Lorelei, Du bist wie eine Blume; Uhland, Schäfer's Sonntagslied, Das Schloss am Meer; Chamisso, Das Schloss Boncourt; Claudius, Die Sterne, Der Riese Goliath; Goethe, Mignon, Erlkönig, Der Sänger; Schiller, Der Jüngling am Bache.

Baumbach, Waldnovellen.

Ezner-Eschenbach, Die Freiherren von Gemperlein.

Wilhelmi, Ener muss heiraten.

Benedix, Eigensinn.

NOTE.—The texts in Greek, French and German, given under the heading Junior Teachers, are for Pass Junior Matriculants only. See Reg. 46 (2).

DUTIES OF EXAMINERS.

1. Each Examiner shal be required to discharge all duties pertaining to his office, and no duty which an Examiner is appointed to perform shall be delegated to another Examiner without the approval of the Educational Council. He shall designate all examination papers according to the course of study for which they are prescribed.

2.—(*a*) The papers set for the Part II. Junior Teachers' and the Senior Teachers' examinations shall be adapted to the requirements of those desiring to become teachers.

(*b*) The papers in all cases shall be within the limits of the courses of study and of the authorized text-books.

(c) Each paper in a department shall be approved and signed by each Examiner in this department before it is submitted to the Board of Examiners for consideration.

(*d*) Each Examiner shall submit to the Board of Examiners a syllabus of the answers to the questions on his paper, and a statement of the values which he proposes to attach to each question and part of a question. The papers so prepared shall finally be revised by the board.

3. The Examiners, in the case of the combined examinations of the Education Department and the University, shall be present at the beginning of the reading of the answer papers. Each Examiner shall discuss with the Associate Examiners in his section the character of the answers required by the questions, and especially the value of incomplete or imperfect answers, so as to insure, as far as possible, uniform marking. In cases of differences of opinion on any point the decision of the Examiners shall be final.

4. The Examiners shall make such reports as will enable the Council to settle the results of the examinations in accordance with the regulations of the Education Department and of the Senate of the University respectively.

5. The Examiners, or such of their number as may be appointed for that purpose by the Council, shall consider all doubtful and special cases and report results to the Council. They shall read appeals and report the results to the Council.

6. The Examiners shall report to the Council the pseudonyms of all Associate Examiners whose work appears to have been performed with marked carelessness or incapacity, or who have shown any substantial disregard of the instructions of the Council.

7. In the prose papers in Classics and Modern Languages the vocabulary required shall be such as is found in the prescribed portion of text and textbook.

Duties of the Registrar.

9. The Registrar of the Council shall preside at all meetings of the Boards of Examiners. All cases of dispute at meetings of the Boards shall be settled by a majority of the Examiners.

10. During the reading of the answer papers the Registrar shall see that the instructions to Associate Examiners hereinafter mentioned are observed. He shall assign a pseudonym to each Associate Examiner and shall have power, in case of necessity, to transfer Associate Examiners from one section to another.

11. He shall exercise a general supervision over sorting, numbering and otherwise preparing the envelopes containing the answers, so that the answers may be conveniently read by the Examiners and Associate Examiners; and, after the reading, he shall superintend the entering of the marks in the books by the clerks of the Department and the preparation of the books so that they may clearly indicate the subjects in which candidates have passed or failed.

12. He shall be present at the meeting of the Board or of any committee thereof called for the purpose of determining the results, and shall furnish all necessary information.

13. He shall take the necessary steps in order that appeals may be read as speedily as possible in accordance with the instructions of the Council.

Duties of Associate Examiners.

14. The Associate Examiners shall be classified into sections according to the subjects of examination, and a chairman shall be appointed in each section by the Council. The chairman shall have a general oversight of the work done in his section, and shall see that the regulations are carried out *and that the marking is uniform.* In the case of an emergency as in the absence of a chairman of a section, the Registrar shall appoint a chairman *pro tempore.*

15. An Associate Examiner shall not have in hand more than ten papers at one time, nor shall he have more than one envelope open upon his table at one time, except in cases of suspected copying, in which case he shall return each examination book to its proper envelope. As soon as an examination book is removed from its envelope the candidate's number should be placed on the front page of the book. *The papers must be returned in the numerical order in which they are received.* In cases of suspected copying the Associate Examiner shall note on the face of the envelope, "Copying, see No. ....., question ....." and through the chairman of the section report the case at once to the Registrar.

16. In the case of the papers in *English Grammar, Literature,* and *Composition,* one mark shall be deducted for each mis-spelt word and one mark for each instance of bad English. At all examinations in Arithmetic, either arithmetical or algebraical solutions shall be accepted.

17. In reading the answer papers each Associate Examiner shall mark distinctly in the left hand margin the value assigned by him to each answer or partial answer, shall place the total on each page at the foot of the margin, and enter this total at the top of the next page; he shall place the result on the face of the envelope, indicating in the case of the papers in English Grammar, Literature and Composition, the deduction for mis-spelt words and incorrect English thereon, thus, *e.g.*, Grammar, 80, — 2 sp., — 4 f. s., = 74. He shall also sign his pseudonym on the envelope of each paper examined.

18. Associate Examiners shall be in their respective places so that the reading may commence promptly at the time specified, viz., 9 a.m. and 2 p.m., and no Associate Examiner shall stop work before the hours of closing, viz., 12 noon and 5 p.m., without reporting to the chairman of the section.

19. Associate Examiners shall refrain from all unnecessary conversation or other causes of disturbance and shall devote themselves strictly to the work of the examination; they shall not at any time enter the rooms of other sections unless when it is necessary to do so in entering or leaving their own rooms; they shall keep a record of the papers read each day and shall report the results of their work to the chairman of their respective sections.

20. The work is confidential throughout. Should the identity of an examination centre or of any particular candidate be discovered by an Associate Examiner he shall report the fact without any delay to the Registrar of the Council, or, in his absence, to the clerk of committees, who shall change the Associate Examiner, or make such other arrangements as he may deem expedient.

21. The instructions herein contained so far as they relate to the examinations of the Education Department and matriculation into the University, shall be subject to amendment from time to time with the approval of the Education Department and the Senate of the University.

Suggestions to High School Principals and their Staffs in Connection with the New Programme of Studies.

Preparatory Note.

During the past year my correspondence and other inspectorial duties were so burdensome in connection with the introduction of the new programme of studies that, to economize time, I now put in the form of a circular my views on some important questions, most of which are continually coming up for discussion.

John Seath,
Toronto, August 26th, 1905. (*High School Inspector.*)

Organization.

The Departmental Memorandum of August, 1905 (circular 50), draws attention to the requirements of the regulations which were approved in August, 1904. So far as concerns the Junior and the District Teachers' Non-professional Examinations, the regulations as to standard and subjects [Reg. 43 (3), 46 and 48] will come into full force at the examinations of 1906, except, as stated in the circular, in the case of the Geometry for the Junior and of Part I. for each of these examinations. In organizing for the coming year it is, therefore, important for the Principal to realize that the standard has been raised, and that the course is now a fixed one, with a Latin bonus at the Junior. The District, Junior, and Senior Teachers' Examinations are now held, be it noted, solely to ascertain the qualifications of the candidates for a teacher's certificate, although, of course, they may be used as Leaving Examinations also; and it is not unreasonable to anticipate that, in settling the results, the interests of the Public Schools will hereafter be solely considered. It is an open secret that, while the system of Leaving Examinations was in operation, allowances were made which would be unjustifiable under present conditions, and which have injured the cause of popular education in the Province.

The Principal's certificate referred to in Circular 50 is defined by the last sentence of Reg. 50 (3). It should cover the Lower School courses in Book-keeping, Reading, Physics, and Chemistry, with at least one year's course in each of Art, Botany, and Zoology. As the regulations show, the one year's course in Art is for a whole school year, while the one year's course in each of Botany and Zoology is from September to November, and from April to the end of June. The details of such courses are at the discretion of the Principal, who will no doubt take into consideration the requirements of the future Public School Teacher. In the case of all candidates (including those who failed this summer) whose course has not yet covered all the subjects, the Principal might allow such pupils to go down to one of the Lower School classes when the subjects are being taken up. The same plan may, of course, be followed hereafter in the case of pupils who are fit for the Middle School but who do not possess the required certificate as to competency in the subjects of Part I. The resulting interference with their Middle School time-table is one for which the candidates, not the Principal, are responsible. and the interests of the Middle School must not be allowed to suffer. For very evident reasons, however, such permission should be given only in exceptional cases.

In some quarters the object and the scope of Reg. 39 (9) have not been appreciated. The object, it is understood, was to enable the Principal to resist more easily the pressure that would in many cases be brought to

bear upon him to continue in a congested Middle School time-table subjects and stages of subjects which properly belong to the Lower School. As to scope: Under the regulations, the Geography for the intending Public School Teacher, and the Arithmetic and Mensuration and the English Grammar for other classes of candidates may, where needed, be reviewed after March. A teacher's special course is provided in Arithmetic and Mensuration, and in English Grammar (See pp. 79 and 80*), which the Principal may have in the Middle School as often as he deems it expedient. And, further, unless the parent or guardian objects, the Principal may require other pupils to take these special courses. In view, however, of the ample Lower School provision in these subjects, the extremely moderate requirements of University Matriculation, and, usually, the superior claims of other subjects of the course, it would be wise for the Principal to restrict this special teacher's course to the intending teacher.

But these difficulties of organization are small compared with those which have hitherto confronted the Principal—the pressure of the Departmental and the University examinations with its train of evils; the unreasonable demands of department teachers; the inadequacy of staffs, due to congested attendance and the plethora of courses undertaken; and, lastly, the defective preparation of Entrance and Continuation Classes, the former being sometimes due to laxity at the examinations, and the latter, to the inconsiderate ambition of badly equipped and badly manned Public Schools. These are, undoubtedly, real difficulties; but nearly all of them may be gradually overcome by due liberality on the part of School Boards and, more particularly, by firm and judicious management on the part of Principals themselves. Like the wagoner in the fable, the local authorities must put their own shoulders to the wheel. The relation of the different grades of Continuation Classes to the High Schools requires, it is true, a better adjustment. Until this is made, concerted action on the part of all the Principals in a district, with the co-operation of the Public School Inspector, if that can be secured, should do much to simplify the situation.

In the above enumeration of the Principal's difficulties, the so-called "multiplicity of subjects" has not been included. Experience will, undoubtedly necessitate amendments in the regulations, and the progress of the Public and Model Schools will, in time, relieve the High Schools of responsibilities which are now forced upon them. But, having regard to our present obligations, the new programme will compare favorably in its limitations with that of any other progressive country. There is no subject upon it which could be safely omitted from a well rounded modern scheme of secondary education, or upon the omission of which even a majority of competent educationists would agree. It must be remembered also that, like the Public School programme, the High School one was made to last for a period of years, and that, accordingly, in some of its details, it assumes a condition of the general system which it will take time to produce. "The house that is a-building is not as the house that is built." Moreover, the general advancement of education in this Province cannot be kept back in order that weak but ambitious schools, whether High Schools or Continuation Classes, may attempt courses beyond their capacity. What is at fault is, not so much the number of subjects on the official programme, as the plethora of courses on many local ones, and a generally defective system for organization. For the former, the locality is itself to blame. The latter is the direct result of examination pressure; for, in most schools at present, all the subjects of a Form are taken up concurrently, with an apportionment of time determined mainly by their difficulty and their exam-

*Except where otherwise stated, the pages throughout are those of the new regulations.

ination importance. Such a system of organization is both unnatural and unnecessary—unnatural because no one but a prodigy would adopt it in private study, and unnecessary, because, even under present conditions, better results can be secured in a saner way.

Experience in Ontario, not to speak of the general experience of other countries, has shown that better results would be secured if the following principles were kept in view:

(1) Not all the subjects prescribed for a form should be taken up concurrently. Subjects and stages of subjects that involve chiefly the memory or mechanical accuracy cannot, of course, be so readily intermitted as those that involve the reasoning powers; but even here this principle is, in many cases, measurably applicable.

(2) The stress upon a subject should vary according to its character in the different stages of its development and to the pupil's advancement in it and the other subjects of the course.

At present the pupil's energies are dissipated among too many subjects and he is dazed by the monotonous grind at the same subject year in and year out. Arithmetic, for example, he has uninterruptedly for nine or ten years. Concentration of energy and variety of subject matter would be of inestimable advantage to him in the natural and pleasurable development of his powers. The qualifications of the staff and the structural difficulties of the time-table will, no doubt, often prove a bar to the systematic application of these two principles; but, as most teachers take more than one subject of a department, it should not be difficult at least to improve the general situation.

(3) Care should be taken to cultivate greater independence on the part of the pupil. It is no secret that, at present, there is altogether too much teaching, especially in the classes preparing for examination. With a better standard this fact would demonstrate itself every midsummer. The teacher should, accordingly, exercise greater self-restraint; and, in particular, study periods should be provided in all the forms. For such pupils in the larger schools, a separate room might also be provided under charge of one of the staff. It will take time for both staff and pupils to become used to such a system, but the training the pupils will thus receive in self-reliance should amply compensate the staff for the additional trouble it may involve*.

*Owing to misapprehension of Reg. 39 (9) in a certain High School, neither the Arithmetic nor the English Grammar was taken up this year in the Middle School until after March. Notwithstanding this, all the candidates at the Junior passed, and passed well, in these subjects. The work had been well done in the Lower School, and was stressed after March. The bearing of this statement and of those below (quoted from letters to me) will prove at least suggestive, in view of the present difficulties of organization. The four Principals concerned are both experienced and successful teachers.

(1) "In Form I. I have never had Euclid. In Form II. I have had two periods. So many leave at the end of one or two years, and so many are quite young, and incapable of connected reasoning, that I do not settle down to a serious study of the subject until the beginning of the third year. The classes then thoroughly enjoy the subject, and make very rapid progress. From the examination standpoint the results are satisfactory, the failures falling short of one a year for the past ten years. In Forms III. and IV. I have three 30-minute periods each a week. In Arithmetic I have three periods of 30 minutes a week in each of three Forms I., II., and III. Much time is spent in grading the work for each year, the first two years being devoted to a thorough course in Commercial Arithmetic and Elementary Mensuration, with systematic drill in work planned to secure accuracy in the machanical operations. This latter feature I consider the most important in the two years' work, since annual experiments bring out the fact that not 5 per cent. of the Entrance Class can work ordinary examples in the four simple rules either rapidly or accurately. Taking one year with another, perhaps 5 per cent. of the candidates, chiefly girls, fail in Arithmetic.

"In Algebra I have one 30-minute lesson a week in Form I., three in Form II., and four each in Forms III. and IV. This, I think, is sufficient, except possibly with Form IV. There are practically no failures in Form III. Algebra; but perhaps 10 per cent. fail in the Senior Algebra (I do not mean 10 per cent. of those recommended, but 10 per cent. of all who write).

"I feel quite satisfied that with students of High Schools ages much time is lost by treating a part of a subject exhaustively, and then giving it little further attention. Frequent reviews, with gradually increasing emphasis on the difficulties, leave the Students encouraged, hopeful, aggressive, and prepared.

The following notes show in a general way how these principles may be applied:

English Grammar should not be stressed at first. It will be enough if, at the end of the first year, the pupil knows well and has perhaps slightly amplified the course now prescribed for the Fourth Form of the Public Schools. (See definition and note on p. 59). On account of its use in connection with the other languages and with English Composition, English Grammar should be taken up as soon as the pupil enters, but it need not be continued throughout the whole first year. After the first year, the subject might be gradually stressed as the pupil's reasoning powers develop, and the serious difficulties should be reserved for the greater maturity of the special Middle School course. (See p. 80 and p. 65, note). English Composition should be stressed throughout the Lower School especially in the first year, being closely connected with the practical side of English Grammar. The subject should also receive systematic attention in the oral and written work of the other classes. (See pp. 66, 68, 69 and 70). English Literature should be stressed throughout the Lower School also during the first year. The pupil usually needs to be trained to read intelligently. This habit the reading courses of the old Public School programme did not inculcate. The fault is remedied in the new one, but it will take time to work the cure. (See pp. 66, 69 and 70).

History is largely a memory subject, at first. The essential facts, therefore, should be acquired when the memory is plastic. Even in the Lower School, however, it will serve a good purpose to vary the stress, and even to intermit the subject. But History lends itself better to the latter mode of treatment in the later years when the pupil is able to appreciate the logical sequence of events and to work with greater indepen-

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"I do not intend to change the number of periods in Mathematics in the Lower School.

"I may add that in Junior Forms, corresponding to Lower School Classes, I exact very little home work. I have an understanding with these classes that, if they enter into the regular class work with the same spirit, earnestness, and vim as they would on a base-ball field or a tennis-court, the home-work exacted will be merely nominal. Last year with the Form just below the Junior Teachers and Junior Matric. I tried this throughout the year, and secured the best results I ever had. In Algebra we covered the work to the end of quadratics; in Euclid, Books I. and II. with easy deductions; and in Arithmetic the full course outlined for Junior Teachers; and I think the average of the class for home-work for the three subjects combined did not exceed half an hour daily. Of course, in Junior Teachers' work much more time is necessary."

(2) "During the past two years I took Middle School Geometry five spaces per week (35 minutes) for the first five months of each year; then Arithmetic in these same five spaces on the time-table for the next four months; and in the last month I reviewed both Arithmetic and Geometry. I feel confident that the success of the class has been greater by taking these subjects intermittingly than concurrently.

"Our time-table (1904-1905) was constructed with five spaces (33 minutes) in the forenoon. After three months I cancelled all the subjects in the first space on the time-table, and divided the forenoon equally amongst the remaining four spaces, and continued this for one week. The following week I cancelled all the subjects in the second place on the time-table, and divided the forenoon equally among the remaining four spaces. Then I cancelled the subjects in the third, fourth, and fifth spaces in the same way, and began again with the first. This increased the morning spaces from 33 minutes each to 45, 40, 40, and 40 minutes, at the small cost of giving some subjects a week's rest. About April 1st I resumed the 33 minute spaces, because the work had all been covered, and the shorter spaces served as well for review.

(3) "Our General School is organized into five Forms, with sub-divisions, the Fourth Form containing the candidates for the Junior. For two or three years we have tried the plan of intermitting for a time some of the subjects. We take History during the first year, and then drop it until the Fourth Form is reached. Drawing is taken every day the first year, and afterwards only advanced work for those needing it. Geography is taken in the second year only, and every day. Geometry is begun in the second year, after the Geometrical Drawing of the first year. Book-keeping and Commercial Transactions is taken in the second year only. No formal Literature is taken the first year: Supplementary Reading is emphasized. German is begun in the Third Form. We have no Greek.

"We made these arrangements to try to relieve the pressure and consequent dispersions resulting from the multiplicity of subjects in each year, and we would not voluntarily go back to the usual arrangement of all the subjects all the years. Two hundred lessons in a subject in one year is much better than the same number of lessons spread over two or three years.

"I should like to carry our plan of intensive study with intermissions further still, and I hope to be able to overcome the difficulties in the way.

"With us, Continuation Pupils coming in without proper preparation must go back to their proper level in the unprepared subjects."

dence. In the Upper School, indeed, the teacher's guidance is needed more than direct teaching; for, there is hardly any other subject in which, at this stage, the pupil can do more for himself (See pp. 66, 69 and 71). The distinguishing feature of the High School course in Geography should be the prominence given to its Physical side. Accordingly, the work for the first year should consist of an elementary course in the Commercial and Astronomical subjects, without burdensome details, and a mere introduction to the more difficult subject of Physical Geography. If taken throughout the whole year, this course should not consume more than a couple of periods a week, and should stress the Commercial and Astronomical parts more than the Physical. The second year's work, however, should be a stressed one in Physical Geography, introducing the present authorized High School text-book and reserving the more difficult portions to be taken up with the review after March in the Middle School. (See pp. 67, 81 and 82).

As to Mathematics: Reference to pp. 66, 79 and 80 will show that the prescribed development of the course in Arithmetic is different from that in vogue under the old regulations. The change has been made, not only to meet the necessities of pupils in the general course, but to improve the department of Mathematics itself by securing due economy of effort. All classes of pupils now take together the Lower School Arithmetic, in which "the processes and problems in the commercial work are such as find direct application in ordinary business life, in which accuracy, rapidity, and neatness of work are aimed at, and in which proofs of the more difficult formulæ in Mensuration are not required." (See p. 66.) The serious difficulties of the subject need not be taken up with the pupil in the general course at any stage. Provision is made for their consideration in the special teacher's course in the Middle School. The great defect of the teaching in both English Grammar and Arithmetic has, in many cases, been the unreasonable difficulties of the work of the earlier years—difficulties which can be overcome with far less effort at a later stage. Moreover, it must be borne in mind that our programme consists of courses of study, not of a collection of isolated subjects; and that the power a pupil gains in the study of each is available throughout, especially in the study of those that are correlated with it. From the conditions, Arithmetic should be stressed for the greater part of the first year, Algebra being then taken for about a couple of periods a week and being thereafter the subject that is stressed. If, indeed, the Middle School course is a two years' one, as it is in some schools, both the Arithmetic and the English Grammar of the special course may be intermitted for the whole or the greater part of the first of these years. Hitherto, under the old programme, Geometry has often been omitted until the second year or taken up after Christmas or Easter of the first. Owing to its character, the Practical Geometry might be taken up hereafter towards the end of the first year (See "Art Course" further on), and the rest of the course should certainly not be stressed until the Middle School.

The languages involve so much memory work of an unfamiliar character that they must be stressed throughout, although, naturally, there will be varying stress and even intermittence in the components of the course in a particular language. As we are now situated, only Latin should be taken up at first, a short lesson a day being provided, if at all practicable. Oral work in French for a couple of periods a week should be provided as soon as the pupil has mastered the initial difficulties of Latin, the subject being stressed the second year and thereafter. At present, in the smaller schools. French is often not taken up until the second year, but it is then stressed from the first. Under ordinary conditions, German and Greek will begin the

second year, being also stressed from the first, although, of course, the size of the class may justify a reduction in the normal number of class-periods. Time is an essential element of language culture, and, very generally, too little time is spent on the languages. But, until the character of the University examination scheme changes, improvement can hardly be expected.

Further on, the Elementary Science and the Art and the Commercial courses are dealt with at greater length. It should be noted here, however, that the principles of intermittence and varying stress have been observed as far as practicable in the construction of the course in Elementary Science. Their application in the case of the other Science subjects is of at least as much importance as in the case of any of the subjects already dealt with.

The minimum time for Reading and for Physical Culture is prescribed. These, be it noted, are non-examination subjects. Before the regulation was made, little or no attention was given them, and occasionally still the minimum is reluctantly provided even where the conditions demand a greater apportionment of time. The Regulation in regard to Reading, in particular, seems, it is true, to bear hard upon those schools, the lower forms of which are both numerous and congested. The proper remedy, however, is an obvious one. Moreover, it must be borne in mind that Reading, to some extent, and Physical Culture, to a large extent are motor exercises, and require special attention in the earlier years. Elementary Science also belongs to the category of examination subjects, and has, accordingly, a minimum prescribed. In the case of Art and of Book-keeping, also non-examination subjects, the work done is submitted for inspection.

In some schools the following provisions are made; they have a direct bearing on the question of organization and deserve to be generally adopted:

(1) Each July or August a prospectus of the school is issued, containing full information for parents and the general public as to the constitution of the staff, the subjects of the courses, the text-books therefor, and the examination requirements, with the general and local regulations in which the locality is interested. Not only does this save correspondence but it educates the public in some matters with which, to the disadvantage of the High School, many are now but poorly acquainted. When the Board is wise enough to object to the expense, the local papers are usually found ready to lend the school the use of their columns.

(2) A circular letter of questions to parents is given each pupil when he enters the school. The answers contain all the information needed for the school register, with details as to the course of study selected and a statement of any special considerations that should affect the treatment of the pupil. If, as often happens, the parent has as yet no settled intentions, the answers show, in particular, how long the pupil is likely to remain at school, and transfer to the Principal the right to determine his course in the meantime. After the first year the problem can usually be solved.

(3) Teachers' meetings should be held regularly. On this subject it is unnecessary to enlarge. At such meetings the Principal correlates as far as possible, the work of the different departments; and, in particular, he takes measures to prevent over-pressure of work—an evil which is, unfortunately, too general and for which the staff, not the system, is responsible. From time to time, the Principal also ascertains directly for himself the condition of the subjects in the different forms. One of his most important duties is to hold the balance amongst the different departments and to restrain the inconsiderate zeal of some of his assistants.

Supplementary Reading.

For many years, provision has been made for Supplementary Reading in English Literature, to extend the course in the prescribed texts, which is too narrow for culture and which, moreover, is often injured by examination considerations. The new regulations recognize two kinds of work in English Literature—the *class* work and the *supplementary* work. At present, no special texts are prescribed for the Lower School, except, of course, in the few schools which take up the work for District certificates. In the Lower Schools, accordingly, the class-work is to be selected by the Principal; in the Middle and Upper Schools, it is practically prescribed by the examinations; and the supplementary work throughout the schools is at the discretion of the Principal. If the selections have been properly made, the class literature will be of a more difficult character than the supplementary literature; for, as a whole, the former is to be studied under the immediate care of the teacher. The supplementary literature, on the other hand, should, also as a whole, be read at home or as seat-work, and should, accordingly, be so graded in the different forms as to maintain the pupil's interest throughout his course.

Attention should be paid to the important notes to the definition and the development of the subject of English Literature on pp. 66, 69, 70, and 71 of the new regulations. Two points in note 2, p. 66, in regard to the Lower School course are especially important:

(1) "In each of the Forms, three or four books (both prose and poetry) should be read each year as Class-work. Part of such books should be read at home or during study periods, and reviewed in class with special reference to the more difficult passages."

Under this clause, the course might consist, for example, of *Ivanhoe* and *The Lady of the Lake* (or *Evangeline*), followed, if practicable, by *The Merchant of Venice;* and in the second year, of *Silas Marner*, and a couple of the *Idylls*, followed, also if practicable, by *Julius Cæsar*.

To some, such a course may appear to be too extensive. It has not, however, proved to be so when a rational plan has been followed. We should be satisfied if the pupil understands the meaning of what he reads. With a sympathetic and cultured teacher, the author may be trusted to do the rest. In the first year, the course would naturally begin with the prose. It should be taken up wholly in the class until the pupil is in a fair way to acquiring the habit of reading with the understanding. Then, still under the direct guidance of the teacher, part might be read at home or as seat-work, the pupil's difficulties and such others as the teacher thinks deserving of attention being carefully considered in the subsequent class-work. There are not more important exercises, it may be added, in this connection than the systematic oral and written reproduction of what has been studied. In dealing with words, sentences and passages, the pupil is apt to overlook their bearing upon the context. As mental discipline, too, the exercises are of great value.

(2) "It is further recommended that at the beginning of each school year a short list be made out for each Form, under a few heads, of such suitable works as may be obtained in the School, Public or other library and that each pupil be required to read during the year at least one under each head, in addition to those taken up in class."

Here we have the provision for Supplementary Reading, the course in which might be introduced in the first year, as soon as the pupil has become accustomed to High School methods. Speaking generally, the Supplementary Reading should be home or seat work, the pupil's difficulties being dealt with systematically in class, as in the case of Class literature. Oral

and written compositions might be based occasionally upon the Supplementary Reading also; but care should be taken not to make a task out of a course the object of which is the creation of a taste.

The books for the Class literature in the Middle and Upper Schools are purchased by the pupils. They should be purchased by the pupils of the Lower School also; excellent editions are to be had at from 10c. to 25c. each. (See Catalogue of 1902 and the Supplement of 1905). In some localities, the possession of the books is of advantage, not only to the pupils, but to a wider circle of readers.

Reference to the new programme will show that Supplementary Reading is enjoined in Geography, History, and Science, as well as in English Literature. To meet the difficulty of providing a sufficient supply of books, the following plan has been followed in a number of schools, with most satisfactory results. Before each session, the members of the staff, with the catalogues of the Public and other local libraries (including, of course, the High School library) before them, select therefrom a dozen or more suitable books for each Form under each of the following heads, the lists indicating where each book is to be found, and each pupil being required to read, during the ensuing school year, at least one from each list for his Form:

I. Prose Fiction; II. Narrative and Dramatic Poetry; III. Biography and History; IV. Travels and Explorations; V. Popular Science.

Modifications of such a plan may, of course, be desirable. As the pupil's taste develops, essays, etc., may be substituted for prose fiction, and poetry of a subjective character may be added. Good translations of the Ancient and Modern Classics and other works likely to create a taste for the languages and their literatures, should also have a place, and it should be the duty of each teacher concerned to see that the interests of his department are not neglected. The lists should be printed on slips, or inserted in the annual circular of the school, or, at least, be kept on the Form bulletin board. And further, when commending its list to a Form, the teachers should make such a statement in regard to the general character of each book as will enable the pupil to make an agreeable selection.

When the Public Library is not free, special arrangements may usually be made with its Board to supply the schools; and, for evident reasons, it would be to the interest of the locality to have at least the Principal appointed one of the members. Occasionally a public-spirited citizen has paid for the Library privileges enjoyed by the High School. In one or two localities already, as is now customary in the United States, the Library Board sends the necessary books in relays to the High School, and keeps its necessities in mind when making its purchases. From time to time, also, sets of half a dozen or so copies of suitable books should be added to the High School library, especially in the larger and wealthier localities, and where the supply from the Public Library is defective; for it is always better, if at all practicable, to have the books directly under the teacher's control. Under this system of Supplementary Reading, the provisions of Reg. 43 (2), (*g*), may readily be complied with. The pupil should be allowed to select the four works he will read; and if the tone of the school is what it should be, few precautions will be necessary to enable the Principal to give the necessary certificate to those who are candidates at a departmental examination.

Two other most important matters, here and there, still need attention. Especially in the Lower School, where the memory is plastic and the examination pressure is less in evidence, the pupil should be systematically required to memorize and to recite appreciatively choice selections in prose

and poetry. The selections should invariably be well worth storing in the treasure-house of the memory; but no more than a fair share of the pupil's energies should be expended on this part of the course. Oral reading has, also, for many years, been a prescribed function of the course in English Literature. It is not necessary, be it noted, to have all the text read aloud; but it *is* necessary that what is read should be well read.

Elementary Science.

Many of the objections urged against the Elementary Science course are due to inappreciation of present educational conditions, and a misapprehension of its intended character. The Nature Study of the Public Schools, the Elementary Science of the Lower School, and the Science of the Middle and Upper Schools are, it must be remembered, continuous courses. The Elementary Science course, accordingly, assumes, as it now stands, that the Nature Study course has been carried out; and, until it is, the former must be of a lower grade than it should be some years hence. It must also be remembered that, even when fully developed, the course will still be an elementary one. Some of the topics demand but a brief treatment; and the stress upon each of the others should be determined, in each school, by the mental disposition of the pupils, the material available, and the prevailing industries of the district, conjoined with the consideration that the course is a two years' one.

The notes to "Elementary Science," on pp. 67-68 of the Regulations, now quoted, in view of their bearing on what follows, give a concise but comprehensive outline of the general character of the work to be done:

"The objects of the course are to train pupils in correct observation and deduction, to give in connection with the instruction in Geography, a fair knowledge of the world around them to those who will not remain at school more than a few years, and to lay the foundation for the more detailed study of each subject in the case of those who will continue the work into the higher forms. The spirit of the Nature Study of the Public Schools should be retained, but the teacher should introduce a more systematic treatment of the subject, with such organization of the material as will lead to simple classification and generalization. The course should be correlated with Geography, Drawing, and Composition.

"Under each of the subheads in Appendix B, full details are given of the course, which is intended to be at least a two years' one. The order of the topics, however, is merely a suggested one. In Botany and Zoology, the extent and the character of the details are left to the principal and the teacher, and should be determined by the accessibility of the material and other local conditions. The courses in these subjects shall be practical throughout. Less attention should be given to the identification of plants than has hitherto been usual, and more to morphology, physiology, and ecology. When desirable, the agricultural applications of the subject should be emphasized. Each pupil should possess a good lens, and be taught how to use it. The compound microscope should be used regularly by the teacher for illustration. Approved methods of collecting and preserving botanical specimens and of keeping live animals suitable for study should be systematically followed. Much of the practical work, especially the observations, will necessarily be done out of doors by the pupils alone, under the direction of the teacher, or by the pupils conducted by the teacher. The courses in Physics and Chemistry shall be as far as possible experimental, and the pupils should be encouraged to work at home and to prepare simple apparatus.

"When practicable there should be an Aquarium, and every school should have an Arboretum and a Herbarium. A Museum consisting of specimens illustrative of the courses should also be established. The pupils should be encouraged to provide specimens from the locality.

"Floras and Faunas should be provided in the library; also other works of reference, and the pupils should be encouraged to use them as supplementary reading, never as text-books or as substitutes for original work. Drawing and systematic written description should be required throughout the course, and the specimens should be dated and preserved in note books for comparison and inspection, the work being systematically supervised by the teacher. In none of the Science classes shall notes be dictated by the teacher. Every pupil should keep a calendar of the dates of the unfolding of buds, the flowering of plants, and the first appearance of birds, insects, and other animals."

Culture is the great object of both the High and the Public School course. Both method and matter are important; but the method is always the more important. In the High School, however, the matter is more important and the course itself is less elastic than in the Nature Study of the Public Schools; for the necessities of the future citizen and of the Public School teacher must now be borne in mind. The Chemistry, be it noted, is an unsystematized introduction to the subject, with a minimum of theory; the Biology, a more comprehensive course, is also unsystematized, with however, provision for an organized view at the close; and the Physics, like the Science of the Middle and Upper Schools, is fairly systematized.

For evident reasons, it is intended that, as a general rule, the time from September to November and from April till the end of June shall be devoted to Biology. The apportionment of time to each of Botany and Zoology, should, on the whole, be about the same; but from week to week it will depend chiefly upon the material available. No time is fixed for Chemistry. Its logical place, however, would be during March, and, if necessary, part of February, at the close of the second year's course in Physics, to which, naturally, the winter months would be devoted . In schools where many pupils leave at the end of the first year, it would be wise to take the Chemistry to suit this condition; for, while the course is an introduction to the Middle School Chemistry, it deals with some common subjects of general interest and importance. In this case the subject should be reviewed at the end of the second year.

It is not intended that the topics of the Elementary Science course should be rigidly exclusive of one another, or be taken up in the exact order in which they appear on the programme. It often happens that facts in regard to more than one topic may be learned from the study of the same object. Questions in Physics and Chemistry often come up in connection with Biology; and, during the courses in Physics and Chemistry, material in Biology is often developed in the laboratory. From time to time also, suitable material, available for various purposes, is brought in by the pupils or gathered during the excursions. Such material should be dealt with at the time; but, when the work is reviewed, it is more systematic, and it will be found more convenient, to do so by topics. In any case, the broad, general principles are to be developed, and the teacher should select and arrange the details accordingly. To the pupil this course may, for some time, appear to be an unorganized one. It should never be so to the teacher.

It should be noted also that the group of subjects, included under Elementary Science, is obligatory only upon the pupil in the general course,

and the candidate for a teacher's non-professional certificate. Many Principals, however, advise all the Entrance Class to take the subject for one year at least, as a useful means of culture, and until their future course has been settled.

The following suggestions are the result of inspectorial observations during the past year:

(1). The ordinary physical and chemical laboratories may be made to serve for the four subjects of the Elementary Science course. Where at all practicable, however, it would be well to have a room reserved and specially fitted up for Biology. As has been pointed out above, a Herbarium and Arboretum, and a Museum are also indispensable, and some schools have already made a good beginning. There is no reason, either, why an Aquarium and a Terrarium should not be provided, except, of course, during the winter months, where the laboratory is not suitably heated. All this equipment should be the special charge of the Science Master; but the pupils and the public should contribute to it as occasion may serve. In a few years, indeed, the school may thus become a bureau of information of great value to the district. The school should also communicate, from time to time, with the Geological Survey at Ottawa, the Agricultural Department at Toronto (and Guelph), the Experimental Farm at Ottawa, and the Science Departments of the Universities, both to secure their periodical publications and to consult them when they can supply needed information.

(2). As the definition shows, the Elementary Science is observational and experimental. From the nature of the course, a class text book cannot be used in Biology; and, if the work is properly done, one will be unnecessary in Physics and Chemistry also. Books, however, should be constantly in use by the pupils for reference and for supplementary reading. In view of our experience, the method of the class work in Physics and Chemistry should present no difficulty if the object of the course is kept in view. In Biology, a subject largely new in character, the main feature should be the regular class discussions. In addition, and connected therewith, there should be other exercises suggested by the ingenuity of the teacher; as, for example, simple questions for investigation out of school hours, proposed to the class or to individuals; discussions prompted by the pupils themselves; essays on various topics with illustrative drawings; collections by individual pupils of classes of plants and animals. A few excursions should be provided for each Fall and Spring during school hours or on Saturdays. To permit of these in school hours, the class periods should be arranged so that the Upper School Science classes may be at work in the laboratory during the teacher's absence. For these excursions, it is indispensable that instructions be given the class before leaving the school as to what special points they are to attend to, what materials or phenomena they are to look for, and what particular locality they are to investigate. Without such system, very little demonstration can be made in the woods and the fields, and what should be one of the most valuable features of the course will become a wasted opportunity. A written report of his work should afterwards be required from each pupil, and the material collected and the observations made should be discussed as part of the subsequent class exercises. Some science masters place a book upon the teacher's desk in each of the class rooms concerned, in which pupils record from day to day any observations they may have made. Although, no doubt, crude at first, these observations are useful and stimulating for class work. Other teachers again, devote part of Monday's lesson to the discussion of observations made by the pupils during the pre-

ceding week. The amount of wood-lore which the pupils of rural schools possess and are able to collect is often surprising.

Next to the class discussions, the most valuable part of the work is the preparation of accurate notes by the pupils. For this a special book, not a mere scribbler, is indispensable.* The first step in the class work is to teach the pupils what to record and how to record it: when he begins he can neither methodize nor discriminate. Until the class are able to put their work down in reasonably good form it should be written in rough note books, and after individual criticism by the teacher should be copied in the regular note books. After a month or so the pupil will probably be competent to omit the intermediate stage in the work of recording; but it will be many months before he can dispense wholly with the teacher's guidance in the work of discriminating. Unnecessary assistance must, however, be carefully avoided, and, in particular, notes must not be dictated by the teacher. The notes will, of course, deal only with the main points; they should be simply an intelligible record, whose main object, apart from the training gained in making them, is to enable the pupil to review his work. It will sometimes happen, of course, that the work in connection with a topic cannot be systematized and recorded until the observations have been completed; but, as a general rule, the record should be made as promptly as possible whether in the class or at home or at their seats depending upon circumstances.

As a means of expression the value of Drawing can hardly be overestimated. In many respects it is far superior to word description, and it should be employed wherever suitable. The Drawing, however, must invariably be a rigidly accurate reproduction of the object.

(3). The first duty of the teacher of Elementary Science (and of Physical Geography) is to make himself well acquainted with his environment—with the resources, the physical character, and the economic requirements of the surrounding district. It is not putting the case too strongly to say that, for the Biology in particular, the teacher's environment is his best text book. The better his scholarship, the better will be his teaching; but, if he relies upon mere book knowledge, he will signally fail to accomplish the object of the course. He should be able to tell the pupils where they can get material and to direct and correct their observations, although not with them on the spot.

(4) Before beginning his work, knowing the conditions and the number of lessons at his disposal, the teacher should make a tentative apportionment of so many lessons to each topic, subject, in Biology in particular, to necessary readjustment as his work proceeds. He should himself keep a note-book in which to record, from day to day, the work he has taken up in class. In Biology, of course, the material will vary in different localities, and, from year to year in the same locality; but there will be on the whole a general consistency of development. With such a note-book, the teacher can methodize his work as well as economize his time. As has already been pointed out, the order of the topics is at the discretion of the teacher. It would be well, though, for the inexperienced to follow in a measure the order of the syllabus until they are able to strike out for themselves.

Another matter of prime importance: *Throughout the whole course the teacher must supervise the work in the pupils' note books.* Without such supervision, note taking by juniors is practically worthless. This means slow progress at first, but it is work that will pay in the end.

* At date of writing The Charles Chapman Co., London, Ont., and The Copp, Clark Co., Toronto have supplied such note books. The former supply also loose leaf scribblers, which are intended to save the teacher trouble in handling the first draft.

(5) In Elementary Science, as in the other subjects of the High School course, regular oral and written examination should be held on the preceding work, to test not only the pupil's knowledge of facts but his power to reason. The promotion examination at the end of the Lower School course should include this department, and the Principal's certificate for Part I, should take into account the Science Master's report of this promotion examination and of the work in the note-books as well as the other class exercises.

(6) In accordance with what has been already said, the text-books the teacher needs most for the course in Elementary Science are those that will help him to become familiar with his environment. The High School Reference list of 1902, with the Supplement just issued, contains a full list of modern works in Science, and the descriptive notes thereto will help the teacher in making a selection for both the pupil and himself. The following will be found suitable as a small library in Elementary Biology for his own use:

For General Biology: Coulter's *Plants;* Atkinson's *Elementary Botany;* Spotton's *Botany, Part I.;* Jordan, Kellogg and Heath's *Animals;* Colton's *Descriptive Zoology;* Thompson's *Study of Animal Life.*

For Agricultural Applications; Percival's *Agricultural Botany*; James' *Public School Agriculture;* Birkett, Stevens and Hill's *Agriculture for Beginners;* Roth's *A First Book in Forestry.* The first of these text books, probably the best "Applied Botany" we have, is a comprehensive treatise; the others will suggest work of an elementary character.

For Class-work: Pepoon, Mitchell and Maxwell's *Studies of Plant Life;* Walter, Whitney and Maxwell's *Studies of Animal Life;* Colton's *Practical Zoology;* Boyer's *Elementary Biology.* These text books suggest the general character of class work, but the treatment of the subjects is too advanced for the Lower School; no minute dissection should be attempted. Besides valuable discussions and useful information about plants and animals, the following contain practical suggestions in regard to class work, which are nearer our present stage of advancement, in the first year of the course at any rate: Silcox and Stevenson's *Modern Nature Study;* Lochhead's *Outlines of Nature Studies;* Hodge's *Nature Study and Life;* Dearness' *The Nature Study Course.*

For guidance in Practical Work: Muldrew's *Nature Study Collection;* Colton's *Teachers' Manual;* Ganong's *The Teaching Botanist;* Eugene Smith's *The Home Aquarium;* Hemenway's *How to Make School Gardens;* Brown's *The Taxidermist's Manual* ($1.25, Putnam's Sons).

For identification and Classification: In addition to the preceding works, the teacher must possess or have access to Floras and Faunas, a sufficient supply of which should, at any rate, be in the High School library. The following are suggested, but, of course, a more comprehensive selection may be made from the Reference Catalogues of 1902 and 1905: Doubleday, Page & Co.'s *The Nature Library,* in 10 vols.; Spotton's *Botany, Part II.,* (The Flora); Muldrew's *Sylvan Ontario;* Keeler's *Our Native Trees;* Comstock's *Manual for the Study of Insects;* McIlwraith's *Birds of Ontario;* Chapman's *Color Key to North America Birds;* Merriam's *Birds of the Village and Field;* Everman's *American Food and Game Fishes.**

* For details as to character and prices, see the High School Reference Catalogue of 1902 and the Supplement of 1905.

NOTE.—Ward's Natural Science establishment, 76-104 College Ave., Rochester, U.S., furnishes Colleges and Schools with every kind of Natural History collections except Botanical specimens and Insects. No Canadian house of its character has yet been established. The Chas. Chapman Co., London, Ont., furnishes Botanical, Entomological and miscellaneous supplies for practical work (labels, insect boxes, trays, etc., etc.)

COMMERCIAL COURSE.

Under the old regulations much energy was uselessly expended upon Bookkeeping. Pupils generally were put into Bookkeeping because a comprehensive course in it was supposed to be necessary to all classes of citizens, and sometimes because they were not otherwise engaged when the subject was being taught those intended for business. As a matter of fact, the knowledge of commercial transactions the ordinary pupil needs may be readily acquired in connection with Commercial Arithmetic. A well taught commercial course affords, it is true, good mental discipline; but the pupil who is not intended for business should get his discipline from the subjects that are of immediate importance to him. That system of organization is best which best utilizes the pupil's energies. Under the new regulations the Bookkeeping Course on p. 68 is obligatory for teachers' certificates only, while on pp. 73-74 a special course in commercial work is provided for those who wish it.

The minimum amount prescribed for Part I of the non-professional Junior and District Teacher's certificates is given in the note to the course on p. 68. As the note also points out, the sets prescribed are to be the *first* work done in these sets, *note copies* of preliminary drafts. This means, be it carefully noted, that, before the pupil begins the three prescribed sets, he shall have had ample preliminary training. In accordance with the scheme of organization already advocated, the course in Bookkeeping should be an intensive one of about six months, from, say, January to the end of June of the first year. When, however, as is sometimes the case, there is not outside pressure for commercial work in the first year, the course might with advantage be postponed to the second. Then, owing to previous training and greater maturity, the pupil can accomplish the work with less difficulty and in a shorter time. Moreover, with this organization, no special provision will be needed for those who enter at the second year without having completed the work.

In some of the special courses, heretofore too little attention has been paid to Stenography and too much to Bookkeeping and Business Papers on the one hand; while, on the other, the subjects of general culture have not been stressed enough. General adaptability is an indispensable adjunct of technical knowledge. The intelligent business man, it is well known, prefers to the so-called business graduate the high School pupil who has been well trained, and who, in particular, is a good speller and ready reckoner, and can write a good hand and compose a good letter, even if his course in Bookkeeping has not been a very extensive one. Moreover, the number who, on leaving school, are entrusted with the account books of an important business is very small indeed. The difference between the commercial courses of the business College and those of the High School should be the emphasis the High School places upon a good general education. In schools where the commercial classes are not segregated from the others in the first year, all might take together at least the subjects that are common [see Reg. 39 (4) and (6)]. In this year the subjects of general culture should receive

special attention, the stress being afterwards transferred to the subjects of the commercial course. Indeed, in the first year, the Bookkeeping for the Junior Teacher's certificate would be ample even for the commercial section. No school at present has a commercial course of more than two years. In the note at the foot of p. 74 provision is made for one extending over three years. In our cities, at least, it should soon be practicable to have such a course. Two years of High School training is too little for the business man of the future.

Art Course.

Heretofore, practically no special equipment or accommodations have been provided for the department of Art, although, obviously, its efficiency depends upon these as much as does the department of Science. In the larger schools a commodious and well-lighted room should now be set apart, furnished with suitable desks and presses, ample blackboards, and water supply and at least one sink. Here, too, the walls should be adorned with good reproductions of the best pictures (See under "School Decoration" below). The influence of artistic surroundings in the Art-room, in particular, cannot be overestimated. When a separate room is not available, one of the ordinary class-rooms should meet the foregoing requirements as far as practicable. In such class-rooms care should be taken when water-color work is to be done to have water in individual cups or glasses, so provided that no time shall be lost either at the end or the beginning of a lesson: an additional ink-well in each desk would meet the case conveniently. A set of drawing models of wood or painted tin should be purchased for the teacher's use, with vases and casts of various artistic objects; and each pupil might himself have a set of type models from which to do his drawing. The sphere, hemisphere, ovoid and spheroid must, of course, be turned from wood, but the rest may be easily made of cardboard or stiff manilla paper. On this subject, as, indeed, on many others, the teacher will find helpful suggestions in Nos. 1 and 2 of the drawing-books authorized for the old course. Blank drawing books should, of course, be used now, the teacher himself supplying the exercises.

When properly carried out, the old course had some practical value besides its educational value as hand and eye training. To these the new course is designed to add some æsthetic culture. We cannot, it is evident secure complete efficiency at first; this department, in particular, is one of slow growth at best; but we may gradually improve the situation.

As to the order of the subjects: Some teachers prefer to take all the first year in an elementary way, completing the course the second. Others, again, prefer to take the elementary course in part the first year, carrying over the rest to the second year. The plan to adopt will naturally depend upon the time-allowance for the department. From its nature, Drawing should, it is evident, be stressed the first year, seat-work being provided as far and as soon as practicable; and less class-work and more seat-work should be done the second. In the first year the subjects might be taken in the following order: Drawing from "Models" (the term includes all kinds of "objects"); Memory-drawing (under the old regulations known as "object-drawing"); the principles of Freehand Perspective, the subject, however, being taken up as needed with the Model and Memory Drawing and extended a little thereafter; Inventive Illustrative Drawing; Ornamental Design, introducing Practical Geometry and its application to Design. Orthographic and Isometric Projection (merely the elements) might be deferred to the second year, except where Manual Training is taken up; and,

in such schools, the Ornamental Design might be taken in the second year. Light and Shade and Color will, of course be used whenever applicable to the subjects of the department of Art.

For economy, as well as for purely educational reasons, it is most important that the principle of correlation, which is a leading feature of the new programme, should be observed throughout the Art course. The most effective work will, accordingly, be done if the Science-master teaches Drawing also; or being himself proficient in the art (as every Science-master should be) works in close harmony with the teacher of Drawing. This principle applies, it is manifest, with at least equal force, to the Practical Geometry of the course in Designing and the Introductory Geometry of the new Mathematical course.

Although color work has been prescribed for the Public Schools since last September, it will evidently be some years before even a majority can do satisfactory work with this vehicle. In most localities, indeed, the Public School work even with pencil has been unsatisfactory. It would be well, therefore, to devote as many as may be needed of the early lessons to practice with rectangular and circular models in light and shade. The pupil may thus be set on the way to acquiring the habit of accurate drawing —a habit of the utmost importance and one which he is less likely to acquire if he begins with irregular objects. He should then be carefully taught the use of brush and color. Thereafter, in the Spring and Fall, he can use his pen, pencil, and brush in Botany and Zoology as well as in the ordinary fields of Art. In Winter the same plan should be followed with Physics and Chemistry.

The preceding remarks deal, of course, with the Drawing prescribed on p. 68 of the Regulations—the course which is obligatory only for a teacher's non-professional certificate and for pupils in the general course, but which, on account of its culture value, deserves, for a year at least, the same consideration in the organization as has been recommended above for the Elementary Science. For some years, the special Drawing course on p. 90 can be taken in only a few of the larger Collegiate Institutes, and in most of such schools only when competent teachers can be procured. The attention of the teacher of Drawing is accordingly drawn to the course for Art Specialists. Circular No. 2, which defines it, contains a list of works of reference. and others will be found in the Reference Catalogue of 1902 and in the Supplement just issued. For the convenience of the teacher in the ordinary course, the names of the works which will be found most serviceable are given here:

For Model Drawing: *Light and Shade*, Cross, $1.00, Ginn & Co., Boston; *Color Study*, 60c., the same author and publisher.

For Memory Drawing, Freehand Perspective, and Inventive Illustrative Drawing: *Text books of Art Education*, Prang; *New Drawing Course*, Vaughan, in four parts, 2/6 each, Nelson & Son, London, Eng.

For Ornamental Design: *Color Study*, Cross; *Design and Making of Patterns*, Hatton, 5/, Chapman & Hall, London, Eng.; *Science and Art Drawing* (complete Geometrical course), Spanton, 10/, Macmillan Co.; *The Bases of Design* and *Line and Form*, Walter Crane, 6/ each, Geo. Bell & Sons.

For Orthographic Projection: *Mechanical Drawing*, Cross, Ginn & Co., Boston. *Practical Plane and Solid Geometry*, Rawle, 1/6. Simpkin, Marshall & Co., London, Eng. *Science and Art Drawing*, Spanton.

For Isometric Projection: *Science and Art Drawing*, Spanton.

School Libraries.

No part of the school equipment is more important than the Library. There is no field of human enterprise in which the man who uses a library has not an advantage over the one who does not, and the school is the place where he should acquire the habit. Besides, the use of the High School library is the indispensable concomitant of the independent work which the new regulations enjoin. In this connection, two matters are of prime importance—the character and the situation of the reference books. Occasionally, some of the books are at present better adapted to the use of the adult, and the library is inconveniently situated. In the selection of the books the necessities of the junior pupil should be borne in mind as well as those of the senior; and the books themselves should always be readily accessible, and need not all be kept in the same room. The general reference books might be kept in a special room or in the Principal's room, of which the senior pupils should have the freedom during their study periods. Sometimes, however, the reference books most in use are, with advantage, kept on reading stands in the main hall. But the special reference library of each department would be more serviceable if in the class-room where it is most in demand. Manifestly, when a reference book is needed, it should be close at hand. Here it is well to emphasize the fact that the Education Department has just issued a Supplement to the Reference catalogue of 1902. No book has found a place in either catalogue the value of which has not been attested by competent authorities. Teachers may, therefore, make their selection from either with confidence in its reliability.

Text-Books.

Since the issue of the list of 1904 some additional High School text-books have been authorized. Two in particular deserve special consideration: Baker's *Theoretical Geometry for Schools* and *The Principles and Practice of Reading*. The former has been prepared for the use of the forms that will go up for the University Matriculation and the Teachers' non-professional examinations of 1907; for the new courses in Geometry come into full operation in both the Middle and the Upper Schools after the examinations of 1906. Many of the selections in *The Principles and Practice of Reading* are suitable for the Literature class and may be so used also; but the book has been prepared especially for the classes in Oral Reading, and experience has shown that the Reading lesson loses much of its freshness if the selections have already been used for another purpose. Oral Reading is subsidiary to Literature teaching, and the meaning of the passage is the first and an indispensable step in the Reading lesson; but the main object of the Literature lesson is the cultivation of taste, while that of the Reading lesson is the effective rendering of the author's meaning. These objects are best secured in the earlier stages, at any rate, when the main object in each case is kept steadily in view. We should have correlation without confusion. The plan of *The Principles and Practice of Reading* is an excellent one, and, if properly used, the book will do much to lighten the teacher's labour and make his work more effective.

In par. 2, of the authorized text-book list, the following is emphasized:

"Books authorized for use in the Public Schools may be used in the Lower School, and it is recommended that, so far as the Principal may deem it advisable, these books be used for the first year instead of the corresponding High School books."

The recommendation applies to the Public School text-books in Arithmetic, English Grammar, History, and Geography. These books are seldom

if ever completed in the Public Schools, and, for economic reasons, should be used the first year in the High Schools. With such additions as the competent teacher will supply, they contain ample material for the period. A change in text-books should be made only after due deliberation and only with a new class; and the responsibility for advising the School board on the subject devolves on the Principal and not on his assistants, although, of course, the judicious Principal will seek their advice when their interests are affected. Reasonable notice should also be given by the Principal to the local bookseller, of any changes to be made in the text-books used in the High School. It has sometimes happened that desirable changes have been delayed in order to enable him to get rid of stock he has on hand. Sometimes, on the other hand, he has been treated with scant consideration.

Temporary Certificates.

Reg. 37 (2) reads as follows:

"If, after due advertisement, a High School Board is unable to obtain a legally qualified assistant, a temporary certificate may be granted by the Minister of Education for the current half year to a suitable person on application to the Board."

When the occasion arises, it will be proper for the Principal to point out to his Board that the application of a legally qualified teacher whose non-professional certificate includes the work to be done, is entitled to acceptance, no matter what may be its grade; and that a temporary certificate must be secured under the regulation, before the person without the legal qualification can be appointed. If a board desires a higher qualification than that available under its first advertisement, it is open to it to advertise again, offering a larger salary. On its failure, after reasonable efforts, to secure the kind of teacher it wants, a printed form will be sent on application to the Deputy Minister, to be filled in with such a statement as will enable the Minister to dispose of the case with due regard to both the local and the general interests. Reg. 35 (4) provides the Department with the means of enforcing its decisions. The scarcity of teachers which, it is alleged, has become acute in some departments, makes Reg. 37 (2) of more importance now than heretofore. The existing stringency, however, is not wholly attributable to this scarcity. The salary question, it is well known, is the important element in the situation. Competent teachers will remain in their positions and competent teachers will return to the ranks if adequate inducements are offered them.

School Decoration.

In grading the accommodation special importance is now attached to School Decoration [See Reg. 149, (5) and (7)]. Not only should suitable color schemes be adopted for calsomining or papering the halls and class-rooms, but the walls (including, of course, those of the Assembly room) should be decorated with good pictures; and casts, vases, and other ornaments should be provided. After 1905, Grade I. will, accordingly, not be given the halls or the class-rooms which are bare of ornament or unsuitably colored. In the present condition of most of the schools of the Province, it would be unreasonable to expect paintings (and the chromolithograph is seldom good); but good photographs (especially carbons), etchings and engravings may be bought at moderate prices, and, in the matter of casts and vases, the form is of more importance than the material. Quality is more to be desired than quantity; all the Education Department expects is that each school shall, from year to year, make a reasonable effort to

comply with the requirements. Very generally, as is well known, we have good substantial school buildings, and grounds that are by no means discreditable. We should now make an organized effort to improve the interiors. To this end the Literary Society and the Graduating Class may be expected to contribute, not to speak of public-spirited citizens. In the words of U. S. Commissioner Harris, our pupils should have "not merely the piety of the heart, but the piety of the intellect that beholds truth, the piety of the will that does good deeds wisely, the piety of the senses that sees the beautiful and realizes it in works of Art."

On p. 63, Section XIV. of the High School Reference Catalogue of 1902, will be found suggestions on the subject of School Decoration. No more useful book has been published on the subject than Burrage & Bailey's *School Sanitation and Decoration* ($1.50, D. C. Heath & Co., Boston). Every school library should have a copy and every School Board and Principal should consult it.

II. Orders in Council.

Mr. John S. Mercer granted a certificate as specialist in Manual Training. Approved 27th January, 1905.

Miss Lucy Cumming appointed Instructor in Sewing at the Ottawa Normal and Model Schools, the appointment to date from 1st November, 1904. Approved 27th January, 1905.

Graduates of McGill University, Montreal, who have pursued certain courses and fulfilled conditions prescribed by 51 of the Regulations of the Department to be granted non-professional standing of Specialists. Approved 27th January, 1905.

Miss Margaret F. McLeod granted a Second Class Certificate. Approved 31st January, 1905.

Holders of Second Class certificates awarded by the Province of Manitoba may be granted interim certificates for Ontario, and holders of other certificates granted by said Province may be recognized as having complied with the non-professional requirements for District certificates for Ontario. Approved 10th March, 1905.

Honor Graduates of Toronto University in the courses detailed to be granted non-professional Specialist standing in such courses. Approved 15th March, 1905.

Mr. John McLaughlin appointed Inspector of Schools for Manitoulin Island, and the Islands adjacent thereto, the Island of St. Joseph and the Townships of Rutherford and Carlyle in the District of Algoma. Approved 28th April, 1905.

Nine certificates to teach Household Science granted. Approved 5th June, 1905.

Honor Graduates of McMaster University in the courses detailed to be granted non-professional Specialist standing in French and German. Approved 14th June, 1905.

Miss Janet Wilson granted a certificate to teach Household Science. Approved 8th July, 1905.

Mrs. Miriam Williams Brown appointed Instructor in Reading in the Normal and Model Schools, Toronto, said appointment to take effect from the 1st day of September, 1905. Approved 12th July, 1905.

Certificate to teach Household Science in the Niagara Falls South High School granted to Miss Eliza S. Fitzgerald. Approved 9th August, 1905.

List of Text-books authorized. Approved 9th August, 1905.

Grants payable to Continuation Classes of the various grades specified. Approved 18th August, 1905.

Miss Nora Lefurgey granted a Second Class certificate. Approved 18th August.

Minister of Education, pending the final decision of the Courts on the question of the qualification of the Christian Brothers, authorized to grant at the request of Separate School Boards temporary certificates to members of religious orders. Approved 14th September, 1905.

Miss Jean Laidlaw appointed Lecturer in Kindergarten Principles in the London Normal School, the appointment to date from 1st September, 1905. Approved 15th September, 1905.

Miss Grace C. Leroy appointed Clerk and Stenographer for the Toronto Normal School, appointment to date from 1st September, 1905. Approved 15th September, 1905.

Miss Annie M. Delaney appointed Clerk and Stenographer at the Ottawa Normal School, the appointment to date from 1st November, 1905. Approved 4th October, 1905.

Appointments to the Educational Council made. Approved 3rd November, 1905.

Mr. Clarkson James appointed Clerk and Private Secretary to the Minister of Education, said appointment to take effect on and from 1st December, 1905. Approved 15th November, 1905.

Mr. Thaddeus William Henry Leavitt appointed Inspector of Public Libraries, said appointment to take effect on and from 1st November, 1905. Approved 15th November, 1905.

Certificates (twenty-one) to teach Household Science granted. Approved 15th November, 1905.

Certificates (two) to teach Household Science granted. Approved 15th November, 1905.

Mr. David B. Lattey granted an Interim Second Class certificate valid for two years. Approved 20th December, 1905.

Miss Helen Holland appointed Teacher of Household Science for the Ottawa Normal and Model Schools, the appointment to date from 1st January, 1906 Approved 22nd December, 1905. (Subsequently resigned.)

High School established in eastern part of City of Toronto, commonly known as Riverdale. Approved 29th December, 1905.

APPENDIX G.—FREE TEXT BOOKS IN RURAL SCHOOLS, 1905.

Inspectorate.	Name of school (section number and township) and amount expended for text books.	Total amount expended.	Total amount of Legislative aid.
		$ c.	$ c.
Middlesex, W	10 Lobo, 6.20; 6 E. Williams, 14.52	20 72	10 36
Perth	1 Blanchard, 7.57; 6 Downie, 6.96; 8 Downie, 5.87	20 40	10 21
Rainy River and Thunder Bay	1 Paipoonge, 10.65	10 65	5 32
Renfrew	10 Raglan, 6.45	6 45	3 22
Totals	7 schools	58 22	29 11

APPENDIX H.—PUBLIC AND FREE LIBRARIES, LITERARY AND SCIENTIFIC INSTITUTIONS, ETC.

REPORT OF T. W. H. LEAVITT, INSPECTOR OF PUBLIC LIBRARIES, SCIENTIFIC INSTITUTIONS AND LITERARY AND SCIENTIFIC SOCIETIES RECEIVING A SHARE OF THE LEGISLATIVE GRANT, IN THE PROVINCE OF ONTARIO, FOR THE YEAR ENDING 31ST DECEMBER, 1904.

Owing to the resignation of Dr. May, Superintendent of Public Libraries, etc., on November 1st, 1905, my report is principally statistical; the retiring Superintendent not having furnished me with the necessary data upon which to base an estimate, specific in its character, of the progress made by the Public Libraries and Scientific Institutions which he had visited and examined during the year.

The following Public Libraries, Literary and Scientific Institutions, etc., were inspected during the year 1905:—

Algonquin, Ancaster, Athens, Atwood, Avonmore, Ayton, Beachville, Belleville, Berwick, Bracondale, Brighton, Brockville, Brussels, Burk's Falls, Burlington, Cargill, Colborne, Cornwall, Crysler, Depot Harbor, Deseronto, Drayton, Dundas, Emsdale, Elgin, Ethel, Fergus, Finch, Hamilton, Hamilton Literary and Scientific Association, Hawkesbury, Harriston, Huntsville, Ingersoll, Kearney, Lancaster, Listowel, London, Maitland, Markham, Monkton, Newboro', Oshawa, Ottawa Field Naturalists' Club, Ottawa Literary and Scientific Society, Ottawa French-Canadian Institute, Ottawa St. Patrick's Literary Association, Ottawa University Scientific Society, Palmerston, Parry Sound, Penetanguishene, Pinkerton, Port Elgin, Port Hope, Port Rowan, Prescott, Speedside, Sprucedale, Trenton, Unionville, Vankleek Hill, Watford, Walkerton, Walkerville, Waterdown, Westport, Wyoming.

The following Libraries did not report for the year 1904:—

Addison, Angus, Baden, Badjeros, Bancroft, Battersea, Baysville, Beeton, Belmont, Berwick, Binbrook, Bloomfield, Bognor, Brougham, Bruce Mines, Burritt's Rapids, Cheltenham, Cold Springs, Copper Cliff, Crysler, Dawson, Duart, Dufferin (Clanbrassie P.O.), Dundalk, Dundela, Enterprise, Finch, Flesherton, Fordwich, Forks of the Credit, Freelton, Gore Bay, Gorrie, Hastings, Havelock, Highgate, Hillsburg, Holland Centre, Holyrood, Inglewood, Inkerman, Kars, Kearney, Keswick, Kinburn, King, Kintore, Linwood, Lion's Head, Lorne Park, Manitowaning, Maitland, Maxville, Maxwell and Feversham, Mono Centre, Mono Mills, Moose Creek, Morewood, Mount Brydges, Munster, Nairn Centre, Napanee Mills (Strathcona P.O.), Newbury, North Augusta, Oil Springs, Ophir, Ottawa, Perth, Poland, Powassan, Primrose, Queensville, Rosemont, Rosseau, Shallow Lake, Sprucedale, Sundridge, Tamworth, Thornton, Trout Creek, Tweed, Vandorf, Vars, Violet Hill, Waterford, Watson's Corners, Webbwood, West Lorne.

The following Libraries were incorporated during the year:—

Deer Park, Frankford, Kerns (Milberta P.O.), South Mountain, Schomberg, Speedside, Sturgeon Falls, Walkerville.

Libraries closed:

Algonquin (books transferred to Public School trustees), Tilbury East (Valetta P.O.), (books transferred to Tilbury Public Library), Vienna (books transferred to High School trustees.

The following table shows the locality of every Public and Free Library in the Province on the 1st December, 1905:—

FREE AND PUBLIC LIBRARIES.

Counties and Districts.	Cities, Towns and Villages.
Addington	Camden, East.
"	Enterprise.
"	Napanee Mills (Strathcona [P.O.)
"	Newburgh.
"	Tamworth.
"	Yarker.
Algoma	Bruce Mines.
"	Chapleau.
"	Goulais Bay.
"	Marksville.
"	Nairn Centre.
"	Ophir.
"	Port Arthur.
"	Rat Portage (Kenora).
"	Sault Ste. Marie.
"	Schrieber.
"	Thessalon.
"	Victoria Mines.
"	Webbwood.
Brant	Brantford.
"	Burford.
"	Glenmorris.
"	New Durham.
"	Paris.
"	Scotland.
"	St. George.
Bruce	Bervie.
"	Cargill.
"	Chepstow.
"	Chesley.
"	Elmwood.
"	Glamis.
"	Hepworth.
"	Holyrood.
"	Kincardine.
"	Lion's Head.
"	Lucknow.
"	Mildmay.
"	Paisley.
"	Pinkerton.
"	Port Elgin.
"	Ripley.
"	Riversdale.
"	Southampton.
"	Teeswater.
"	Tara.
"	Tiverton.
"	Underwood.
"	Walkerton.
"	Westwood.
"	Wiarton.
Carleton	Carp.
"	Dawson.
"	Kars.
"	Kinburn.
"	Manotick.
"	Metcalfe.
Carleton	Munster.
"	North Gower.
"	Ottawa.
"	Richmond.
Dufferin	Glen Cross.
"	Grand Valley.
"	Honeywood.
"	Melancthon.
"	Mono Centre.
"	Orangeville.
"	Primrose.
"	Rosemont.
"	Shelburne.
"	Violet Hill.
Dundas	Chesterville.
"	Dundela.
"	Inkerman.
"	Iroquois.
"	Matilda (Iroquois P.O.)
"	Morewood.
"	Morrisburg.
"	South Mountain.
"	Winchester.
Durham	Bowmanville.
"	Millbrook.
"	Orono.
"	Port Hope.
Elgin	Aylmer.
"	Bayham.
"	Dutton.
"	Port Burwell.
"	Port Stanley.
"	Rodney.
"	St. Thomas.
"	Shedden.
"	Sparta.
"	Springfield.
"	West Lorne.
Essex	Amherstburg.
"	Comber.
"	Essex.
"	Harrow.
"	Kingsville.
"	Leamington.
"	Pelee Island.
"	Walkerville.
"	Windsor.
Frontenac	Battersea.
"	Garden Island.
"	Harrowsmith.
"	Kingston.
"	Mississippi.
"	Sydenham.
"	Wolfe Island.
Glengarry	Lancaster.
"	Maxville.
"	Williamstown.
Grenville	Burritt's Rapids.

FREE AND PUBLIC LIBRARIES.—*Continued.*

Counties and Districts.	Cities, Towns and Villages.
Grenville (*Con.*)	Cardinal.
"	Easton's Corners.
"	Jasper.
"	Kemptville.
"	Maitland.
"	Merrickville.
"	North Augusta.
"	Oxford Mills.
"	Prescott.
"	Spencerville.
Grey	Ayton.
"	Badjeros.
"	Bognor.
"	Chatsworth.
"	Clarksburg.
"	Dromore.
"	Durham.
"	Dundalk.
"	Flesherton.
	Holland Centre.
"	Holstein.
"	Kemble.
"	Hanover.
"	Lake Charles.
"	Markdale.
"	Meaford.
"	Maxwell and Feversham.
"	Owen Sound.
"	Priceville.
"	Shallow Lake.
"	Singhampton.
"	Thornbury.
Haliburton	Haliburton.
"	Minden.
Haldimand	Caledonia.
"	Canfield.
"	Cayuga.
"	Cheapside.
"	Dufferin (Clanbrassil P.O.)
"	Dunnville.
"	Hagersville.
"	Jarvis.
"	Nanticoke.
"	Victoria (Caledonia P.O.)
"	York.
Halton	Acton.
"	Burlington.
"	Georgetown.
"	Milton.
"	Oakville.
Hastings	Bancroft.
"	Belleville.
"	Deseronto.
"	Frankford.
"	Madoc.
"	Marlbank.
"	Stirling.
"	Trenton.
"	Tweed.
Huron	Auburn.
"	Brucefield.
"	Blyth.
Huron	Brussels.
"	Clinton.
"	Dungannon.
"	Ethel.
"	Exeter.
"	Fordwich.
"	Goderich.
"	Gorrie.
"	Hensall.
"	Molesworth.
"	Seaforth.
"	St. Helen's.
"	Walton.
"	Wingham.
"	Wroxeter.
Kent	Blenheim.
"	Bothwell.
"	Chatham.
"	Dresden.
"	Duart.
"	Highgate.
"	Tilbury.
"	Ridgetown.
"	Romney.
"	Thamesville.
"	Wallaceburg.
"	Wheatley.
Lambton	Arkona.
"	Aberarder.
"	Alvinston.
"	Brigden.
"	Bunyan.
"	Copleston.
"	Forest.
"	Inwood.
"	Oil Springs.
"	Petrolea.
"	Point Edward.
"	Sarnia.
"	Thedford.
"	Watford.
"	Wyoming.
Lanark	Allan's Mills.
"	Almonte.
"	Carleton Place.
"	Dalhousie.
"	Elphin.
"	Lanark.
"	Maberley.
"	Middleville.
"	Pakenham.
"	Perth.
"	Poland.
"	Smith's Falls.
"	Watson's Corners.
Leeds	Addison.
"	Athens.
"	Brockville.
"	Elgin.
"	Gananoque.
"	Mallorytown.
"	Newboro'.

FREE AND PUBLIC LIBRARIES.—*Continued.*

Counties and Districts.	Cities, Towns and Villages.
Leeds (*Con.*)	Westport.
Lennox	Odessa.
"	Napanee.
Lincoln	Abingdon.
"	Beamsville.
"	Caistorville.
"	Grantham (St. Catharines [P.O.)
"	Merritton.
"	Grimsby.
"	Niagara.
"	Smithville.
"	St. Catharines.
Manitoulin	Cockburn Island.
"	Gore Bay.
"	Little Current.
"	Manitowaning.
Middlesex	Ailsa Craig.
"	Belmont.
"	Coldstream.
"	Dorchester.
"	Glencoe.
"	Komoka.
"	London.
"	Lucan.
"	Melbourne.
"	Mt. Brydges.
"	Newbury.
"	Parkhill.
"	Strathroy.
"	Wardsville.
Muskoka	Bracebridge.
"	Baysville.
"	Gravenhurst.
"	Huntsville.
"	Port Carling.
"	Severn Bridge.
Nipissing	Copper Cliff.
"	Haileybury.
"	Kerns (Milberta P.O.)
"	North Bay.
"	Sturgeon Falls.
"	Thornloe.
Norfolk	Bloomsburg.
"	Delhi.
"	Port Dover.
"	Port Rowan.
"	Simcoe.
"	Waterford.
Northumberl'd	Brighton.
"	Campbellford.
"	Cobourg.
"	Cold Springs.
"	Colborne.
"	Fenella.
"	Gore's Landing.
"	Warkworth.
Ontario	Beaverton.
"	Brooklin.
"	Brougham.
"	Cannington.
"	Claremont.
"	Oshawa.
Ontario	Pickering.
"	Port Perry.
"	Sunderland.
"	Uxbridge.
"	Whitby.
"	Zephyr.
Oxford	Beachville.
"	Drumbo.
"	Embro.
"	Harrington.
"	Ingersoll.
"	Kintore.
"	Plattsville.
"	Norwich.
"	Otterville.
"	Princeton.
"	Tavistock.
"	Tillsonburg.
"	Thamesford.
"	Woodstock.
Parry Sound	Burk's Falls.
"	Callender.
"	Depot Harbor.
"	Emsdale.
"	Kearney.
"	Parry Sound.
"	Powassan.
"	Rosseau.
"	South River.
"	Sprucedale.
"	Sundridge.
"	Trout Creek.
Peel	Alton.
"	Belfountain.
"	Bolton.
"	Brampton.
"	Caledon.
"	Cheltenham.
"	Claude.
"	Forks of the Credit.
"	Inglewood.
"	Lorne Park.
"	Mono Road.
"	Mono Mills.
"	Port Credit.
"	Streetsville.
Perth	Atwood.
"	Listowel.
"	Milverton.
"	Monkton.
"	Mitchell.
"	Shakespeare.
"	St. Mary's.
"	Stratford.
Peterborough	Hastings.
"	Havelock.
"	Lakefield.
"	Norwood.
"	Peterborough.
Prescott	Hawkesbury.
"	Vankleek Hill.
Prince Edward	Bloomfield.

FREE AND PUBLIC LIBRARIES.—*Continued.*

Counties and Districts.	Cities, Towns and Villages.
Prince Edward	Picton.
Rainy River	Dryden.
"	Fort Frances.
Renfrew	Admaston.
"	Arnprior.
"	Burnstown.
"	Cobden.
"	Douglas.
"	Forester's Falls.
"	Pembroke.
"	Renfrew.
"	White Lake.
Russell	Russell.
"	Vars.
Stormont	Avonmore.
"	Berwick.
"	Cornwall.
"	Crysler.
"	Finch.
"	Moose Creek.
"	Newington.
"	Wales.
Simcoe	Alliston.
"	Angus.
"	Barrie.
"	Beeton.
"	Bradford.
"	Coldwater.
"	Collingwood.
"	Cookstown.
"	Creemore.
"	Elmvale.
"	Hillsdale.
"	Lefroy.
"	Midland.
"	Orillia.
"	Penetanguishene.
"	Stayner.
"	Sunnidale (New Lowell
"	Thornton. [P.O.)
"	Tottenham.
Victoria	Bobcaygeon.
"	Cambray.
"	Fenelon Falls.
"	Kinmount.
"	Kirkfield.
"	Little Britain.
"	Lindsay.
"	Manilla.
"	Norland.
"	Oakwood.
"	Omemee.
"	Woodville.
Waterloo	Ayr.
"	Baden.
"	Berlin.
"	Elmira.
"	Floradale.
"	Galt.
"	Hawkesville.
"	Hespeler.
"	Linwood.
Waterloo	New Dundee.
"	New Hamburg.
"	Preston.
"	Waterloo.
"	Wellesley.
Welland	Bridgeburg.
"	Fonthill.
"	Fort Erie.
"	Niagara Falls.
"	Niagara Falls South.
"	Port Colborne.
"	Ridgeway.
"	Thorold.
"	Welland.
Wellington	Alma.
"	Arthur.
"	Belwood.
"	Clifford.
"	Drayton.
"	Elora.
"	Erin.
"	Ennotville.
"	Fergus.
"	Glen Allan.
"	Guelph.
"	Harriston.
"	Hillsburg.
"	Morriston.
"	Mount Forest.
"	Palmerston.
"	Rockwood.
"	Speedside.
Wentworth	Ancaster.
"	Binbrook.
"	Dundas.
"	Freelton.
"	Hamilton.
"	Mill Grove.
"	Lynden.
"	Saltfleet (Stony Creek
"	Waterdown. [P.O.)
York	Aurora.
"	Bracondale.
"	Deer Park.
"	Don.
"	East Toronto.
"	Highland Creek.
"	Islington.
"	Keswick.
"	King.
"	Maple.
"	Markham.
"	Mount Albert.
"	Newmarket.
"	Queensville.
"	Richmond Hill.
"	Scarboro'.
"	Schomberg.
"	Stouffville.
"	Thornhill.
"	Toronto.
"	Toronto Junction.

FREE AND PUBLIC LIBRARIES.—*Concluded.*

Counties and Districts.	Cities, Towns and Villages.
York (*Con.*)	Unionville.
"	Vandorf.
York	Weston.
"	Woodbridge.

The above list may be classified as follows:—	
Public Libraries reporting	264
Free Libraries reporting	133
Public Libraries not reporting	74
Free Libraries not reporting	14
Public Libraries incorporated since 1st December, 1904	8
Totals	493

I. PUBLIC LIBRARIES (NOT FREE).

The following extracts are taken from the annual reports for the year ending 31st December, 1904. (For details see Table A).

1. Classification of Public Libraries Reporting.

Public Libraries with reading rooms	90
Public Libraries without reading rooms	174
Total	264

2. Public Libraries—Receipts and Balances on Hand.

The total receipts of 264 Public Libraries was	$57,685 66
Balances on hand	6,434 75

3. Public Libraries—Expenditure.

The total expenditure of 264 Public Libraries was	$51,250 91

4. Public Libraries—Assets and Liabilities.

Assets of 264 Public Libraries	$389,244 95
Liabilities of 264 Public Libraries	9,179 95

5. Number of Members in Public Libraries.

264 Public Libraries have 32,303 members.

6. No. of Volumes in Public Libraries and No. of Volumes Issued.

Number of volumes in 264 Libraries	504,963
Number of volumes issued in 264 Libraries	757,191

7. Reading Rooms in Public Libraries.

90 Public Libraries reported having reading rooms.
15 Libraries reported having periodicals for circulation.
105 Libraries subscribed for 2,108 newspapers and periodicals.

TABLE A.—Receipts, Expenditures, Assets and Liabilities of Public Libraries (not Free) for the year ending 31st December, 1904.

Number.	Public Libraries.	Receipts.					Expenditure.	Balance on hand.	Number of members.	Number of volumes in library.	Number of volumes issued.	Number of newspapers and periodicals.	Assets.	Liabilities.
		Legislative grants.	Municipal grants.	Members' fees.	Balances and other sources.	Total receipts.								
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.					$ c.	$ c.
1	Aberarder	25 10	30 00	52 50	60 73	168 33	159 69	8 64	105	3,208	1,604	22	1,510 00	150 00
2	Abingdon	.....	.....	7 00	10 55	17 55	7 95	9 60	103	366	477	.....	175 82	.....
3	Admaston	.....	20 00	12 50	48 74	81 24	45 32	35 92	124	1,216	859	.....	550 00	.....
4	Alma	61 33	10 00	25 50	24 58	121 41	113 44	7 97	103	1,774	2,448	13	646 25	1 00
5	Allan's Mills	14 69	.....	12 75	2 36	29 80	29 80	.....	105	543	445	.....	375 00	.....
6	Alliston	20 45	.....	56 00	.....	76 45	75 67	78	84	2,024	.....	.....	1,546 22	7 20
7	Almonte	101 28	150 00	140 00	16 50	407 78	404 46	3 32	159	3,747	3,230	23	3,915 64	.....
8	Amherstburg	123 21	150 00	63 62	238 43	575 26	471 12	104 14	123	3,382	3,689	20	5,395 00	.....
9	Ancaster	.....	25 00	17 05	39 37	81 42	63 32	18 10	78	702	660	.....	512 40	.....
10	Arkona	11 00	20 00	27 00	47 84	105 84	99 48	6 36	107	2,371	3,105	16	1,200 00	.....
11	Arthur	57 37	100 00	74 50	170 66	402 53	389 50	13 03	133	3,262	3,122	28	2,175 00	38 42
12	Atwood	110 58	15 00	43 00	76 77	245 35	189 26	56 09	125	1,553	6,610	.....	1,514 68	54 77
13	Auburn	7 85	35 00	27 40	12 10	82 35	79 13	3 22	95	1,138	1,311	11	802 83	118 00
14	Aurora	49 99	.....	85 85	97 96	233 80	198 79	35 01	102	2,871	3,850	.....	3,833 01	1,060 32
15	Avonmore	.....	.....	53 00	48 12	101 12	27 35	73 77	55	1,294	1,456	.....	659 30	20 00
16	Ayton	.....	.....	.....	486 13	486 13	472 20	13 93	135	657	1,000	.....	413 74	195 00
17	Barrie	135 09	250 00	272 75	124 40	782 24	780 82	1 42	307	4,824	10,548	20	4,977 86	453 50
18	Bayham	16 45	.....	13 50	25 75	55 70	25 27	30 43	54	739	1,098	.....	525 32	.....
19	Beachville	95 11	5 00	40 50	228 41	369 02	365 99	3 03	134	901	1,574	.....	615 26	60 77
20	Beamsville	48 16	20 00	62 45	614 49	745 10	458 10	287 00	107	2,488	3,507	7	2,325 00	.....
21	Beaverton	41 89	49 75	92 25	30 71	214 60	214 46	14	164	1,444	1,703	23	1,234 23	.....
22	Belwood	46 06	15 00	23 00	72 62	156 68	152 47	4 21	126	1,580	3,018	.....	1,314 42	6 03
23	Bervie	42 83	35 00	8 25	4 55	90 63	89 31	1 32	104	1,580	789	.....	822 00	.....
24	Blenheim	51 49	100 00	138 00	20 18	309 67	308 40	1 27	189	3,954	6,032	20	2,350 00	.....
25	Bloomsburg	2 72	.....	.....	.....	2 72	2 00	72	81	195	500	.....	50 00	8 00
26	Blyth	47 32	20 00	26 90	15 30	109 52	71 95	37 57	105	1,737	1,350	.....	698 50	.....
27	Bobcaygeon	68 49	50 00	67 00	68 49	253 98	241 46	12 52	136	2,441	4,326	18	2,111 45	30 00
28	Bolton	53 43	50 00	55 00	34 90	193 33	193 33	.....	110	2,378	3,476	21	1,576 03	11 22
29	Bowmanville	24 64	.....	176 00	141 69	342 33	326 30	16 03	153	3,440	5,252	38	3,550 00	35 75
30	Bracondale	41 52	25 00	30 50	640 16	737 18	634 63	102 55	122	880	2,169	.....	661 05	.....

32	Bridgeburg	38 87	60 00	40 50	77 43	220 80	201 04	19 76	114	1,241	8,894		1,177 93	209 80				
33	Brigden	24 07	45 00	34 25	13 40	116 72	85 08	31 64	137	777	2,234		479 66					
34	Brooklin	51 40	80 00	41 05	80 51	263 02	210 85	46 07	191	2,108	2,733		1,270 00	3 75				
35	Bruce field	60 00	35 00	46 90	10 51	152 41	125 72	26 69	101	839	1,760		521 70					
36	Bunyan	39 87	5 00	8 00	63 25	116 12	90 92	25 20	114	612	1,526		411 00					
37	Burford	116 95		69 20	308 05	494 20	489 76	4 44	107	2,116	1,957	21	1,550 70	47 70				
38	Burlington	37 53	75 00	64 50	120 79	297 82	233 45	64 37	129	2,538	4,744	7	1,905 51					
39	Burnetown	24 11		13 30	35 66	73 07	57 58	15 49	116	895	824		310 00					
40	Caistorville				19 93	19 93	19 93		126	379	584		297 75					
41	Callender	93 25	10 00	15 75	116 89	235 89	216 88	19 01	52	422	1,412		290 00	58 74				
42	Cambray	39 68	50 00	12 60	43 96	146 24	137 32	8 92	108	1,051	2,252		739 28					
43	Campbellford	65 82	130 00	95 26	4 05	295 13	276 08	19 05	212	4,357	6,117	22	2,425 00					
44	Canfield	16 05	5 00	7 75	24 18	52 98	46 24	6 74	107	749	953		511 38					
45	Cannington	44 47	25 00	33 00	94 69	197 16	160 74	36 42	150	2,354	2,434	12	2,051 87					
46	Cargill	100 00	40 00	27 25	156 26	323 51	271 37	52 14	109	2,148	2,986		1,716 46					
47	Carp	45 49	15 00	50 50	1 15	112 14	87 20	24 94	102	1,379	1,458		1,033 10					
48	Chapleau			117 50	280 31	397 81	327 35	70 46	108	1,911	912	18	3,960 45					
49	Chatsworth	26 22		53 50	47 23	126 95	117 27	9 68	116	2,718	5,853		1,841 07					
50	Cheapside	26 46		16 75	21 04	64 25	54 65	9 60	111	1,577	1,009		1,132 24					
51	Chepstow	102 75	30 00	16 50	69 00	218 25	218 25		71	335	815		221 00	25 00				
52	Claremont	60 43	40 00	26 75	7 20	134 38	130 65	3 73	119	2,579	2,154		1,935 37	4 00				
53	Clarksburg	5 37		4 00	10 71	20 08	20 08		8	1,037			900 00	12 50				
54	Claude	76 00		25 00	1 50	102 50	15 75	86 75	102	2,964	2,138		1,950 00					
55	Cobourg	136 96	100 00	151 50	132 79	521 25	520 51	74	252	3,909	1,675	36	2,350 00	16 00				
56	Cockburn Island	50 00			50 00	100 00		100 00	50	292			263 82	213 82				
57	Colborne		50 00	54 00	189 71	293 71	292 70	1 01	119	1,821	1,647	2	1,275 00	135 90				
58	Coldstream	51 69	10 00	26 85	74 18	162 72	152 44	10 28	113	1,697	2,980	7	972 00					
59	Coldwater	51 98		58 50	58 44	168 92	164 25	4 67	119	1,825	2,287	19	1,352 10					
60	Comber	107 30	43 03	50 00	58 54	258 87	254 24	4 63	100	1,869	2,326	16	1,566 51					
61	Cookstown	33 20	10 00	17 40	45 60	106 20	106 20		102	1,580	7,052		1,145 00	216 00				
62	Depot Harbor			108 50	159 38	267 88	255 36	12 52	104	304	573	40	303 95	66 43				
63	Dorchester			16 40	130 75	147 15	121 96	25 19	105	10,76	920		802 82					
64	Douglas	20 50		31 75		52 25	49 85	2 40	127	1,069	2,923		764 90					
65	Dresden	14 30	75 00	63 80	51 45	204 55	190 47	14 08	124	1,777	3,722		1,254 86	49 37				
66	Dromore	14 34		12 00		26 34	26 34		77	577	757		298 59					
67	Drumbo	99 29	10 00	67 50	31 19	207 98	207 98		106	1,173	2,284		897 27					
68	Dryden			31 60	35 35	66 95	30 13	36 82	58	874	3,086		1,035 00					
69	Dundas	117 81	300 00	177 25	212 92	807 98	806 21	1 77	226	7,878	9,030	33	6,400 00					
70	Dungannon	13 59	35 00	18 00	48 65	115 24	107 24	8 00	97	1,845	1,838		365 00					
71	Dunnville	31 95	100 00	60 00	73 50	265 45	212 13	53 32	109	2,869	6,528		2,103 32	5 00				
72	Durham	31 57	100 00	88 24	139 95	359 76	302 38	57 38	114	3,810	5,682	27	3,800 00					
73	Easton's Corners	20 82		26 25	38 27	85 34	21 13	64 21	50	1,116	1,118		816 72					
74	East Toronto	100 05		33 75	100 00	233 80	220 95	12 85	102	545	1,409		414 00	7 00				
75	Elgin		25 00	44 00		69 00	69 00		46	584	184	2	340 00	78 00				
76	Elmira	17 93	15 00	22 10	88 78	143 81	143 81		131	2,948	2,312	22	2,103 68	53 00				

TABLE A.—Receipts, Expenditures, Assets and Liabilities, etc.—*Continued.*

Number.	Public Libraries.	Receipts.					Expenditure.	Balance on hand.	Number of members.	Number of volumes in library.	Number of volumes issued.	Number of newspapers and periodicals.	Assets.	Liabilities.
		Legislative grants.	Municipal grants.	Members' fees.	Balances and other sources.	Total receipts.								
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.					$ c.	$ c.
77	Elmvale	27 74	35 00	75 05	10 31	148 10	145 30	2 80	158	1,821	2,859	.....	1,000 00	50 00
78	Elmwood	22 06	10 00	17 82	63 21	113 09	102 57	10 52	124	724	1,359	.....	442 33	.....
79	Elora	90 59	113 40	143 50	158 41	505 90	417 03	88 87	135	9,454	6,440	20	7,500 00	.....
80	Elphin	.....	.....	.....	5 84	5 84	5 61	23	84	379	643	.....	211 38	.....
81	Embro	73 00	35 00	90 00	58 00	256 00	206 01	49 99	114	5,391	5,154	17	4,355 78	.....
82	Emsdale	55 06	10 00	9 65	28 42	103 13	100 93	2 20	105	1,140	450	.....	715 00	45 56
83	Ennotville	60 00	25 00	14 75	107 88	207 63	173 89	33 74	181	3,150	1,110	.....	2,700 00	.....
84	Essex	62 09	175 00	61 25	95 14	393 48	387 08	6 40	163	2,904	3,511	26	2,616 45	.....
85	Ethel	14 34	15 00	23 75	37 21	90 30	65 12	25 18	148	1,482	1,843	.....	968 47	.....
86	Fenella	25 96	.....	12 00	6 72	44 68	13 20	31 48	108	709	727	.....	344 90	.....
87	Fenelon Falls	74 34	75 00	96 25	147 65	393 24	388 47	4 77	132	3,792	4,716	32	2,780 00	118 00
88	Fergus	69 20	75 00	69 75	23 03	236 98	226 56	10 42	111	5,076	3,140	13	5,960 00	.....
89	Floradale	.....	.....	21 60	31 73	53 33	53 33	.....	105	2,134	1,837	.....	1,101 10	31 73
90	Fonthill	47 47	50 00	38 50	57 68	193 65	143 07	50 58	117	2,845	2,959	16	2,648 04	.....
91	Forrester's Falls	23 89	15 00	33 25	71 42	143 56	135 67	7 89	240	564	2,339	1	300 27	.....
92	Fort Erie	47 83	35 00	39 09	11 04	132 96	132 96	.....	106	2,917	3,721	.....	1,848 00	4 17
93	Fort Frances	63 12	40 00	44 00	16 58	163 70	138 18	25 52	119	1,254	2,751	11	1,298 60	9 62
94	Gananoque	102 97	250 00	274 00	92 52	719 49	621 52	97 97	202	3,519	12,591	20	2,793 49	.....
95	Glamis	100 00	20 00	10 75	41 62	172 37	172 37	.....	68	678	1,151	.....	446 00	.....
96	Glen Allan	31 38	.....	10 25	14 00	55 63	55 02	61	105	1,210	866	.....	970 29	.....
97	Glen Cross	20 92	15 00	18 30	23 66	77 88	55 17	22 71	100	146	873	2	77 88	.....
98	Glenmorris	.....	50 00	28 80	12 47	91 27	87 00	4 27	100	2,465	1,115	16	1,969 50	.....
99	Gore's Landing	38 52	.....	44 55	142 27	225 34	178 19	47 15	119	988	876	.....	930 92	.....
100	Goulais Bay	48 50	.....	2 00	39 50	90 00	3 50	86 50	.....	319	.....	1	175 00	.....
101	Haileybury	19 76	.....	29 25	37 65	86 66	54 74	31 92	129	468	1,052	.....	250 00	.....
102	Haliburton	30 70	25 00	25 25	48 14	129 09	101 19	27 90	101	833	1,453	.....	417 00	.....
103	Hanover	25 04	25 00	27 40	113 30	190 74	186 48	4 26	159	902	2,356	.....	662 27	10 50
104	Harrington	.....	.....	52 50	50 40	102 90	81 78	21 12	105	890	1,020	.....	468 00	.....
105	Harrow	42 07	62 00	42 05	33 47	179 59	141 18	38 41	124	1,083	2,448	16	542 70	.....
106	Harrowsmith	33 43	.....	16 75	.....	50 18	35 30	14 88	67	309	708	.....	250 89	.....
107	Hawkesbury	.....	.....	195 00	20 60	215 60	211 15	4 45	114	370	68	.....	198 45	.....

108 Hawkesville		25 00	12 15	10 64	17 09	13 10	1 20	106	[illegible]	714		378 04	
109 Hensall	100 17	85 00	32 85	72 13	[illegible] 15	280 93	0 22	131	1,510	2,071		1,208 58	70 00
110 Hepworth	10 77		17 25		28 02	28 02		102	1,011	1,317		610 86	
111 Highland Creek	24 11		18 00	41	42 52	81 00	11 52	112	1,471	998		1,248 00	
112 Hillsdale	50 96		80 25	10 00	141 21	110 77	30 44	114	804	2,504		433 00	25 00
113 Holstein	35 04		61 00	159 94	255 98	233 25	22 73	128	897	2,064		610 05	
114 Honeywood	18 70		30 50	86 25	135 45	78 98	56 47	109	423	869		165 00	
115 Huntsville	125 00	175 00	74 50	15 75	390 25	378 55	11 70	115	3,130	8,483	20	2,270 00	
116 Inwood	49 93		35 75	57 04	142 72	134 58	8 14	86	401	1,386		273 35	25 00
117 Islington	49 00	10 00	41 20	4 40	104 60	104 14	46	116	1,724	2,085	11	935 00	
118 Jarvis	40 38		103 25	2 56	146 19	142 15	4 04	108	3,041	1,903	22	1,550 00	179 00
119 Jasper	70 00		17 50	4 72	92 22	80 20	12 02	62	607	785		405 00	
120 Kemble	39 57		16 45	103 66	159 68	158 33	1 35	105	1,004	832		695 60	33 00
121 Kincardine	82 34	160 00	73 05	99 35	414 74	413 70	1 04	187	4,577	9,691	48	3,725 00	344 50
122 Kingston	161 72	400 00	270 00	55 49	887 21	856 06	31 15	238	5,340	27,180	40	6,200 00	78 58
123 Kinmount	91 68	50 00	37 00	91 95	270 63	262 82	7 81	120	1,681	2,779		1,245 75	
124 Kirkfield	8 80	50 00	40 25	123 08	222 13	203 06	19 07	143	2,602	1,492	16	1,012 43	10 00
125 Komoka	66 33	10 00	50 85	5 00	132 18	122 89	9 29	102	335	1,020		217 66	
126 Lake Charles			25 00	8 50	33 50	20 50	13 00	100	2,088	1,698		1,460 82	
127 Lefroy	39 13	25 00	27 50	23 87	115 50	101 31	14 19	120	458	1,917		300 00	35 00
128 Little Britain	39 85	50 00	25 05	101 44	216 34	211 69	4 65	114	2,095	2,059	21	1,787 10	
129 Lucan	26 76	50 00	19 90	15 99	112 65	112 65		115	2,126	2,074		1,818 00	
130 Lynden	9 81	10 00	23 95	18 11	61 87	61 75	12	134	1,388	1,674		740 89	
131 Maberley			5 50	18 25	23 75	23 75		112	364	486		201 50	14 68
132 Madoc	105 31		81 88	147 39	334 58	315 96	18 62	150	1,735	5,830		1,170 00	
133 Mallorytown	32 81		94 00	12 25	139 06	139 06		175	1,392	2,099		1,025 44	20 54
134 Manilla	100 92	50 00	19 15	27 21	197 28	192 81	4 47	111	2,682	1,549	1	1,978 74	
135 Manotick			28 00	24 67	52 67	52 67		107	1,803	2,132		1,217 44	11 62
136 Maple	32 91	20 00	19 50	50 65	123 06	115 63	7 43	155	730	1,740	14	609 43	
137 Markham	41 34		65 00	170 05	276 39	204 39	72 00	128	3,098	8,870		2,407 00	4 00
138 Marksville		25 00	26 50	10 70	62 20	62 20		105	871	1,833		580 46	62 64
139 Matilda (Iroquois)	20 00		10 00	45 78	75 78	75 78		162	391	8,067		264 87	
140 Meaford	47 72	75 00	103 50	310 84	537 06	447 92	89 14	216	2,795	4,867	26	2,150 00	
141 Melancthon				22 85	22 85	22 85		43	1,099	474		572 38	10 43
142 Melbourne	67 48	20 00	25 50	53 53	166 51	164 42	2 09	102	1,199	1,022		625 00	129 00
143 Metcalfe			31 00	19 30	50 30	50 00	30	117	682	1,555		475 00	
144 Middleville		3 00	16 40	61 00	80 40	65 46	14 94	76	675	833		325 00	
145 Mildmay	70 30	40 00	17 10	30 68	158 08	157 93	15	107	2,073	1,792		1,177 70	17 67
146 Millgrove	14 60		6 25	41 86	62 71	57 34	5 37	121	529	1,129	3	317 87	
147 Milton	29 74		57 10	74 11	160 95	142 31	18 64	174	3,517	3,614	8	4,200 00	
148 Minden	33 43	25 00	23 00	33 78	115 21	102 02	13 19	102	1,217	1,699		938 67	
149 Mississippi	69 57		25 00	1 25	95 82	95 82		68	1,203	890		700 00	
150 Molesworth	50 32	15 00	17 92	250 66	333 90	261 58	72 32	87	793	1,306		549 82	
151 Monkton	43 54	20 00	32 00	11 64	107 18	107 18		112	1,449	2,127		1,000 00	34 00
152 Mono Road		9 50	31 50	38 02	79 02	78 35	67	103	2,658	1,556		1,263 00	

TABLE A.—Receipts, Expenditures, Assets and Liabilities, etc.—*Continued.*

Number.	Public Libraries.	Receipts.					Expenditure.	Balance on hand.	Number of members.	Number of volumes in library.	Number of volumes issued.	Number of newspapers and periodicals.	Assets.	Liabilities.
		Legislative grants.	Municipal grants.	Members' fees.	Balances and other sources.	Total receipts.								
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.					$ c.	$ c.
153	Morrisburg	85 59	75 00	144 70	72 61	377 90	377 90	.....	123	2,726	4,259	30	1,325 00	66 01
154	Morriston	17 35	.....	35 25	7 84	60 44	60 05	39	101	1,324	1,571	3	763 75	.....
155	Mount Albert	43 97	25 00	20 40	54 23	143 60	143 60	.....	109	868	1,625	.....	635 08	39
156	Mount Forest	59 00	100 00	68 25	30 35	257 60	248 72	8 88	142	3,097	3,981	14	3,134 35	.....
157	Nanticoke	35 16	.....	14 00	71 64	120 80	106 28	14 52	145	2,010	1,284	.....	1,427 45	.....
158	Napanee	162 29	125 00	234 25	166 18	687 72	650 93	36 79	221	4,598	12,868	37	3,386 79	.....
159	Newboro'	99 60	.....	17 80	10 07	127 47	5 63	121 84	104	435	915	.....	329 22	172 20
160	Newburgh	47 88	40 00	49 17	71 95	209 00	209 00	.....	100	2,060	1,547	22	1,430 00	107 00
161	New Durham	45 45	.....	49 00	50 84	145 29	127 63	17 66	105	912	901	.....	473 24	93 96
162	New Hamburg	99 68	75 00	57 00	5 30	236 98	222 98	14 00	114	2,820	4,113	.....	2,063 98	34 85
163	New Dundee	.....	30 00	14 30	40 21	84 51	65 91	18 60	66	760	957	.....	449 64	.....
164	Newmarket	35 95	200 00	12 10	13 42	261 47	261 47	.....	488	2,302	6,407	28	950 00	.....
165	Niagara	107 41	50 00	150 55	4 20	312 16	308 94	3 22	117	6,456	10,519	27	5,386 00	.....
166	Norland	49 00	50 00	15 25	42 23	156 48	152 50	3 98	70	544	1,219	.....	370 00	155 00
167	North Gower	31 81	.....	34 25	48 24	114 34	107 50	6 84	116	1,964	3,603	.....	775 00	.....
168	Norwich	107 26	50 00	79 60	38 11	274 97	249 53	25 44	102	1,955	3,407	25	1,330 44	.....
169	Norwood	120 73	50 00	25 70	45 58	242 01	196 50	45 51	236	2,314	3,350	13	1,447 00	.....
170	Oakville	48 63	100 00	71 65	23 20	243 48	242 73	75	160	3,604	3,288	13	2,860 00	.....
171	Oakwood	26 08	50 00	24 60	138 82	239 50	239 50	.....	132	1,750	918	13	994 54	.....
172	Odessa	31 20	.....	27 75	153 70	212 65	202 82	9 83	132	1,032	2,524	13	528 00	31 40
173	Omemee	53 82	100 00	42 50	54 30	250 62	231 60	19 02	103	1,180	1,780	25	550 00	.....
174	Orillia	108 16	200 00	254 00	50 29	612 45	605 51	6 94	275	4,576	8,561	26	4,355 00	240 00
175	Orono	49 92	.....	39 00	4 00	92 92	87 74	5 18	101	1,269	1,973	.....	1,072 07	70 00
176	Owen Sound	76 13	.....	233 57	56 00	365 70	365 70	.....	235	5,974	10,528	23	5,000 00	36 20
177	Oxford Mills	.....	.....	13 25	38 00	51 25	51 25	.....	106	1,274	3,753	.....	1,028 24	16 02
178	Pakenham	10 85	.....	14 00	313 68	338 53	151 31	187 22	28	195	142	.....	340 29	10 80
179	Pelee Island	.....	.....	5 00	49 76	54 76	23 80	30 96	20	316	235	.....	286 90	.....
180	Peterborough	133 70	.....	444 05	641 55	1,219 30	984 55	234 75	376	10,262	12,689	89	12,315 80	240 00
181	Petrolea	61 84	.....	102 54	56 99	221 37	221 37	.....	120	1,016	3,108	....	766 04	78 85
182	Pickering	34 51	40 00	46 10	53 22	173 83	149 12	24 71	115	1,681	2,795	.....	1,074 76	45 00

183	Pinkerton	78	22	30	00	25	00	53	47	180	69	185	16	1	53	160	1,603	1,666	3	1,125	82		
184	Plattsville	20	07			47	00	105	33	263	30	263	16		16	133	1,013	1,562		670	00		
185	Point Edward	100	00	67	70	105	00	6	76	279	46	262	72	16	74	116	3,000	2,077		4,075	29		
186	Port Arthur	89	71	439	21	160	00	62	76	781	68	642	96	108	72	206	2,447	4,171	25	3,344	57		
187	Port Burwell	30	23			18	40	26	08	74	71	74	71			90	857	802		432	50	70	39
188	Port Credit	39	32	20	00	17	25	21	12	97	69	97	13		26	116	1,766	1,765		1,130	68		
189	Port Dover	34	54			60	50	34	95	129	99	106	59	23	43	103	926	2,159	7	645	00		
190	Port Elgin	51	07			32	00	15	30	98	37	89	33	9	04	130	3,251	3,139	17	2,018	53		
191	Port Hope	146	25			213	15	304	20	663	60	663	60			177	4,526	7,213	37	5,087	08	175	00
192	Port Perry	88	92	85	00	103	50	226	91	504	33	504	33			171	2,221	4,227	21	1,675	00	47	91
193	Port Stanley	27	19	25	00	36	00	1	15	89	34	88	98		36	106	1,262	1,893		955	00		
194	Priceville	72	40			11	50	31	65	115	55	112	48	3	07	43	335	844		208	39	57	81
195	Princeton	101	86	15	00	33	75	8	02	158	63	112	81	45	82	86	1,989	1,880		1,230	00		
196	Rat Portage (Kenora P. O.)	136	88	300	00	218	00	403	56	1,058	44	1,044	66	13	78	170	3,668	10,684	28	3,024	11	440	25
197	Richmond	45	75			44	00	3	55	93	30	93	29		01	108	1,496	1,658		1,118	00		
198	Ridgetown	88	57	40	00	99	25	38	93	266	75	265	65	1	10	184	3,733	4,102	31	4,700	00	40	90
199	Ripley	27	99	50	00	71	00	44	51	193	50	150	50	43	00	123	1,855	3,671		1,504	84		
200	Riversdale	20	97	25	00	8	25	11	85	66	07	57	07	9	00	107	970	929		696	08		
201	Rockwood	32	35			45	75	79	71	157	81	102	63	55	18	104	1,521	1,829	13	570	00		
202	Rodney	37	44	10	00	15	00	4	07	66	51	66	51			65	1,125	1,563		1,084	68		
203	Romney	58	60	40	00	37	10	21	28	156	98	119	10	37	88	125	2,546	1,250		1,966	91	10	25
204	Russell	33	67			56	90	189	15	279	72	250	02	29	70	133	1,727	1,781	26	2,734	72	250	00
205	Saltfleet (Stony Creek P. O.)	100	00	75	00	36	10	24	35	235	45	223	21	12	24	147	1,207	3,368		927	25		
206	Scarboro'	74	03			80	20	38	40	192	63	163	60	29	03	104	5,683	2,817		4,072	60		
207	Schreiber	37	26			244	65	1,027	44	1,309	35	864	24	445	11	213	1,676	3,672	12	2,860	28	300	00
208	Scotland	69	20			48	25	103	73	221	18	201	80	19	38	113	1,277	1,678	22	986	89		
209	Severn Bridge	48	67			26	35	65	88	140	90	139	35	1	55	32	975	1,433		307	33		
210	Shakespeare	12	00			34	00	59	16	105	16	103	68	1	48	36	1,589	2,157	7	1,042	60	25	00
211	Shedden	49	93	25	00	55	35	72	99	203	27	192	40	10	87	103	1,394	1,594		728	25	20	00
212	Smithville	91	59	30	00	74	50	152	61	348	70	329	42	19	28	149	948	2,618		761	75	4	00
213	Southampton	34	06	27	82	51	35	74	95	188	18	114	60	73	58	135	4,632	2,580	21	3,591	19		
214	South River			15	00	26	40	64	38	105	78	18	00	87	78	103	960	1,525		1,175	42		
215	Sparta	23	49	60	00	31	50	110	44	225	43	176	20	49	23	110	2,458	2,661		1,907	38		
216	Speedside					88	25	52	20	140	45	133	47	6	98	118	207	735		129	71	25	00
217	Spencerville	14	40	10	00	17	00	71	70	113	10	113	10			131	620	784		300	00	84	00
218	Springfield			26	00	15	00	23	84	64	84	43	59	21	25	60	1,620	1,242		1,046	25	244	22
219	Stirling	153	74	40	00	52	50	46	05	292	29	135	71	156	58	124	661	3,053		385	72		
220	Strathroy	139	08	75	00	163	75	476	77	854	60	837	90	16	70	288	6,311	19,897	26	5,700	00		
221	St. George	69	23	50	00	108	70	312	80	540	73	478	21	62	52	133	4,782	2,985	13	5,512	71		
222	St. Helens	25	75	35	00	21	78	13	72	96	25	81	97	14	28	110	1,745	1,096		1,150	00		
223	Sunderland	77	88	55	00	18	75	131	22	282	85	238	47	44	38	120	1,950	1,145	26	1,496	00		
224	Sunnidale (New Lowell P.O.)			15	00	16	10	62	24	93	34	87	40	5	94	93	770	821		400	00		

TABLE A.—Receipts, Expenditures, Assets and Liabilities, etc.—*Concluded.*

Number.	Public Libraries.	Receipts.					Expenditure.	Balance on hand.	Number of members.	Number of volumes in library.	Number of volumes issued.	Number of newspapers and periodicals.	Assets.	Liabilities.
		Legislative grants.	Municipal grants.	Members' fees.	Balances and other sources.	Total receipts.								
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.					$ c.	$ c.
225	Sydenham	68 74	.....	65 60	109 97	244 31	240 62	3 69	178	626	6,049	23	275 00	.....
226	Tavistock	127 05	.....	78 00	287 75	492 80	391 76	101 04	104	3,507	9,885	27	1,938 80	.....
227	Teeswater	116 68	30 00	111 70	128 16	386 54	291 76	94 78	224	3,916	3,904	16	2,250 00	.....
228	Thamesford	37 22	.....	47 80	54 29	139 31	137 31	2 00	128	1,871	2,679	16	1,355 90	.....
229	Thamesville	12 52	125 00	91 50	285 15	514 17	462 48	51 69	104	3,591	3,318	21	3,096 40	194 90
230	Thedford	62 33	.....	54 50	37 83	154 66	146 61	8 05	108	2,220	5,360	.....	1,115 00	.....
231	Thornbury	53 83	25 00	22 50	1 80	103 13	76 97	26 16	156	1,282	2,455	.....	490 00	.....
232	Tilbury	26 61	75 00	79 50	119 28	300 39	300 39	.....	117	1,985	3,334	16	1,438 28	26 85
233	*Tilbury E. (Valelle P.O.)	32 87	35 00	8 00	.....	75 87	67 94	7 93	.....	1,682	.....	.....	.....	.....
234	Tilsonburg	83 54	100 00	120 00	116 13	419 67	418 65	1 02	190	2,984	5,885	18	2,000 00	.....
235	Tiverton	.....	30 00	32 60	100 66	163 26	144 17	19 09	100	2,304	2,659	.....	805 00	.....
236	Toronto Junction	97 83	300 00	138 50	198 52	734 85	595 41	139 44	181	3,632	5,882	36	2,800 00	.....
237	Underwood	50 51	35 00	35 00	9 16	129 67	123 80	5 87	179	2,687	3,531	.....	1,178 02	.....
238	Unionville	28 27	30 00	27 00	28 75	114 02	111 72	2 30	118	721	3,039	.....	492 00	.....
239	Vankleek Hill	73 31	.....	44 50	12 89	130 70	130 70	.....	130	1,058	2,693	1	1,017 07	6 59
240	Victoria (Caledonia P.O.)	45 40	... .	17 00	78 82	141 22	133 59	7 63	136	2,579	1,476	.....	1,868 57	.....
241	Victoria Mines	36 85	20 00	16 00	.....	72 85	2 96	69 89	17	370	367	.....	159 33	.....
242	Vienna**	100 00	.....	19 00	.....	119 00	119 00	.....	38	504	271	.....	234 00	130 00
243	Wales	70 13	.....	42 50	98 68	211 31	211 31	.....	137	1,252	3,223	.....	864 77	.....
244	Walkerton	65 86	170 00	92 25	59 21	387 32	387 24	08	121	3,447	6,185	17	1,978 69	20 00
245	Walton	.....	20 00	42 28	7 41	69 69	51 55	18 14	106	1,417	2,631	13	465 00	105 12
246	Wardsville	19 30	.....	11 30	14 01	44 61	33 50	11 11	77	1,394	1,230	.....	928 46	57 00
247	Warkworth	43 75	35 00	28 85	135 01	242 61	201 77	40 84	102	1,165	893	16	575 00	167 39
248	Waterdown	50 38	30 00	28 60	42 25	151 23	141 39	9 84	164	1,449	2,158	.....	410 00	18 00
249	Welland	99 89	100 00	77 10	60 81	337 80	281 14	56 66	169	3,938	5,237	33	4,588 26	.....
250	Wellesley	.... 53 90	25 00	34 25	95 89	209 04	209 04	.....	130	1,590	3,014	.....	1,118 57	.....
251	Westport	.....	.....	60 00	.....	60 00	60 00	.....	.....	256	625	.....	300 00	.....
252	Weston	23 83	50 00	39 75	6 33	119 91	119 56	35	130	3,282	4,108	28	2,350 00	26 29

[illegible]	Wheatley	40 45	80 00	74 00	85 00	389 40	370 70	18 70	109	1,695	2,805	.....	1,150 00	68 50
254	Whitby	66 00	76 00	94 15	107 57	332 71	318 03	14 68	101	3,291	5,098	.....	2,100 00	94 00
255	White Lake	34 35	.....	.....	43 07	77 42	66 02	11 40	125	827	574	.....	445 11	.....
256	Williamstown	57 57	36 00	25 75	11 19	129 51	96 18	33 33	108	1,053	1,835	.....	1,457 76	20 00
257	Winchester	.....	.....	62 25	26 88	89 13	79 76	9 37	158	775	.....	20	491 00	11 05
258	Wingham	125 94	325 00	75 35	60 47	586 76	573 55	13 21	414	3,833	11,863	49	2,640 00	.....
259	Wolfe Island	.....	.....	4 50	7 74	12 24	5 00	7 24	47	337	263	.....	220 00	.....
260	Woodbridge	42 33	.....	25 00	95 36	162 69	107 83	54 86	110	1,922	1,306	14	1,729 86	.....
261	Woodville	24 60	75 00	26 90	90 22	216 72	193 20	23 52	116	2,334	1,843	23	1,020 00	.....
262	Yarker	12 15	50 00	4 00	.....	66 15	54 64	11 51	100	522	1,295	.....	232 83	.....
263	York	41 50	25 00	14 50	4 93	85 93	77 25	8 68	117	967	2,480	.....	637 00	.....
264	Zepher	49 21	24 87	12 00	7 49	93 57	81 57	12 00	50	1,327	1,037	.....	704 41	95 18
	Total	12,645 71	102,51 28	14,070 53	20,718 14	57,685 66	51,250 91	6,434 75	32,303	504,963	757,191	2,108	389,244 95	9,179 95

*Library closed, books transferred to Tilbury Public Library.

**Library closed, books transferred to Vienna High School.

II. PUBLIC LIBRARIES, FREE.

The following extracts are taken from the annual reports for the yea ending 31st December, 1904. (For details see Table B).

1. Classification of Free Libraries Reporting.

Free Libraries, with reading rooms	90
Free Libraries, without reading rooms	43
Total	133

2. Free Libraries—Receipts and Balances on Hand.

The total receipts of 133 Free Libraries was	$162,075 11
Balances on hand	8,490 05

3. Free Libraries—Expenditure.

The total expenditure of 133 Free Libraries was	$153,585 06

4. Free Libraries—Assets and Liabilities.

Assets of 133 Free Libraries	$1,005,217 56
Liabilities of 133 Free Libraries	104,744 07

5. Number of Readers in Free Libraries.

133 Free Libraries report having had 147,182 readers.

6. No. of Volumes in Free Libraries, and No. of Volumes Issued.

Number of volumes in 133 Free Libraries	648,815
Number of volumes issued in 133 Free Libraries	1,750,042

7. Reading Rooms in Free Libraries.

90 Free Libraries reported having reading rooms.
92 Free Libraries subscribed for 3,848 newspapers and periodicals.

TABLE B.—Receipts, Expenditures, Assets and Liabilities of Public Libraries (Free) for the year ending 31st December, 1904.

Number.	Free Libraries.	Receipts.					Expenditure.	Balance on hand.	Number of members.	Number of volumes in library.	Number of volumes issued.	Number of newspapers and periodicals.	Assets.	Liabilities.
		Legislative grants.	Municipal grants.	Members' fees.	Balances and other sources.	Total receipts.								
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.					$ c.	$ c.
1	Acton	24 73	150 00	.....	16 38	191 11	151 84	39 27	252	2,155	3,588	.....	2,210 78	.....
2	Ailsa Craig	68 78	100 00	4 10	121 86	294 74	213 46	81 28	156	2,516	2,590	.....	2,190 31	.....
3	Alton	65 05	.....	.....	31 06	96 11	96 11	.....	197	4,449	3,709	.....	4,613 53	.....
4	Alvinston	102 53	100 00	19 65	31 55	253 73	253 73	.....	525	1,824	1,878	.....	1,300 00	196 56
5	Arnprior	50 79	100 00	.....	47 26	198 05	169 07	28 98	200	2,540	5,145	.....	1,428 98	.....
6	Athens	56 09	60 00	24 74	87 41	228 24	195 06	33 18	174	1,544	1,333	16	1,040 00	.....
7	Aylmer	129 69	300 00	34 40	26 79	490 88	459 21	31 67	519	4,413	11,078	29	3,816 00	42 00
8	Ayr	45 94	139 50	4 25	83 05	272 74	265 45	7 29	320	3,275	5,782	26	1,800 00	.....
9	Belfountain	84 45	25 00	.....	1 55	111 00	111 00	.....	150	2,301	1,768	.....	900 00	.....
10	Belleville	150 65	800 00	.....	340 96	1,291 61	1,263 94	27 67	1,803	5,634	34,467	52	4,700 00	.....
11	Berlin	143 83	1,819 84	.....	106 15	2,069 82	2,069 82	.....	926	7,138	140,75	71	31,967 98	.....
12	Bothwell	65 23	100 00	.....	102 70	267 93	258 22	9 71	198	2,268	5,146	.....	1,550 00	.....
13	Bracebridge	125 40	413 50	32 97	122 76	694 63	691 43	3 20	394	2,174	9,143	25	2,106 18	.....
14	Brampton	133 25	470 00	.....	42 83	646 08	623 97	22 11	438	4,511	13,492	23	3,050 00	.....
15	Brantford	250 00	3,000 00	10 00	1,293 39	4,553 39	4,553 39	.....	2,885	19,840	56,394	136	57,000 00	.....
16	Brighton	121 23	195 00	.....	35 30	351 53	343 77	7 76	274	3,239	5,490	23	1,657 76	.....
17	Brockville	243 93	1,200 00	29 25	298 05	1,771 23	1,741 22	30 01	2,726	10,524	40,025	53	22,500 00	.....
18	Brussels	96 17	153 00	.....	181 83	431 00	390 89	40 11	256	3,121	3,774	23	1,800 00	.....
19	Burk's Falls	20 67	400 00	.....	42 28	462 95	385 42	77 53	321	2,222	3,596	18	1,302 53	.....
20	Caledon	29 34	.....	15 75	243 20	288 29	218 26	70 03	105	3,501	1,445	.....	2,734 93	.....
21	Caledonia	95 57	50 00	.....	161 45	307 02	174 90	132 12	250	1,758	5,937	.....	1,625 80	.....
22	Camden East	48 07	.....	.....	94 77	142 84	142 84	.....	232	1,881	1,738	16	1,060 71	176 89
23	Cardinal	17 95	150 00	.....	154 58	322 53	263 07	59 46	214	4,837	2,909	23	1,100 00	.....
24	Carleton Place	116 10	300 00	.....	352 87	768 97	479 74	289 23	422	4,538	8,636	18	3,150 00	.....
25	Cayuga	20 20	50 00	16 50	3 00	89 70	78 92	10 78	100	1,820	1,441	.....	10 75	28 56
26	Chatham	165 45	1,425 00	.....	297 61	1,888 06	1,739 99	148 07	650	6,481	17,851	40	25,508 49	.....
27	Chesley	87 89	197 35	.....	104 48	389 72	249 82	139 90	318	2,039	8,203	24	905 00	.....
28	Chesterville	115 47	50 00	.....	195 98	361 45	223 29	138 16	354	1,642	5,921	.....	1,443 27	.....
29	Clifford	59 78	100 00	14 20	.....	173 98	161 04	12 94	230	3,764	2,244	.....	1,884 29	.....
30	Clinton	152 03	165 00	.....	456 25	773 28	691 42	81 86	937	4,964	13,595	36	13,827 32	.....

TABLE B.—*Continued.*

Number.	Free Libraries.	Receipts.					Expenditure.	Balance on hand.	Number of members.	Number of volumes in library.	Number of volumes issued.	Number of newspapers and periodicals.	Assets.	Liabilities.
		Legislative grants.	Municipal grants.	Members' fees.	Balances and other sources.	Total receipts.								
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.					$ c.	$ c.
31	Cobden	25 56	63 56	9 65	.....	98 77	82 83	15 94	117	756	1,501	.....	640 67	5 65
32	Collingwood	45 90	1,250 00	.....	5,846 34	7,142 24	7,128 22	14 02	683	5,215	13,237	45	21,270 09	.....
33	Copleston	48 90	.....	.....	.....	48 90	48 90	.....	99	1,350	1,374	.....	800 00	.....
34	Cornwall	127 25	500 00	37 80	210 96	876 01	677 05	198 96	824	3,588	13,555	40	10,700 00	.....
35	Creemore	28 96	25 00	.....	24 66	78 62	75 73	2 89	114	1,304	1,536	.....	600 00	.....
36	Dalhousie (McDonald's Cors. P.O)	11 83	.....	4 50	61 09	77 42	75 94	1 48	44	772	249	.....	480 00	.....
37	Deseronto	131 20	600 00	.....	139 50	870 70	810 41	60 29	902	4,359	35,686	45	2,636 71	31 63
38	Delhi	67 00	160 00	.....	53 69	280 69	258 99	21 70	196	1,766	4,395	15	1,316 96	.....
39	Don	37 69	25 00	10 00	14 61	87 30	87 30	.....	120	1,142	440	.....	768 97	.....
40	Drayton	70 63	150 00	.....	111 59	332 22	329 22	3 00	397	3,199	9,778	22	1,414 96	240 55
41	Dutton	36 21	75 00	34 34	120 98	266 53	266 53	.....	135	1,838	2,335	.....	1,447 23	43 39
42	Erin	28 50	65 00	.....	9 80	103 30	90 29	13 01	162	2,087	3,622	.....	1,463 79	.....
43	Exeter	106 00	.....	19 00	68 81	193 81	145 24	48 57	523	4,492	10,038	22	2,535 00	.....
44	Forest	90 64	325 00	.....	115 56	531 20	431 74	99 46	464	3,758	9,070	18	3,340 00	30 00
45	Galt	250 00	1,475 00	.....	201 53	1,926 53	1,483 62	442 91	2,200	6,051	29,320	59	6,900 00	.....
46	Garden Island	101 73	250 00	46 50	272 11	670 34	670 34	.....	138	5,960	1,769	37	3,686 09	.....
47	Georgtown	96 96	200 00	7 25	113 51	417 72	320 78	96 94	340	2,998	8,748	31	2,350 00	.....
48	Glencoe	100 62	140 00	12 00	10 94	263 56	256 13	7 43	265	2,503	3,275	.....	1,210 00	.....
49	Goderich	110 92	415 00	.....	174 21	700 13	491 56	208 57	613	4,406	10,509	34	1,750 00	.....
50	Grand Valley	58 64	197 91	.....	9 90	266 45	263 74	2 71	195	2,559	2,205	14	1,600 04	.....
51	Grantham (St. Catharines P.O.)	100 00	75 00	.....	34 52	209 52	196 26	13 26	277	2,368	1,824	.....	1,558 00	.....
52	Gravenhurst	47 00	200 00	.....	.....	247 00	200 78	46 22	543	2,563	6,739	.....	1,150 00	34 86
53	Grimsby	132 97	335 00	.....	.....	467 97	440 39	27 58	762	4,647	16,416	23	3,827 58	.....
54	Guelph	250 00	1,700 00	.....	108 15	2,058 15	2,057 99	16	1,200	11,826	58,224	49	12,285 00	.....
55	Hagersville	26 69	100 00	7 10	26 01	159 80	159 80	.....	276	2,067	5,136	14	1,537 82	2 90
56	Hamilton	250 00	12,650 00	.....	978 55	13,878 55	13,792 83	85 72	14,424	26,517	117,369	151	71,373 62	20,242 91
57	Harriston	73 31	225 00	6 25	46 30	350 86	331 81	19 05	395	4,532	6,230	29	2,913 00	39 00
58	Hespeler	102 34	275 00	.....	122 26	499 60	409 69	89 91	401	3,542	9,371	29	2,750 00	.....

59	Ingersoll.	108 06	676 00		121 03	808 58	701 04	56 04	800	4,501	161 94	25	2,100 00	....
60	Iroquois	[illegible]	150 00	....	155 38	380 10	379 05	1 05	283	2,097	6,091	26	1,300 00	120 00
61	Kemptville	77 00	286 00	....	422 84	785 03	612 14	173 70	379	1,546	7,308	21	1,222 78	176 83
62	Kingsville	116 70	200 00	....	104 06	510 76	423 00	87 76	240	1,088	5,194	25	1,552 00	50 00
63	Lakefield..........	62 43	100 00	2 00	24 47	188 90	174 82	14 08	1,650	1,313	2,275	20	650 00	....
64	Lanark............	121 96	84 50	1 00	50 13	257 59	213 65	43 94	230	1,776	4,421	......	1,363 00	....
65	Lancaster..........	100 36	40 00	....	671 86	812 22	763 42	48 80	303	3,439	3,333	12	5,099 65	....
66	Leamington........	101 55	200 00	....	182 22	483 77	419 10	64 67	318	1,939	5,266	22	1,550 00	....
67	Lindsay	180 24	944 05	28 04	10,505 84	11,658 17	11,616 64	41 53	516	3,941	19,607	51	17,216 53	248 87
68	Listowel..........	121 06	300 00	45 85	69 25	536 16	536 16	....	627	3,353	10,465	20	1,110 00	....
69	Little Current.....	40 00	55 00	....	....	95 00	73 64	21 36	200	1,542	3,112	......	814 00	2 50
70	London	250 00	8,000 00	....	554 95	8,804 95	8,751 83	53 12	3,000	18,064	69,896	170	50,059 00	19,000 00
71	Lucknow..........	22 22	100 00	38 45	45 74	206 41	189 31	17 10	263	2,982	3,622	......	1,575 00	26 55
72	Markdale..........	100 77	125 00	15 80	14 68	256 25	256 25	....	152	2,897	3,601	19	2,735 00	51
73	Marlbank..........	46 63	....	....	62 09	108 72	108 72	....	247	703	1,499	17	532 90	....
74	Merrickville.......	100 04	125 00	10 30	166 79	402 13	394 73	7 40	210	3,035	5,494	......	2,541 99	237 59
75	Merritton..........	51 40	100 00	....	29 00	180 40	169 59	10 81	499	2,087	5,075	......	1,385 92	....
76	Midland	110 99	380 01	4 50	20 27	515 77	507 65	8 12	566	2,834	9,008	24	1,040 00	....
77	Millbrook..........	75 93	175 00	....	204 07	455 00	311 65	143 35	308	2,176	7,158	29	1,593 35	300 00
78	Milverton	101 50	60 00	5 70	92 98	260 18	242 55	17 63	201	2,330	3,117	......	1,767 91	....
79	Mitchell	79 28	335 00	16 30	126 71	557 29	435 28	122 01	221	4,117	8,541	25	5,090 89	....
80	Newington.........	72 24	....	36 15	89 21	197 60	197 60	....	100	647	258	......	1,893 81	83 25
81	Niagara Falls......	156 85	775 00	117 95	147 43	1,197 23	1,193 86	3 37	809	7,745	16,891	27	7,225 00	....
82	North Bay.........	66 72	150 25	....	18 98	235 95	235 95	....	334	2,143	4,405	16	1,600 00	18 98
83	Orangeville........	130 67	404 25	16 00	63 67	614 59	521 86	92 73	557	3,899	7,519	33	3,700 00	150 00
84	Oshawa...........	112 30	795 40	....	245 28	1,152 98	1,062 66	90 32	982	4,769	15,297	40	2,125 00	....
85	Otterville	....	52 74	....	20 67	73 41	36 18	37 23	110	866	1,597	......	577 78	37 10
86	Paisley............	63 53	251 00	24 15	6 11	344 79	344 79	....	275	4,498	4,238	22	2,800 00	....
87	Palmerston........	118 86	275 00	....	152 07	545 93	486 17	59 76	......	2,249	....	19	1,724 00	....
88	Paris..............	88 00	500 00	30 50	405 35	1,023 85	913 14	110 71	414	6,540	5,065	35	20,110 71	....
89	Parkhill...........	9 19	24 75	....	25 95	59 89	46 75	13 14	390	2,156	2,636	......	1,153 32	....
90	Parry Sound	49 02	310 00	....	150 33	509 35	456 90	52 45	154	2,002	4,270	......	1,225 00	18 00
91	Pembroke.........	130 78	603 96	....	169 79	904 53	858 74	45 79	694	2,409	7,103	25	1,395 79	40 00
92	Penetanguishene...	93 52	343 91	....	....	437 43	437 43	....	361	5,028	9,674	6	3,035 00	....
93	Picton	150 31	693 00	9 00	56 46	908 77	797 41	111 36	800	3,345	23,835	30	2,100 00	....
94	Port Carling......	21 15	75 39	11 75	62 73	171 02	161 77	9 25	135	1,439	1,153	14	675 00	25 00
95	Port Colborne	43 85	100 00	....	60 34	204 19	195 84	8 35	248	1,991	4,494	......	1,375 24	....
96	Port Rowan	....	60 00	15 40	161 58	236 98	236 98	....	333	2,174	3,371	5	1,555 00	342 33
97	Prescott	125 59	275 00	....	55 33	455 92	448 41	7 51	930	5,248	10,506	24	5,450 00	....
98	Preston	106 99	250 00	....	167 52	524 51	423 72	100 79	471	6,446	5,767	22	6,575 40	....
99	Renfrew..........	43 97	300 00	3 00	39 40	386 37	305 69	80 68	330	3,845	21,386	15	3,537 96	99 00
100	Richmond Hill ...	71 74	100 00	3 25	39 54	214 53	174 55	39 98	175	3,200	2,472	23	1,950 00	....
101	Ridgeway	51 26	25 00	....	66 16	142 42	139 28	3 14	120	1,430	2,463	......	1,060 09	25 00
102	Sarnia............	250 00	1,322 79	....	2,008 74	3,581 53	3,370 05	211 48	1,600	4,809	26,412	57	19,590 62	....
103	Sault Ste. Marie...	132 40	440 00	125 75	137 68	835 83	696 39	139 44	724	2,608	16,691	21	1,000 00	....

TABLE B.—*Concluded.*

Number.	Free Libraries.	Receipts.					Expenditure.	Balance on hand.	Number of members.	Number of volumes in library.	Number of volumes issued.	No. of newspapers and periodicals.	Assets.	Liabilities.
		Legislative grants.	Municipal grants.	Members' fees.	Balances and other sources.	Total receipts.								
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.					$ c.	$ c.
104	Seaforth	114 34	307 67	7 75	45 17	474 93	461 80	13 13	434	4,962	9,725	15	4,763 13	600 00
105	Shelburne	30 33	220 00	.....	20 49	270 82	270 07	75	169	2,402	2,772	19	1,875 00	.....
106	Simcoe	149 91	470 13	.....	508 58	1,128 62	795 65	332 97	599	5,637	12,888	49	7,332 97	.....
107	Smith's Falls	136 17	1,100 00	.....	1,445 08	2,681 25	2,662 49	18 76	837	3,976	13,674	40	15,600 00	450 00
108	Stayner	45 00	80 00	6 00	8 60	139 60	136 69	2 91	257	1,752	3,892	.....	1,214 37	.....
109	Stouffville	74 59	165 00	.....	131 80	371 39	343 65	27 74	387	4,198	8,279	30	4,383 00	.....
110	Stratford	250 00	1,200 00	12 00	851 34	2,313 34	1,934 06	379 28	1,500	7,172	34,719	45	21,934 36	.....
111	Streetsville	50 00	160 00	18 00	41 90	269 90	207 99	61 91	515	2,765	7,533	20	3,000 00	340 00
112	St. Catharines	250 00	2,500 00	.....	1,020 17	3,770 17	3,390 50	379 67	2,029	8,979	14,395	45	10,940 54	2,362 80
113	St. Mary's	84 65	450 00	.....	125 88	660 53	660 53	.....	430	4,623	14,228	22	2,524 00	52 66
114	St. Thomas	171 88	2,350 00	.....	225 74	2,747 62	2,562 23	185 39	2,806	9,223	19,942	47	5,400 00	.....
115	Tara	40 52	75 00	9 50	28 53	153 55	115 40	38 15	120	2,009	1,817	11	2,040 02	23 95
116	Thessalon	86 95	224 00	.....	14 36	325 31	324 25	1 06	140	2,176	2,166	16	1,635 32	95 10
117	Thornhill	16 03	30 00	.....	16 56	62 59	62 11	48	127	868	955	3	595 43	.....
118	Thornloe (New Liskeard, P.O.)	35 28	175 00	18 40	.....	228 68	216 60	12 08	127	773	.....	.....	707 66	.....
119	Thorold	139 07	400 00	.....	19 31	558 38	547 95	10 43	1,030	5,322	7,610	20	5,647 00	9 00
120	Toronto	250 00	35,223 00	.....	2,376 55	37,849 55	37,849 55	.....	64,449	136,065	397,264	912	273,970 23	50,373 73
121	Tottenham	.....	.....	.....	20 78	20 78	20 78	.....	74	2,461	1,097	.....	13 10	7 14
122	Trenton	100 27	250 00	25 00	60 00	435 27	435 27	.....	443	2,293	8,302	58	2,379 06	150 00
123	Uxbridge	76 10	250 09	45 10	343 64	714 84	714 84	.....	614	6,583	8,359	32	9,800 00	168 64
124	Walkerville	.....	1,200 00	.....	.....	1,200 00	216 39	983 61	.....	193	.....	.....	1,368 84	192 00
125	Wallaceburg	115 38	325 95	.....	430 72	872 05	390 38	481 67	450	2,407	9,182	24	1,997 69	.....
126	Waterloo	116 95	790 68	.....	48 97	956 60	663 64	292 96	535	7,858	9,477	38	6,691 18	.....
127	Watford	89 88	166 00	55 27	151 13	462 28	461 38	90	182	2,824	4,097	21	1,600 00	116 04
128	Westford	35 17	15 00	.....	7 70	57 87	57 50	37	108	1,502	361	.....	1,174 27	.....
129	Wiarton	119 70	200 00	45 15	40 98	405 83	390 64	15 19	400	3,623	4,418	21	2,992 93	.....
130	Windsor	250 00	2,900 00	.....	872 50	4,022 50	3,968 34	54 16	1,532	1,2471	51,260	75	42,986 88	650 00
131	Woodstock	139 74	995 95	106 57	805 75	2,048 01	2,045 50	2 51	991	6,395	24,041	38	3,800 00	.....
132	Wroxeter	62 43	84 00	5 00	30 91	182 34	181 41	93	152	4,464	25 90	.....	4,303 90	.....
133	Wyoming	40 43	75 00	27 50	37 20	180 13	180 13	.....	101	1,721	1,980	.....	1,025 00	36 60
	Total	12,646 94	106,334 04	1,342 28	41,751 85	162,075 11	153,585 06	8,490 05	147,182	648,815	1,750,042	3,848	1,005,217 56	104,744 07

PROPORTIONATE NUMBER OF VOLUMES IN PUBLIC LIBRARIES.

Libraries with less than 250 Volumes.

Bloomsburg, Glen Cross, Speedside, Walkerville.

Libraries with over 250 and less than 500 Volumes.

Abingdon, Caistorville, Callander, Chepstow, Cockburn Island, Depot Harbor, Elphin, Gourmais Bay, Haileybury, Harrowsmith, Hawkesbury, Honeywood, Inwood, Komoka, Lefroy, Maberley, Matilda (Iroquois P.O.), Newboro', Pakenham, Pelee Island, Priceville, Victoria Mines, Westport, Wolfe Island.

Libraries with over 500 and less than 1,000 Volumes.

Allan's Mills, Ancaster, Ayton, Bayham, Beachville, Bracondale, Brigden, Brucefield, Bunyan, Burnstown, Canfield, Cobden, Dalhousie (McDonald's Corners P.O.), Dromore, Dryden, East Toronto, Elgin, Elmwood, Fenella, Forester's Falls, Glamis, Gore's Landing, Haliburton, Hanover, Harrington, Hawkesville, Hillsdale, Holstein, Jasper. Maple, Marlbank, Marksville, Metcalfe, Middleville, Millgrove, Molesworth, Mount Albert, New Durham, New Dundee, Newington, Norland, Otterville, Port Burwell, Port Dover, Riversdale, Severn Bridge, Smithville, South River, Spencerville, Stirling, Sunnidale (New Lowell P.O.), Sydenham, Thornhill, Thornloe (New Liskeard P.O.), Unionville, Vienna, White Lake, Winchester, Yarker, York.

Libraries with over 1,000 and less than 1,500 Volumes.

Admaston, Auburn, Avonmore, Beaverton, Bridgeburg, Cambray, Carp, Clarksburg, Copleston, Creemore, Don, Dorchester, Douglas, Drumbo, Easton's Corners, Emsdale, Ethel, Fort Frances, Glen Allan, Harrow, Hepworth, Kemble, Lakefield, Lynden, Mallorytown, Melancthon, Melbourne, Minden, Mississippi, Monkton, Morriston, Odessa, Omemee, Orono, Oxford Mills, Petrolea, Plattsville, Port Carling, Port Stanley, Richmond, Ridgeway, Rodney, Saltfleet (Stony Creek P.O.), Scotland, Shedden, Thornbury, Vankleek Hill, Wales, Walton, Wardsville, Warkworth, Waterdown, Zephyr.

Libraries with over 1,500 and less than 2,000 Volumes.

Alma, Alvinston, Athens, Atwood, Belwood, Bervie, Blyth, Caledonia, Camden East, Cayuga, Chapleau, Cheapside, Chesterville, Colborne, Coldstream, Coldwater, Comber, Cookstown, Delhi, Dresden, Dungannon, Dutton, Elmvale, Hensall, Highland Creek, Islington, Kemptville, Kingsville, Kinmount, Lanark, Leamington, Little Current, Madoc, Manotick, North Gower, Norwich, Oakwood, Pickering, Pinkerton, Port Credit, Port Colborne, Princeton, Ripley, Rockwood, Russell, Schreiber, Shakespeare, Springfield, Stayner, St. Helen's, Sunderland, Thamesford, Tilbury, Tilbury East (Valetta P.O.), Wellesley, Westford, Wheatley, Williamstown, Woodbridge, Wyoming.

Libraries with over 2,000 and less than 2,500 Volumes.

Acton, Ailsa Craig, Alliston, Arkona, Beamsville, Belfountain, Bobcaygeon, Bolton, Bothwell, Bracebridge, Bradford, Brooklin, Burford, Burk's

Falls, Cannington, Cargill, Chesley, Erin, Floradale, Glenmorris, Grantham (St. Catharines P.O.), Hagersville, Iroquois, Lake Charles, Little Britain, Lucan, Merritton, Mildmay, Millbrook, Milverton, Nanticoke, Newburgh, Newmarket, North Bay, Norwood, Palmerston, Parkhill, Parry Sound, Pembroke, Port Perry, Port Rowan, Shelburne, Sparta, Tara, Thedford, Thessalon, Tiverton, Tottenham, Trenton, Wallaceburg, Woodville.

Libraries with over 2,500 and less than 3,000 Volumes.

Arnprior, Aurora, Burlington, Chatsworth, Claremont, Claude, Dunnville, Glencoe, Elmira, Essex, Fonthill, Fort Erie, Georgetown, Grand Valley, Gravenhurst, Kirkfield, Lucknow, Markdale, Manilla, Meaford, Midland, Mono Road, Morrisburgh, New Hamburg, Port Arthur, Romney, Sault Ste. Marie, Streetsville, Tillsonburg, Underwood, Victoria (Caledonia P.O.), Watford.

Libraries with over 3,000 and less than 3,500 Volumes.

Aberarder, Amherstburg, Arthur, Ayr, Bowmanville, Brighton, Brussels, Deseronto, Drayton, Ennotville, Huntsville, Jarvis, Lancaster, Listowel, Markham, Merrickville, Mount Forest, Picton, Point Edward, Port Elgin, Richmond Hill, Walkerton, Weston, Whitby.

Libraries with over 3,500 and less than 4,000 Volumes.

Almonte, Blenheim, Caledon, Clifford, Cobourg, Cornwall, Durham, Fenelon Falls, Forest, Gananoque, Hespeler, Lindsay, Milton, Oakville, Orangeville, Rat Portage (Kenora P.O.), Renfrew, Ridgetown, Smith's Falls, Tavistock, Teeswater, Thamesville, Toronto Junction, Welland, Wiarton, Wingham.

Libraries with over 4,000 and less than 5,000 Volumes.

Alton, Aylmer, Barrie, Brampton, Cardinal, Campbellford, Carleton Place, Clinton, Exeter, Goderich, Grimsby, Harriston, Ingersoll, Kincardine, Mitchell, Napanee, Orillia, Oshawa, Paisley, Port Hope, Sarnia, Seaforth, Southampton, St. George, Stouffville, St. Mary's, Wroxeter.

Libraries with over 5,000 and less than 6,000 Volumes.

Belleville, Collingwood, Embro, Fergus, Garden Island, Kingston, Owen Sound, Penetanguishene, Prescott, Scarboro', Simcoe, Thorold.

Libraries with over 6,000 and less than 8,000 Volumes.

Berlin, Chatham, Dundas, Galt, Niagara, Niagara Falls, Paris, Preston, Stratford, Strathroy, Uxbridge, Waterloo, Woodstock.

Libraries with over 8,000 and less than 10,000 Volumes.

Elora, St. Catharines, St. Thomas.

Libraries with over 10,000 and less than 20,000 Volumes.

Brantford, Brockville, Guelph, London, Peterborough, Windsor.

Libraries with over 20,000 and less than 30,000 Volumes.

Hamilton.

Library with over 100,000 Volumes.

Toronto.

Ontario Society of Artists.

The thirty-third Annual Report of the Society gives the following facts:—

The thirty-second Annual Exhibition was opened February 19th, 1904, by His Honour the Lieutenant Governor of Ontario. The Exhibition contained 238 works in all, of which 130 were oils, 96 water colors and the remaining 12 were in the classes of sculpture and design.

The two pictures selected by the Society at the Annual Meeting, in accordance with the annual grant of $200.00 from the Provincial Government, were as follows:—

"Coming Storm." J. W. Beatty. $100.00.

"The Day is Done." F. M. Bell-Smith. $100.00.

The pictures selected by the Guild of Civic Art from the thirty-second Exhibition, and which were chosen by them to complete the spending of the Government Grant for this purpose, were as follows:—

"October." W. E. Atkinson.

"Newfoundland Stream." W. Smith.

"Bretonne." George Chavignaud.

"Sunset Glow." F. H. Brigden.

The Provincial Art Gallery at the Normal School was re-hung. An Exhibition of the Society of Arts and Crafts was held in the Art Gallery. The Canadian Catholic Union held an Exhibition of religious pictures in the same place. The Architectural Eighteen Club also held an Exhibition.

The management of the Canadian National Exhibition was placed in the hands of the Society; the exhibit contained 141 oils, 64 water colors and 25 other works of Art.

The Central Ontario School of Art, which is affiliated with the Society, is carrying on its work, but the City and Government support is inedaquate.

The Evening Life Class meets regularly twice a week and the average attendance is good.

LITERARY AND SCIENTIFIC INSTITUTIONS.

1. *Hamilton Scientific Association.*

The Association consists of a General Association and four branch sections, namely, Biological, Geological, Astronomical and Photographical.

During the year the Executive Council held ten meetings at which the principal papers read were:—

Eclipses. Prof. De Lury.

Chemistry applied to Industry. C. B. Fox, B. A.

Probable Course of Evolution in Plants (illustrated). J. B. Turner, M.A.

The Conquest of Wild Canada (illustrated). Prof. S. P. Coleman, M. A.

Pompeii. Prof. G. W. Johnston, B. A.

Formation of Coal Beds and Life of Coal Forming Age (illustrated). W. A. Parks, Ph. D.

Origin of Banking in England. Stuart Strathy.

The Association reports a large increase in membership, and its financial position is improving.

The Astronomical Section reports 15 meetings; and two of its officers were selected by the Dominion Government to take part in the "Eclipse" expedition to Labrador.

The Biological Section has been very successful, some of its members having discovered several plants.

The Geological Section has been enriched by the addition of several valuable specimens and collections.

Several additions have been made to the Museum. The Camera Club forwarded a complete set of plates to the American Lantern Slide Interchange.

2. *The Ottawa Literary and Scientific Society.*

The membership of the Society shows a slight decrease, but the receipts from members' fees increased by $50.00. A donation of $200.00 was received from Mr. John Manuel, one of the Life Members. Nearly 250 volumes were added to the Library by purchase and gift. The issues of books and magazines were:—

Books and bound Magazines, 3,910.

Unbound Magazines, 1,325.

The Lecture Course was highly successful and the attendance larger than in former years.

The programme was as follows:—

Inaugural Address.

Elements of Strength and Weakness in the Modern State. The President W. D. LeSueur.

Some British Political Leaders. Sir Louis Davies, K. C. M. G.

The South Seas (illustrated). Dr. Otto Klotz.

Prehistoric Man (illustrated). Prof. A. B. Macallum, Ph. D.

Songs of the Old Regime. G. A. S. Gillespie.

The Egyptian Campaign of 1882, as seen by a Young Canadian (illustrated). Major C. F. Winter.

Photography in Natural Colours (illustrated) . J. S. Plaskett, B. A.

Some Words about Food. A. McGill, B. A.

Whaling Industries. Prof. E. E. Prince, F. R. S. C.

A New Method of Distributing Acetylene. E. A. LeSueur, B. Sc.

3. *L'Institut Canadien-Francais D'Ottawa.*

This Institute was founded in 1852. It is the only French Literary Society assisted by the Ontario Government. Unfortunately a recent fire crippled it financially and impeded its work.

Since the disaster the Quebec Government made a grant of $100, and also donated some valuable books. A promise of books from the French Government has also been made. Aided by the Insurance, $1,952, repairs have been made, new furniture secured and a piano purchased. The reading room is now supplied with 22 French and English papers and the Library is being gradually replaced.

During the winter months the Institute went to considerable expense in securing popular lecturers from a distance. The attendance at these entertainments was large and the programme included several literary treats of the highest order.

4. *St. Patrick's Literary and Scientific Association.*

The number of members in this Association decreased during the year. The Report of the Librarian shows that only 406 books have been issued.

A series of free lectures were given in Association Hall. The Programme was as follows:—

The Formation of Mountains. Dr. Daly.

Social Settlements. W. McKenzie King.

Industrial Conditions. Samuel Gompers.
Gaelic Literature. Dr. O'Boyle.
John Philpot Curran. E. P. Gleeson, B. A.
English Literautre. Martin Griffin.
The Land Settlement Question. D'Arcy Scott.
Biblical Exegetics. Dr. Van Becelaer.

5. *The Ottawa Field Naturalists' Club.*

The Ottawa Field Naturalists' Club reports a membership of 265,, of which 29 new members were added during the past year.

The programme of winter soirees included:—

Address. J. F. White.

Short Popular Talks on the following subjects:—

Mammals. Messrs. Prince, Low, J. M. Macoun and Ballantyne.
Geology. Messrs. Ellis, Ami, Chalmers, Dowling and Keele.
Entomology. Messrs. Fletcher, Harrington, Gibson and Young.
Zoology. Messrs. Prince, John Macoun, Halkett and Odell.
Ornithology. Messrs. Kingston, E. F. G. White, Eifrig and W. T. Macoun.

Programme for the Annual Meeting.

Ferns of the Ottawa District. T. E. Clarke.
Botany. Messrs. Sinclair, John Macoun, Fletcher, Campbell and Attwood.
Report of Botanical Branch.

Excursions.

Sub-excursions were held in the early summer to Beechwood, Blueberry Point, Beaver Meadow and Rockliffe.

Two general excursions were held during the season: one to Casselman, Ont., the other to Chelsea, Que. A feature of these trips was a short address on the work of the afternoon.

Volume XVIII of the Ottawa Naturalist contains 227 pages, with five plates. The following are among the papers which appear in this volume:—

The Canadian Species of Trocholites. Dr. J. F. Whiteaves.
Warbler Songs and Notes. Rev. G. Eifrig.
The Evening Grosbeak. Rev. C. J. Young.
The Grasping Power of the Manus of Ornithomimus altus. L. M. Lambe.
Some Canadian Antennarias. E. L. Greene.
Relationship Between Weather and Plant Growth. Dr. C. Guillet.
Nesting of Some Canadian Warblers. W. F. Kells.
The White Pelican of Manotick. Dr. J. F. Whiteaves.
On the Squamoso-parietal Crest of two Species of Horned Dinosarus from the Cretaceous of Alberta. L. M. Lambe.
The Mountain Bluebird of Manitoba. N. Criddle.
The Food Value of Certain Mushrooms. Prof. F. T. Shutt.
New Brunswick Warblers. W. H. Moore.
Description of a New Genus of Rugose Corals from the Silurian Rocks of Manitoba. J. F. Whiteaves.
The Flora of the Peace River Region. J. M. Macoun.
The British Association President's Address. Prof. E. E. Prince.
Discovery of Eggs of the Solitary Sandpiper. Walter Raine.

Summer Warblers in Compton. L. M. Terrill.
The Winter Fringillidae of New Brunswick. W. H. Moore.
Landslide on the Lievre River. Dr. A. E. Barlow.
Canine Intelligence. Sir James Grant.
New British Columbia Rosaceae. E. L. Greene.
Some of the Rarer Plants of Wellington County. A. B. Klugh.

The valuable series of Nature Study articles, edited by Dr. James Fletcher, have been distributed among teachers throughout Canada. This work of the highest importance, as Nature Study is deservedly receiving increased attention in the Public Schools.

The Geological, Ornithological, Botanical, Entomological and Zoological Branches report a most successful year.

6. *The Scientific Society of the University of Ottawa.*

Owing to the destruction of the University of Ottawa by fire, this Society not only lost a very valuable library and many scientific appliances, but also rooms in which to conduct investigations. In consequence the members decided to attend the meetings of the Ottawa Field Naturalists' Club in the Normal School Reception Hall, until such time as the University should be rebuilt.

During the year the Society expended for scientific books $130.00, and a small sum for photographic supplies.

7. *The Royal Astronomical Society of Canada.*

During the year there were 24 meetings of the Society. The papers and lectures were as follows:—

(1) Astronomy and Physics of 1903. President's Address.
(2) The Beginnings of Astronomy. Prof. A. Baker. M.A.
(3) Electricity and Magnetism. Dr. C. I. Kelly.
(4) Astronomical Chalk Talk. John A. Paterson, M. A., K. C.
(5) The Sun-dial and its Lessons. J. E. Maybee, M. E.
(6) The Work of Newton. Prof. A. T. DeLury, M. A.
(7) The Sequel to Newton's Discoveries. Prof. A. T. DeLury, M. A.
(8) Speculations on the Evolution of Solar and other Stellar Systems. Prof. A. T. DeLury, M. A.,
(9) The Relation of Philosophy to Ancient and Modern Theories of Cosmogony. Prof. J. Watson, M. A., LL. D.
(10) The Planetesimal Hypothesis. Prof. A. P. Coleman, Ph. D.
(11) Stellar Motions. A. F. Miller.
(12) Man's Place in the Universe. J. R. Collins.
(13) Solar Activity. Prof. Louis Léon.
(14) The Paris Lunar Photographs. D. J. Howell.
(15) Some late results in Astrophysical Research. W. B. Musson.
(16) An Evening at the Observatory.
(17) Review of Summer's Work.
(18) The Shelburne Meteorites. Prof. DeLury and Prof. Walker.
(19) Review of some recent Observations of the surface markings of Mars and other Planets. J. R. Collins.
(20) The Diffraction Spectrum, with Experiments. C. A. Chant.
(21) Eclipses. Prof. DeLury.
(22) Biographical Sketches. Miss E. A. Dent.
(23) Recent Lunar Photography. D. J. Howell.
(24 Some recent Experiments with Reflected Light. C. A. Chant.

8. *The Canadian Section of the Society of Chemical Industry.*

At the second Annual Meeting, held in Toronto, March 25th, 1904, the chairman stated that the session had been one of unusual interest, as, for the first time, meetings had been held in Montreal and Ottawa. He also pointed out that full success could only be realized by holding meetings in different parts of the Dominion.

During 1904 the following papers were read and discussed:—

The Sugar Beet in Canada. Frank T. Shutt, M. A., F. R. S. C.

The Softening of Hard Waters for Purposes of Boiler Supply. A. McGill, B. A. Sec., F. R. S. C.

A Note on the Fractional Condensation of Air, with a View to the Commercial Production of Oxygen. E. A. Leseur, B. A. Sec.

Experimental Investigation of Certain Problems in Water Treatment. A. McGill, B. A. Sec.

Decomposition of Benzine at High Temperatures. G. W. McKee.

The Section reports a list of 114 members.

9. *The Canadian Institute.*

The fifty-sixth Annual Report of the Institute shows that twenty-two meeting were held during Session.

Twenty-four papers were read as follows:—

Science and English Law. The President.
Recent Work in Immunity. Prof. Mackenzie.
Principles of Insurance. Arthur Harvey.
Causes of Indian Famines. Rev. J. T. Sunderland.
Chemical Industries of Canada. Prof. Lang.
Medical Inspection of Schools. Dr. Hodgetts.
Forestry Problems in Canada. Dr. Clark.
Old Testament Science. Dr. McCurdy.
Finsen, His Life and Work. Dr. Dickson.
Architecture of China, Corea and Japan. H. B. Gordon.
Iroquois Beach. Prof. Coleman.
Scope and Methods of Sociology. W. Houston.
Dragon Flies. Dr. E. M. Walker.
Pan-Islamism. Dr. R. Davidson.
Volcanic Origin of Petroleum. Eugene Coste, M. E.
Civic Improvements. G. P. Hynes.
Silver and Cobalt Ores of Tamiscaming. Prof. Miller.
Folk-lore of the Hebrews. Prof. Murison.
Food of the Canadian Lumberman. Prof. Ellis.
After Images. Dr. A. H. Abbott.
The Novel as a Guide to Conduct. Prof. Keys.
The Geology of Trinidad. R. Lechmere Guppy.
Absorption of Fat in the Intestine. G. E. Wilson.
Meteorological Fore-casts. R. F. Stupart.

The Librarian reports:—

Donations to Library, 120.
Periodicals and volumes loaned, 1,189.
Exchanges received from 515 Societies, 2,347.

10. *Wellington Field Naturalists' Club.*

This Club reports that meetings have been held regularly throughout the year. On an average two papers have been read and discussed each evening.

Among the most important papers were the following:—
Some Fishes of the River Speed. T. Barlow.
The Genus Aster in Wellington County. A. B. Klugh.
The Canada Porcupine. W. H. Muldrew.
The Frogs of Wellington County. T. G. Jarvis.
The Short-tailed Field Mouse. A. A. Davidson.
The Conifers of Wellington County. T. J. Moore.
Specialization in the Study of Natural History. A. B. Klugh.
Observations on some Mammals. S. Beattie.
Some Mosses of the vicinity of Guelph. V. W. Jackson.
Botanical Observations in the Mid-winter. E. J. Colgate.
The Genus Solidago in South-Central Ontario. W. Herriot.
The Star-nosed Mole. A. A. Davidson.
The Sequence of Plumages and Moults of the Black-throated Green Warbler. A. B. Klugh.
The Mammalia of Northern Wellington County. Allan Brooks.
Several excursions were held in which valuable field-work was done.

HISTORICAL SOCIETIES.

1. *Essex Historical Society.*

This Society was paid a grant of $100.00. The formal organization of the Society was completed January 19th, 1905. At subsequent meetings held the following papers were read:—

The Early History of Essex County. Francis Cleary.

Various papers on local subjects. Miss Kilroy, Miss Barr and Mr. F. Cleary.

The Ontario Historical Society met at Windsor, and its members were entertained by the local Society. During the meeting a trip was arranged to Amherstburg, where the citizens of that historic town gave the guests a cordial welcome.

The membership of the Society numbers 91, and the private contributions, up to July 11th, amounted to $85.00.

2. *London and Middlesex Historical Society.*

This Society was paid a special grant of $100.00, and reports that eight regular monthly meetings were held during the year.

Valuable facts relating to pioneer life were collected and arranged, prizes having been offered through the Public Schools for such material.

The following pioneer papers were read:—
Col. Talbot by Judge Hughes.
The Settlement of Lobo. J. D. and Dr. Cl. T. Campbell.
Duncan McKenzie. Mrs. Ghan.
Reminiscences of Richard Stevens. Mr. McQueen.
Early Militia of Canada. Mr. McQueen.
Recollections of William Percival. Miss Burgess.
Laura Secord. Dr. Wolverton.

History of Union Jack. Miss Priddis.
Settlement of Canada's Boundaries. Mr. McVicar.
Addresses were delivered as follows:—
Relics of Early Days. Mr. Matheson, of Lucan.
Work of the Archivist. Mr. Fraser, Toronto.
Aboriginal Characteristics. David Boyle, Toronto.
Gifts of books and geological specimens were secured through Mr. C. F. Colwell, Ottawa.

3. *Lundy's Lane Historical Society.*

This Society received a grant of $200.00.
The historian of the Society, Lieut.-Col. Cruikshank, issued part IV of his valuable "Documentary History of the Campaign on the Niagara Frontier in 1812-14." This volume embraces the battles of Stoney Creek, Beechwoods, or Beaver Dams, and Black Rock. It also contains a valuable map. A second edition of Queenston Heights was also published. Through the exertions of the Society a handsome granite monument has been erected by the Government of Canada on the Battle Grounds at Fort Erie. A full inscription has been prepared by the historian of the Society, which will be made in two bronze tablets, and placed on the shaft. The Soceity has devoted special attention to the collection and publication of historical documents. Lieut.-Col. E. Crookshank is the author of the following:—
The Battle of Lundy's Lane.
The Battle of Queenston Heights.
The Fight in the Beechwoods.
The Story of Butler's Rangers.
Drummond's Winter Campaign.
The Documentary History of the Campaign on the Niagara Frontier, in IV parts.
The following works, published by the Society, are also in print.
The Story of Laura Secord. Mrs. S. A. Curzon.
Memento of the Unveiling of the Monument on Lundy's Lane. W. Kirby.
The Annals of Niagara. W. Kirby.
Niagara 100 Years Ago. Miss Carnochan.
A Century Study. Rev. E. J. Fessenden.
Brief Account of Battle Lundy's Lane. Sir R. H. Bonnycastle.
Accounts of re-interments of remains of soldiers of 1812, found in 1891 and 1893, with addresses on each occasion.

4. *Niagara Historical Society.*

A grant of $100.00 was given this Society. A second edition of The Taking of Fort George, was issued and a new publication, Reminiscences of Niagara, printed and distributed.
During the year the following papers were read: —
An Historic House. Janet Carnochan.
Extracts from Early Travellers in Niagara. Janet Carnochan.
U. E. Loyalists. Rev. A. Sherk.
Several valuable contributions were received, including: —
Michigan Historical Society, 27 vols.
Documents from the Dominion Archives, Ottawa.
Revolving case for photographs. Hon. Richard Harcourt.
Old Flags, Lincoln Militia.
Scrap Book, Manuscripts, etc. Mrs. Thompson, Toronto.

5. *The Ontario Historical Society.*

The Ontario Historical Society continues to exercise a wholesome influence by way of fostering the establishment of Local Societies, of which there are now twenty-eight. With two exceptions all these are affiliated with the Provincial Society. The last to organize was that of Thamesville, and is known as the Tecumseh Historical Society.

One of the most active local societies is that of Niagara-on-the-Lake, if we may judge from the amount of valuable printed matter published.

In many cases the local societies have been the means of collecting and preserving written and printed material which would otherwise have been lost, and in consequence matters of local history are no longer regarded as being of little account. There are numerous private collectors who have acquired material of much local or general interest. As it is extremely desirable that material of this kind should be preserved, the Ontario Historical Society will gladly pay the cost of transmission on anything that may be forwarded to it, either by post or express, which may have any bearing on local or Provincial History.

The last Annual Meeting was held at Niagara-on-the-Lake, and was well attended by most of the County and City organizations. It is not improbable that the next Annual Meeting will be held at Collingwood, where the Huron Institute has been lately organized.

6. *The Women's Canadian Historical Society of Toronto.*

This Society received a grant of $100.00. Nine meetings of the Executive Council and six regular meetings were held. At the latter the following papers were read:—

Fiscal Reform as relating to Canada. By Mrs. H. C. Osborne.

A Chapter on Acadia. Lady Edgar.

Early Travellers in Upper Canada. M. Agnes FitzGibbon.

The French Royalists of the Oak Ridges. Miss Teefy.

Chateau Papineau. Miss Sara Mickle.

Quaker Settlements in Upper Canada. Miss Jean Graham.

The Development of Canadian Art. Divided into two papers, the second being illustrated by a volume of original water color drawings by the late Mrs. Jamieson, loaned by Mrs. James Bain. By Mrs. Wellesley Holmsted.

Canadian Wild Flowers. Mrs. Agnes FitzGibbons (now Chamberlin).

A Trip to Newfoundland. Miss Josephine MacCallum.

Extracts from an Officer's Diary at Plattsburg. Original lent by Mrs. S. G. Wood.

An open meeting was held in the hall of the Toronto Conservatory of Music, at which a paper on the late "Hon. Joseph Howe; His Life and Work," was given by Mr. George Morang.

Three hundred and fifty copies of Transaction No. IV have been printed and distributed.

The following donations were received:—

Report of the unveiling of the monument commemorating the first claim of Great Britain to the American Continent, from Mrs. Chamberlin.

An old Log-Book of the vessel Snowflake, Commander, Sanderson Brown, 1821, (with notes on the early settlement in Canada, Township of Georgina, by the commander), from Mrs. Seymour Corley.

Life of Lord Elgin, by Sir John Bourinot, from Mr. Morang.

Canadian Annual Review. J. C. Hopkins.

The Algonquin Manabozoho and Hiawatha. J. C. Hamilton.
The History of Goat Island. Dickson Patterson.
Sketch of Island of Orleans. Dr. Bowen.
Landing of the Popham Colony. Mrs. Chamberlin.
Reprint of "Canada and the Treaty Making Power. Thomas Hodgins.
Two pamphlets on the sites of Huron Villages in Simcoe County. A. F. Hunter.
Miniature flag-staff (naval) from wood taken from hull of frigate Lawrence, Sir James Yeo's flag-ship, 1813.

7. *Women's Wentworth Historical Society.*

Government Grant, $100.00.
It received fifteen new members during the year.
The indebtedness of the Society has been consideraby decreased.
An anniversary tea was held at the battlefield (Stoney Creek) October 22nd, 1904, at which His Honour Lieutenant-Governor Clark and Mrs. Clark were present.

8. *Wentworth Historical Society.*

Government grant, $100.00.
It published Vol. IV, Journals and Transactions of the Society, containing nineteen valuable illustrations.
Mr. H. H. Robertson, the First Vice-President, collected data regarding the government building, which once stood on Burlington Beach, called the King's Inn, and burned by the United States forces in 1813.
Mrs. John Rose Holden gathered many interesting incidents and facts regarding Joseph Brant, the Brant Tract and Brant House.
The following papers were read and published:—
An Imperial Preference. Justus A. Griffin.
The Brant Family. Mrs. John Rose Holden.
First Agriculture Society in Wentworth. H. H. Robertson.
Gore District Militia, and the Militia of West Lincoln and West York. H. H. Robertson.
The George Hamilton Burial Plot. Agnes Hamilton Lemon.
Historical Comment on the Origin and Development of some of the Laws of Ontario. Charles Lemon.
Militia Rolls of 1812. Justus A. Griffin.

APPENDIX I.—REPORT OF THE LIBRARIAN OF THE EDUCATION DEPARTMENT.

To the Hon. R. A. PYNE, M.D., M.P.P.,
Minister of Education for the Province of Ontario:

I have the honour to submit herewith the report on the Library of the Education Department for the year 1905.

In the following table a record is given of the number of books loaned during the years 1896-1905 to the students of the Normal and Model Schools, and to the teachers and other persons.

The books are not loaned for a longer period than two weeks except in special cases.

Comparing the number of books loaned in 1905 with those loaned in 1904 there is a decrease of 800. In explanation of this difference I beg to state that owing to the longer term of the Normal School the students have more spare hours for study, and in preference to taking books home they study and make notes from them in the Library. Much more of this work might be done greatly to the comfort of the students if, in some way, provision could be made for a reading or study room in connection with the Library.

The students and other users of the Library are to be commended for their careful handling of the books. It is self-evident that the books that are in disrepair are in that condition through long continued use rather than from indifferent usage.

Books given out in the month of—	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905
January	573	699	608	484	526	518	542	587	673	646
February	1,040	1,370	928	868	948	1,124	959	1,036	970	848
March	1,270	1,702	1,393	1,158	1,454	1,563	1,084	1,538	978	777
April	1,021	1,111	882	848	766	997	1,187	899	854	497
May	843	923	969	895	911	867	832	901	738	723
June	400	609	677	518	540	576	510	591	482	317
July	32	254	265	256	231	317	336	168	220	296
August	16	184	233	329	224	176	233	152	259	260
September	295	514	410	489	432	411	538	476	378	446
October	1,170	1,200	1,043	1,018	1,312	1,058	958	761	776	661
November	1,268	1,099	1,024	1,034	1,229	1,014	1,158	687	900	962
December	752	704	464	549	547	516	535	600	480	475
Totals	8,680	10,369	8,896	8,446	9,120	9,137	8,872	8,396	7,708	6,908

Number and Subjects of the Books Purchased in the Years 1896-1905:

Year.	Volumes.	Subjects.
1896	495	
1897	476	
1898	533	Education,
1899	315	Science,
1900	275	Literature,
1901	164	Art,
1902	304	Text-books,
1903	218	Miscellaneous.
1904	409	
1905	486	

As will be seen from the following table considerable additions have been made to the important subjects of Pedagogy, Science, (Political Economy, etc.) and Industrial and Domestic Science.

There is a decided falling off in the department of Fiction. This is to be regretted, but it was unavoidable as the vote for the purchase of books was too limited. We have most of the standard works, and while they are read very freely, the teachers naturally look forward to an acquaintance with the writings of the best of our present day authors. Teachers ought to be encouraged in every way to read, and a liberal supply of the best books from the pen of the leading authors will do much to bring this about. To be able to look forward to reading an interesting and instructive book each week-end would act as a stimulus to the students-in-training to concentrate their whole energies upon their studies during the time they have to spend in the lecture rooms. There are few things that exert a happier influence upon one's life than the reading of a genuinely meritorious book—a book with the elements of refinement in it—and I am sure the students of the Normal School, after reading such a book, will enter with much heartiness into the feeling of Thomas à Kempis when he said "I have sought for rest everywhere, but I have found it nowhere, except in a little corner, with a little book."

The number of Books Purchased in 1901-1905 was as follows:

Subjects.	1901	1902	1903	1904	1905
Pedagogy	29	40	7	18	30
Science (Political Economy, Anthropology, etc.)	8	11	3	10	32
Philosophy and Ethics	12	9	8	17	13
Industrial and Domestic Science	2	8	6	24	66
Poetry	1	1	10	13	5
Fiction and Practical Life	5	9	19	79	37
Literature	3	46	35	92	70
Text-Books	32	45	27	37	84
Miscellaneous (History, Biography, Reference Works)	72	102	61	84	119
Natural History and Nature Study	.....	33	27	20	25
Arts	.....	.....	15	15	5
Totals	164	304	218	409	486

The following table shows a marked decline from last year. The large number of text-books received then included those published by two leading English firms:

Number of Books donated to the Library 1898-1905:

—	1898	1899	1900	1901	1902	1903	1904	1905
Text-Books	49	74	65	111	41	144	349	95
Miscellaneous	.....	.....	7	13	54	95	16	37
Totals	49	74	72	124	95	239	365	132

Newspapers and Magazines Received during the Years 1900-1905:

—	1900	1901	1902	1903	1904	1905
Number of daily and weekly newspapers received	86	91	88	89	109	126
Number of magazines and other periodicals received	100	102	100	111	94	98
Totals	186	193	188	200	203	224

Books, Magazines, etc., Bound during the Years 1893-1905:

1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905
109	136	141	98	99	90	94	37	83	71	4	81	45

Official Reports on Education in different Countries received during 1902-1905:

	1902	1903	1904	1905
Great Britain and Ireland	43	53	59	26
Various Provinces of the Dominion	42	45	31	31
Australasia—				
Victoria	5	3	2	4
New South Wales	3	.....	3	3
South Australia	1	1	1	.....
Western Australia	1	2	1	3
Queensland	.....	.....	2	1
Tasmania	1	.....	2	.....
New Zealand	29	18	26	10
Other British Possessions:				
Mauritius	1	.....	.....	.....
Cape of Good Hope	1	2	2	1
Natal	1	1	1	2
Jamaica	1	1	1	1
Cape Town	.....	12	1	1
Barbadoes	1	1	1	1
British Guiana	2	1	1	.....
Hong Kong	1	.....	.....	.....
Transvaal	.....	.....	1	1
Various States of the American Union	54	81	65	55
Miscellaneous:				
Brazil	3	.....	.....	.....
Argentine Republic	12	10	2	3
Uruguay	.....	5	.....	2
France	8	4	2	2
Germany	.....	1	3	10
Portugal	2	2	1	2
Switzerland	6	2	3	.....
Italy	29	16	3	1
Mexico	1	.....	2	.....
Japan	.....	2	1	.....
Totals	248	263	217	160

Miscellaneous Pamphlets Received in 1902-1905:

	1902	1903	1904	1905
From various Countries	75	65	12	7
From the Dominion of Canada and its Provinces	74	53	27	46
Totals	149	118	39	53

During the past year all the books in the Library have been thoroughly cleaned and the Library itself renovated. It is now, for the first time in several years, in a perfectly sanitary condition.

Your kind permission to allow the installation of the electric light into the alcoves of the Library—which were very dark after 3 o'clock in the afternoon—is very much appreciated by the staff and the teachers-in-training. The difficulty encountered for so many years of reading the titles and getting information from the books is now happily at an end.

A large collection of legal texts were disposed of last summer to a city Law Book publisher, and the money realized was expended in purchasing new books in several subjects of study.

The following is a list of the books added to the Library during the past year, 486 of which were purchased and the balance donated.

PEDAGOGY.

The Professional Training of Teachers in the United States, by G. W. A. Luckey.
The Logical Basis of Education, by J. Welton.
Infant Schools, their History and Theory, by D. Salmon and W. Hindshaw.
The Principles of Education, by T. Raymont.
Notes on German Schools, by W. T. Winch.
The Teaching of Biology in the Secondary Schools, by F. E. Lloyd and M. A. Bigelow.
Fundamentals of Child Study, by E. A. Kirkpatrick.
The Possibility of a Science of Education, by S. B. Sinclair.
A New School Management, by Levi Seeley.
Our Schools, their Administration and Supervision, by W. E. Chancellor.
Education and the Larger Life, by C. H. Henderson.
Pedagogues and Parents, by Ella C. Wilson.
The Supervision of Country Schools, by Andrew S. Draper.
Education in the United States, by Nicholas Murray Butler, 2 Vols.
The Trend in Higher Education, by W. R. Harper.
The Infant School, its Principles and Methods, by J. Gunn.
Economy in Education, by Ruric N. Roark.
Preparation of the Child for Science, by M. E. Boole.
Common Sense Didactics, by Henry Sabin.
Elementary Schools, by W. Foxley Norris.
A Primer of School Method, by Dexter and Garlick.
School Teaching and School Reform, by Sir Oliver Lodge.
School Organization, by S. E. Bray.
The Psychology of Child Development, by Irving King.
Special Method in Arithmetic, by Charles A. McMurray.
Special Method in Language, by Charles A. McMurray.
An Introducation to the Study of Geometry, by A. J. Pressland.
In Loco Parentis, by Rev. Marshall G. Vine.

SCIENCE (POLITICAL ECONOMY, ANTHROPOLOGY, ETC.)

The Work of the Digestive Glands, by J. P. Pawlow.
The Early Cave Men, and The Tree Dwellers, both by Catherine Dopp.
Adam Smith's Wealth of Nations, by Hector Macpherson.
Archaeology and False Antiquities, by R. Munro.
The Vault of Heaven, by Richard A. Gregory.
Astronomy for Amateurs, by Camille Flammarion.
R. A. Proctor's Works:—
  Light Science for Leisure Hours.
  Myths and Marvels of Astronomy.
  Other Suns Than Ours.
  Our Place Among Infinities.
  Other Worlds Than Ours.
  Pleasant Ways in Science.
  Rough Ways made Smooth.
  The Expanse of Heaven.
  The Orbs around us.
Economic Studies, by W. Bagehot.
The Elements of Banking, by H. D. Macleod.
Principles of Political Economy, by John Stuart Mill.
Earthquakes, by Clarence E. Dutton.
A Short History of Coins and Currency, by Lord Avebury.
A First Course of Chemistry, and A First Course of Practical Science, each by J. H. Leonard.

Modern Tariff History, by Percy Ashley.
The Expression of the Emotions in Man and Animals, by Charles Darwin.
The Hygiene of the School, by W. F. Barry.
Primitive Culture, by Edward B. Tylor, 2 Vols.
Man and Class, a Survey of Social Divisions, by W. J. Ghent.
Astronomers and their Observations, by Lucy Taylor.
Health at School by Clement Dukes, M.D.
A Text-book of Sociology, by J. Q. Dealey and L. F. Ward.

Philosophy and Ethics.

The Practice of Self-Culture, by Hugh Black (2 copies).
Moral Education, by Edward Howard Griggs.
An Outline of a Bible School Curriculum, by George W. Pease.
An Introduction to the Bible for Teachers of Children, by Georgia L. Chamberlain.
A Struggle for Life, Higher Criticism Criticized, by Rev. John Langtry.
A System of Logic, by John Stuart Mill.
Duty, by Samuel Smiles.
Man and His Environment, by John P. Kingsland.
Religious Teaching in Schools, by Helena L. Powell.
The Children's Book of Moral Lessons, by F. J. Gould.
A Teacher's Handbook of Moral Lessons, by A. J. Waldegrave.
A Philosophical Introduction to Ethics, by W. R. B. Gibson.
The Laws of Health, by Dr. Nabarro.

Industrial and Domestic Science.

Education of the Wage Earners, by Thomas Davidson.
Works by Paul N. Hasluck:
- Cassell's Cyclopedia of Mechanics, 3 Vols.
- The Handy Man's Book.
- Practical Graining and Marbling.
- Practical Draughtsmen's Work.
- Practical Staircase Joinery.
- Engraving Metals.
- Electric Bells, How to make them.
- Bamboo Work.
- Photographic Cameras, etc.
- Optical Lanterns, etc.
- Bookbinding.
- Bent Iron Work.
- Photography.
- Wood Finishing.
- Mounting and Framing Pictures.
- Decorative Designs.
- Building Model Boats.

Stained Glass Work, by C. W. Whall.
Industrial Education in the 16th and 17th Centuries, by George Unwin.
Trades Unions, by Geoffrey Drage.
Modern Industrialism, by Frank L. McVey.
Light and Shade with Chapters on Charcoal Drawing, by Anson K. Cross.
Clay Modelling for Schools, by Anna M. Holland.
A Manual of Clay Modelling, by Mary L. H. Unwin.
Brushwork Studies of Flower, Fruit and Animals, by Elizabeth C. Yeats.
Color Study, a Manual for Teachers and Students, by Anson K. Cross.
Science and Art Drawing, by J. Humphrey Spanton.
Complete Perspective Course, by J. Humphrey Spanton.
Architectural Drawing, by C. F. Edminster.
Blackboard Drawing, by F. Whitney.
Geometrical Drawing and Design, by J. H. Spanton.
The Principles of Design, by E. A. Batchelder.
Drawing for Printers, by Ernest Knaufft.
A Practical Handbook for Drawing for Modern Methods of Reproduction, by Charles G. Harper.
Nelson's Blackboard Drawing, by Allen W. Seaby.
Nelson's New Drawing Course, by J. Vaughan.
Design, An Exposition of the Principles and Practice of the Making of Patterns by Richard G. Hatton.

Das Gewerbliche Fortbildings und Fachschulwesen in Deutschland, by Franz Richter.
Seat Work and Industrial Occupations, by M. L. Gilman and E. B. Williams.
Manual Training Woodwork, by George Ricks.
Manual Instruction in Woodwork, by G. Wood.
Woodwork (The English Sloyd), by S. Barter.
Wood Carving, by Charles G. Leland.
Carpentry Workshop Practice, by Charles F. and George A. Mitchell.
Nelson's Woodwork for Schools in Parts 1, 2, and 3, the same complete in one volume, by J. Wallace.
Basket Work of all kinds, and Practical Metal Plate Work, each, by Paul N. Hasluck.
Diplomatic and Consular Reports on the High, Technical and Industrial Schools of Germany. 10 Phamphlets in all.
Technical Education in Evening Schools, by Clarence H. Creasey.
Bacteriology and the Public Health, by George Newman.
Infection and Immunity, by George M. Sternburg.

Poetry.

Poems of Christina Rossetti, by Wm. M. Rossetti.
London Lyrics by Frederick L. Lampson.
Emerson's Poems.
Les Aspirations-Poésies Canadiennes. W. Chapman.
The Earthly Paradise, a Poem by Wm. Morris.
Shelley's Poetical Works, by Thomas Hutchinson.
Paradise Lost, by John Milton.
Rubáizát of Solmon and other Poems, by Amanda T. Jones.
Canadian Born, by E. Pauline Johnson.

Fiction and Practical Life.

Little Folks of Many Lands, by Lulu Maud Chance.
Hours in a Library, by Leslie Stephens.
The White Company, by Conan Doyle.
Micah Clarke, by Conan Doyle.
Emma.
Northanger Abbey.
Sense and Sensibility.
Pride and Prejudice.
Mansfield Park.
} by Jane Austen.
A Ladder of Swords, by Gilbert Parker.
The Prospector, by Ralph Connor.
Pathfinders of the West, by A. C. Laut.
Sir Toady Lion, by S. R. Crockett.
The Westerners, by Stewart White.
The Lure of the Labrador Wild, by Dillon Wallace.
The Marble Fawn,
The Blithedale Romance,
} By Nathaniel Hawthorne.
Adventures among Books, by Andrew Lang.
Carrots, Just a Boy, by Mrs. Molesworth.
Traits and Stories of the Irish Peasantry, by W. Carlton.
No Ambition, by Adeline Sergeant.
Works of Andrew Lang:
The True Story Book.
The Red True Story Book.
The Blue Poetry Book.
The Animal Story Book.
The Red Book of Animal Stories.
Sun-Babies, or Studies of Child Life in India, by Cornelia Sorabzi.
Fort Amity, by A. T. Quiller-Couch.
Memories Grave and Gay, by John Kerr.
The Making of the Canadian West, by R. C. McBeth.
The Bravest of the Brave, by Captain Charles de Langlade.
The Blazed Trail, by Stuart Edward White.
The Right of Way, by Gilbert Parker.
Seats of the Mighty, by Gilbert Parker.
Mooswa, by W. A. Fraser.
Jean Mitchell's School, by Angelina W. Wray.
Thanksgiving,—Memories of the Day: Helps to the Habit, by William Adams.

LITERATURE.

Harvard Studies in Classical Philology, Vol. 15, 1904.
Cassell's National Library (New Series) 57 Volumes, embracing the works of George Eliot, Sterne, Shakespeare, Browning, Carlyle, Dickens, Goldsmith, Johnson, Thackeray, Tennyson, Poe, Scott, Emerson, Burns, Bunyan, Sheridan, Macaulay, Hawthorne, Walpole, Southey, Addison, Milton, Byron, Bacon, Moore, Walton, Hakluwt, Socrates, Burke, Boccaccio and Lamb.
Bell's Hamlet, Prince of Denmark.
Emerson's Essays, 3 Vols.
Goethe's Faust, translated by Bayard Taylor.
Wagner's Parsifal, as retold by Oliver Huckel.
The English Poets, by T. F. Ward, 2 Vols.
Classical Echoes in Tennyson, by Wilfred P. Mustard.
The Georgics of Virgil, by Lord Burchclere.
The Essays and the New Atlantas, by Francis Bacon.
A First View of English Literature, by Moody and Lovett.
Longman's Class-Book of English Literature, viz.:
Paradise Lost.
The Man Born to be King.
The Lady of the Lake.
The Lay of the Last Minstrel.
Macaulay's History of England.
The Story of the Glittering Plain.
Marmion.
A Legend of Montrose.
Tales of King Arthur and the Round Table.
Ivanhoe.
The Talisman.

TEXT-BOOKS.

A New Geography on the Comparative Method, by J. M. D. Meiklejohn.
The Students Geography, by George Gill.
Chemistry, Inorganic and Organic, by E. L. Bloxam.
The Principles of Inorganic Chemistry, by Wilhelm Ostwald.
Elementary Algebra, Parts 1 and 2, by W. M. Baker and A. A. Bourne.
Cassell's Physical Educator, by Eustace Miles.
The 'Council' Arithmetic for Schools, by T. B. Ellery, Parts 1 and 2.
High School Geography, by G. A. Chase.
Geographical Library of Travel, 24 Numbers, embracing Canada, Australia, Mexico, Alaska, Japan, China, Phillipines, London and Liverpool, North and South Germany, Spain and Portugal, Switzerland, Italy, Belgium and Denmark, France, Puerto Rico, Norway, Russia, Cuba, Hawaii, Holland, Scotland, England and Wales.
The Principles and Practices of Reading, Canada Publishing Company.
Introductory Latin Grammar, by E. W. Hagarty.
Commercial Course in Book-keeping, by Dickenson and Young.
A Canadian History for Boys and Girls, by Emily P. Weaver.
MacMillan's New Globe Readers, parts 1 and 2.
MacMillan's Picture Arithmetic, parts 1 and 2.
Stories from Natural History, by R. Wagner.
The Landseer Object Lesson Readers, 8 Volumes.
High School French Grammar and Reader, by Fraser and Squair.
High School History, by Buckley and Robertson.
Arithmetic for High Schools, by A. T. De Lury.
High School Algebra, by Robertson and Birchard.
High School Euclid, by McKay and Thompson.
New Primary Latin Book, by Robertson and Carruthers.
First Greek Book by J. W. White.
Beginner's Greek Book, by J. W. White.
High School German Grammar and Reader, by VanderSmissen and Fraser.
New Primary Latin Book, Part 2, by Carruthers and Robertson.
T. Nelson & Son's publications, London, England, viz.: Composition Books, Supplementary and Royal Crown Readers, Royal Atlas, St. George History Readers, Royal Windsor History Readers, Literature Readers, The World and Its People, Geographical Readers.
Summary of Canadian Commercial Law for Schools and Colleges, by W. H. Anger.
Elementary Pure Geometry with Mensuration, by E. Budden.

Plane Geometry, Practical and Theoretical, by J. S. McKay.
A First French Song Book, by Kirkman and Morgan.
Biographical History Reader, by A. B. Lees.
Macmillan's Globe Geographical Readers.
Regional Geography, Europe and the Mediterranean, by J. B. Reynolds.
The Council History Reader, Story of London, by G. E. Mitton.
Beginner's Trigonometry with Logarithms, by M. S. David.
Manual of Drill and Physical Exercises, by Thomas Chesterton.
Chemical Statics and Dynamics, by J. W. Mellor.
Text-Book of Physical Exercises, by Carter and Bott.
Senior Country Reader, Parts 1, 2, and 3, by H. B. M. Buchanan.
Studies and Questions in Book-keeping, and Worked Studies and Questions in Book-keeping, both by A. Nixon.
Introductory Physiology and Hygiene, by A. P. Knight.
High School Physical Science, Part 1, revised edition, by Merchant and Fessenden.
The Story of the English People for Beginners, by John Finnemore.
Elementary Plane Geometry, and Geometry for Schools (theoretical), both by Alfred Baker.
Introduction to Analytic Geometry, by Smith and Gale.
Commercial Geography, by Cannett Garrison and Houston.
School Room Exercises for Thanksgiving and Christmas, by Ella M. Powers.
High School Elementary English Composition, by F. H. Sykes.
High School Ancient History, by P. V. N. Meyers.
High School Euclid Books, 1 to 3, by McKay and Thompson.
High School Chemistry, revised edition, by W. S. Ellis.
High School Primary Latin Book, by Robertson and Carruthers.
High School Chemistry, authorized edition, by Knight and Ellis.
High School Cadet Drill Manual, by W. B. Munro.
High School Physical Science, Part 1, revised, by Merchant and Fessenden.
Tales from Herodotus, by G. S. Farnell.
Cornelius Nepos, Vol. 1, Greek Lives, by H. Wilkinson.
Homer's Odyssey Books, 19 to 24, by W. W. Merry.
Luciani Somnium Charon, with English Notes, by W. E. Hertland.
Lysiae Orationes XVI, by E. S. Shuckburgh.
Ciceronis Orationes XIV, selected, by R. Klotz.
Freiherren Von Gemperlein, by Ebner Eschenbach's.
Baumbach Waldnovellen, by Dr. Wilhelm Bernhardt.
Einer Muss Beiraten—Wilhelmi, Ergensinn Benedix, by W. H. VanderSmissen.
Le Voyage de Monsieur Perrichon, par Eugene Labiche.
Quatre Contes de Prosper Merimee with Notes, by F. C. L. Van Steenderen.
A Note Book of Experimental Mathematics, by Godfrey and Bell.
Practical and Theoretical Geometry, Part 1, by A. H. McDougall.

MISCELLANEOUS (HISTORY, BIOGRAPHY, REFERENCE, ETC).

The Talbot Regime, or the first half century of the Talbot Settlement, by C. O. Ermatinger.
Robertson's Landmarks of Toronto, Vol. 4.
A History of the War of 1812, by James Hannay.
Readings in European History, by James H. Robinson.
History of Western Europe, by James H. Robinson.
World's best Histories, 32 Vols., embracing Japan, China, Russia, Germany, United States, England, Canada, Ireland and France.
Pen Pictures of Early Pioneer Life in Upper Canada, by a "Canuck."
The Story of the County of Dundas, from 1784-1904, by J. Smith Carter.
Wolfe and Montcalm, by Henry Raymont Casgrain.
Canada in the Twentieth Century, by A. G. Bradshaw.
Little Arthur's History of England, by Lady Callcott.
The Fight with France for North America, by A. G. Bradley.
Political Annals of Canada, by A. P. Cockburn.
The Great Events by famous Historians, B. C. 5,867 to A. D. 1905, 20 Vols.
Essentials in English History, by A. P. Walker, and A. B. Hart.
Cumberland's History of the Union Jack.
Adam Smith, by F. W. Hurst.
Life of General Brock, by Lady Edgar.
Life of Shakespeare, by Alfred Ewen.
Life of Samuel de Champlain, by Narcisse E. Dionne.
Thomas Moore, by S. Gwynn.
Sydney Smith, by G. W. E. Russell.

Chatham, by Fredrick Harrison.
Jean Bourdon (French) par L'Abbe Auguste Gosselin.
La Famille D'Trumberry de Salaberry, par Pierre-Georges Roy (French).
Life of Andrew Marvel, by Augustine Birrell.
The Earl of Elgin, by George M. Wrong.
Mackenzie, Selkirk and Simpson, by George Bryce.
Sir Oliver Mowat, by C. R. W. Biggar, 2 Vols.
Six Great School Masters, by F. D. How.
Canadian Almanac, 1905.
Canadian Catholic Directory, 1905.
Dictionary of Prose Quotations, by Anna J. Wood.
Murray's New English Dictionary, Vols. 6, 7, 8.
Baedeker, Italy Hand-book for Travellers.
Canadian Year Book, 1905, by Alfred Hewett.
Canadian Annual Review, 1902, by J. Castell Hopkins.
Who's Who, 1905, by A. & C. Black.
Annual Financial Review for 1904, with Appendix.
The Canadian Annual Review of Public Affairs, for 1904, by J. Castell Hopkins
The Statesman's Year Book, 1905.
The St. Louis Exhibition, by H. P. Fletcher.
German Statistical Year Book, 1904.
Debrett's Peerage and Baronetage, 1905, illustrated.
Addresses and Proceedings of the National Teachers' Association, 1904.
Scientific American Book, by A. A. Hopkins and A. R. Bond.
History of the Royal Grenadiers, by Captain E. James Chambers.
Mental Diseases by Dr. Daniel Clarke.
Canadian Politics, by J. Robert Long.
The Nile, in 1904, by Sir William Willocks.
"Torontonians as we seeen Em."
Poole's Index to Periodical Literature.
Classified Guide to Technical and Commercial Books, by E. Greenwood.
Alumni Souvenir of the University of Toronto and affiliated Colleges.
The Journal of the Royal Sanitary Institute, London, Eng.
Annual Report of the Medical Officers of the late School Board for London (Eng. 1904.
Report of the Inter-departmental Committee on Physical Detericration, Londo Eng.
Torontonensis, 1905.
Physical Deterioration, its cause and the cure, by A. Watt Smith.
American Library Association Catalogue, 1904.
United States Catalogue of Books, in Print, to 1902.
The Cumulative Book Index, 1903-4.
The Reader's Guide to Periodical Literature, 1900-4.
Diary of Samuel Pepsy, by G. Gregory Smith.
The First Crossing of Grennland, by F. Nansen.
Memiors of Life at Oxford and Elsewhere, F. Meyrick.
Sketches on the Old Road through France to Florence, by A. H. Hallam, et. a
River, Road and Rail, by Francis Fox.
The Lighting of School-rooms, by Stuart H. Rowe.

NATURAL HISTORY AND NATURE STUDY.

House Garden and Field, by L. C. Miall.
Stories of Animal Life, by Charles F. Hodder.
Short Stories of Our Shy Neighbors, by Mrs. M. A. B. Kelly.
Trees, Parts 1 and 2, Buds and Leaves, by H. M. Ward.
How Nature Study should be Taught, by E. F. Bigelow and others.
Manual of the Trees of North America, by Charles S. Sargent.
The Flower Garden, by Ida D. Bennett.
Soil Inoculation for Legumes, by George G. Moore, two copies.
Winner's in Life's Race, and Life and Her Children, both by Miss A. B. Buckley.
The Kinship of Nature, by Bliss Carman.
Bird Life and Bird Lore, by R. Bosworth Smith.
Nature Studies, by R. A. Proctor.
Familiar History of Birds, by Edward Stanley.
Out of Doors, by Rev. J. G. Wood.
Strange Dwellings, by Rev. J. G. Wood.
The Culture of Trees in Pots, by J. Brace.
Fertilization of Orchids, by Charles Darwin.

Vegetable Mould and Earthworms, by Charles Darwin.
The Face of Nature, by Rev. C. T. Ovenden.
Mushrooms, Edible, Poisonous Etc., by George F. Atkinson.
Flowers and Ferns in their Haunts, by Mabel Osgoode Wright.
According to Season, by Frances Theodora Parsons.

ART.

The Old Masters and their Pictures, by Sarah Tytler.
Hals Great Masters in Painting and Sculpture, by Gerald S. Davis.
The British Isles, depicated by Pen and Camera, with a series of colored Plates.
The Wallace Collection at Hertford House, by A. L. Baldry.
A Short History of Art, by Julia B. DeForest.

In order to still further reduce the pressure upon our shelves and get additional space for further accessions, the following material was transferred to Alex. Fraser, M.A., Provincial Archivist, February 1905.

Miscellaneous Government Reports	140
Old Atlases	2
Annual Reports of various Institutions	260
Miscellaneous Departmental Reports	70
Legislative Papers	30
Municipal Returns, Voters lists, etc	40
Immigration Literature	60
Northern Ontario pamphlets	20
City and Town Directories	40
Pamphlets (British and U.S.A.)	157
British Treaties	1
Poor Law Commissioners, British	3
Publishers' Catalogues	76
Almanacs Canadian and American	40
General Statistics, France	6
New South Wales Reports	12

LIST OF FRENCH CANADIAN BOOKS TRANSFERRED TO ALEX. FRASER, M.A., PROVINCIAL ARCHIVIST, MARCH, 1905.

Mission du Missisipi en 1700-1861.
Captivite Parmi les Onneiouts en 1690-1-1864.
Dussieux's Canada, 1862.
Lajoie's Catechisme Politique. Civil Government, 1851.
La Rues Canada. History, 1875.
Turcotte's L'ile D'Orleans. History, 1867.
Martel's Droit Canadien, 1877.
Faucher's Choses and Autres, Literature, 1874.
Michelant's Relation Originale, Jacques Cartier Voyages, 1534.
Michelants Jacques Cartier. Voyages, 1534.
Original Relation de Jacques Cartier, 1535-6.
Voyages du Prince de Galles an Amerique, 1860.
Langevin's Canada, Descriptive. 1855.
Journal Jesuit Missionaries, 1645-1668.
Lemoine's Album du Touriste, Quebec, 1872.
Lareau's Melanges, Historique Litteraires, 1877.
D'Ouvrages Sur L' Histoire. Canada, 1837.
Weld's Voyages au Canada, Vols. 1, 2, 3, 1795-7.
Soirees Canadiennes, Literary. 1861.
Bibliotheque du Code Civil, Quebec, 1871.
Les Natchez. Chateaubriand, Vols., 1, 2, 3, 4, 1830.
Viger Vs Bothier-Law Cases, 1827.
Dionne's Oiseaux du Canada, Natural History, 1883.
M'Arthy's L'Ancient Dro du Canada Dictionaire, 1809.
Montigny's Cathechisme Politique. 1878.
Conseller du Peuple, Reflections, 1856.
La Hontan Nouvelle France, Voyages, Vols., 1, 2, 1683.
Tevet's French American, In Italian, 1761.
Campe's la Decouverte de L'Amerique, Vols., 1, 2, 3. 1798.
Charlevoix's Journals, Indian History, 1721-22.

Theodat's Pays des Hurons, Voyages, Vol. 1, 2.
Tache's Union Federale, Essay, 1858.
Garmeau's L'Histoire du Canada, 1858.
Tasse's Canadiens de L'Ouest, Vols. 1, 2.
Talche's le Canada Essay, 1855.
Estat de L' Eclise en Canada, 1688.
Soirees Canadiennes, Literary, 2 Vols., 1862, 1863.
Ursulines de Quebec, Historical, Vols., 1, 2, 1864.
Theodats Histoire du Canada, Vols. 1, 2, 3, 4, 1636.

In addition to the foregoing, certain volumes relating to French interests, published in French, were transferred to the Bureau of Archives to be disposed of in exchange for papers and books bearing on the history of Ontario, and I understand have been used for that purpose by the Provincial Archivist.

List of Reports, Magazines, Newspapers etc., transferred to Alexander Fraser, M.A. Provincial Archivist in March, May and June, 1905.

"Events" 1902. Incomplete.
Gold Region of Nova Scotia, Report of Dr. T. Sterry Hunt, F.R.S., (1868).
Report Delegates appointed to Negotiate for the Acquisition of Rupert's Land and the Northwest Territory, (1869).
Return to House of Commons of Reports of Superintendents of Roads from Thunder Bay to Fort Garry on the Red River, (1870).
Papers in reference to Bank Note Contract, (1897).
The Monthly Review, 1900, 1 volume.
The Monthly Review, 1901, 10 volumes (Oct. and Nov. missing).
The Monthly Review, 1902, 7 volumes.
The Monthly Review, 1903, 5 volumes.
The Monthly Review, 1904, 1 volume.
The Outlook, 1898, incomplete.
The Outlook, 1899, incomplete.
The Outlook, 1900, incomplete.
The Outlook, 1901, incomplete.
The Outlook, 1902, incomplete.
The Outlook, 1903, incomplete.
The Literary Digest, 1902-3, incomplete.
Saturday Review (London, Eng.), 1903-4, incomplete.
Rebellion Record, 1860-1-2, incomplete.
Montreal Herald, 1901-2-3-4, incomplete.
Hamilton Spectator, 1900-1-2-3-4, incomplete.
Ottawa Free Press, 1901-2-3-4, incomplete.
Hamilton Times, 1900-1-2-3-4, incomplete.
Kingston British Whig, 1900-1-2-3-4, incomplete.
Christian Guardian, 1902-3-4, incomplete.
Dominion Presbyterian, 1902-3-4, incomplete.
The Presbyterian, 1902-3-4, incomplete.
The American Agriculturist, 1902-3, incomplete.
Canadian Churchman, 1902-3-4, incomplete.
Welland Tribune, 1902-3-4, incomplete.
The Farming World, 1902-3-4, incomplete.
The Weekly Sun, 1900-1-2-3-4, incomplete.
The Canadian Baptist, 1902-3-4, incomplete.
The Catholic Register, 1902-3-4, incomplete.
United Canada, 1903-4, incomplete.
Canadian Freeman, 1903-4, incomplete.
Catholic Record, 1903-4, incomplete.
Manitoba Free Press, 1902, incomplete.
Dominion Dental Journal, 2 numbers.
Canada Lancet, 1 number.
Canadian Journal of Medicine and Surgery, 1902-3-4, incomplete.
Dominion Medical Journal, 1902-3-4, incomplete.
Irish Industrial Exhibition, World's Fair, St. Louis, 1904. Parts 1, 2, 3.
Canada German Calendar, Berlin, 1905.
World's Columbian Exposition, Chicago, Catalogue of School Appliances, etc., Ontario, 1893.

Calendar Ontario Ladies' College, Whitby, 1885-6, 1874-5, 1891-2.
The Sunbeam, published at Ontario Ladies' College, Whitby, Dec., 1885.
Calendar Western University College, London, Ont., 1884-1883.
Medical Department of the Western University, London, 1884.
Announcement Alma Ladies' College, St. Thomas, 1883-4, 1884-5, and 1885-6.
The Prairies of the Western States; their Advantages and Drawbacks. By Charles Lindsey, Toronto, 1860.
North American Notes and Queries, 1900 and 1901, incomplete.
Minutes of proceedings of School Board, for London, England, 55 volumes.
Appendix to the Report of the School Management Committee of School Board for London, England; 19 volumes.
Commissioner's Report concerning Charities in England, 38 volumes.
"Ladies' Magazine and Canadian Home Journal," 1902 and 1903, incomplete.

Canadian News and New Brunswick Herald, Aug., 1856, to Dec., 1857.
" " " " " Jan. 1858, to Dec., 1858.
" " " " " Jan., 1859, to Dec., 1859.
" " " " " Jan., 1860, to Dec., 1860.
" " " " " Jan., 1861, to Dec., 1861.
" " " " " Jan., 1862, to June, 1862.
" " " " " Jan., 1866, to Dec., 1866.
" " " " " Jan., 1867, to June, 1867.
" " " " " July, 1867, to Dec., 1867.
" " " " " Jan., 1868, to Dec., 1868.
" " " " " Jan., 1875, to Dec., 1875.

Toronto Nation, Jan., 1874, to Dec., 1874.
Toronto Nation, 2 volumes, Jan., 1875, to Dec., 1875.
Toronto Church Herald 2 volumes, 1872.
The Church Herald, Jan., 1873, to April, 1873.
The Builder, Jan., 1873, to Dec., 1873.
The Builder, Jan., 1873, to June, 1873.
The Builder, Jan., 1874, to June, 1874.
The Builder, Jan., 1875, to June, 1875.
New York Christian Intelligencer, Jan., 1874, to Dec., 1874.
New York Christian Intelligencer, Jan., 1875, to Dec., 1875.
London (Eng.) Methodist Recorder, Jan., 1873, to Dec., 1873.
London (Eng.) Methodist Recorder, Jan., 1874, to Dec., 1874.
London (Eng.) Methodist Recorder, Jan., 1875, to Dec., 1875.
The Rock (English), Jan., 1873, to Dec., 1873.
The Rock (English), Jan., 1874, to Dec., 1874.
The Rock (English) Jan., 1875, to Dec., 1875.
New York Musical Review, 1858-59.
The Economist, Toronto, 1897-8-9, 1900-1, incomplete.
Canadian Architect and Builder, 1896-7-8-9, 1900, incomplete.
Canadian Presbyterian, 1896-7, incomplete.
Winnipeg Nor'Wester, 1896, incomplete.
Church Record, Toronto, 1900-1, incomplete.
Evangelical Churchman, 1889 1896-7-8-9, 1900, incomplete.
Christian Guardian, 1890-1-2-3-4-5-6-7-8-9, 1900-1, incomplete.
Presbyterian Review, 1896-7-8-9, 1900-1, incomplete.
Canadian Baptist, 1891-2-3-4-5-6-7-8-9, 1900-1, incomplete.
The Canadian Journal, 1852-3-4-5, incomplete.
Educational Weekly, 1885-6-7, incomplete.
Canada School Journal, 1887, incomplete.
Educational Journal, 1887, incomplete.
Popular Educator, 1888-9, 1890-1-4-5-6-7-8-9, 1900, incomplete.
American Primary Teacher, 1891-5-6-7-8-9, 1900, incomplete.
Publisher's Circular, 1897-8-9, 1900, incomplete.
Canadian Freeman, 1896-7-8-9, 1900-1, incomplete.
Educational Times (English), 1886-7-8-9, 1891-2-3-4-5-6-7-8-9, incomplete.
Popular Science News, 1898-9, 1900, incomplete.
Printer and Publisher, 1901, incomplete.
Teacher's Institute, 1897-8-9, 1900, incomplete.
The Nation, 1899, complete.
School Bulletin, 1891-5-6-7-8-9, 1900, incomplete.
World Wide, 1901, incomplete.
Canadian Bookseller, 1898-9, 1900-1, incomplete.
Bookseller and Stationer, 1896-7-9, 1901, incomplete.
Toronto Truth, 1897-8, incomplete.

Schoolmaster (English), 1894-5-7-8-9, incomplete.
Church Chronicle, Toronto, 1863-4-5-6-8-9, incomplete.
United Canada, 1896-7-8-9, 1900-1, incomplete.
The Week, 1895, 1894, 1896, incomplete.
Canadian Church Magazine, 1896-7-9, 1900-1, incomplete.
Catholic Record, 1897-8-9, 1900-1, incomplete.
Catholic Register, 1896-7-8-9, 1900-1, incomplete.
Montreal Weekly Witness, 1897-8-9, 1900, incomplete.
Saturday Night, 1900, 1901, incomplete.
Bookseller (English), 1894-5-6-7-8-9, incomplete.
Welland Tribune, 1898-9, 1900-1, incomplete.
British Empire Review, 1899, 1900-1, incomplete.
Britannia, 1897-8-9, incomplete.
Publisher's Weekly, 1897-8-9, 1900, incomplete.
The Nation, 1897-8-9, 1900-1-2, incomplete.
Science, 1892-4-5-6-7, incomplete.
The Citizen, 1898, incomplete.
University Extension World, 1893, 1894, incomplete.
Dominion Presbyterian, 1899, 1900-1, incomplete.
Canadian Practitioner, 1890-1-5-8-9, 1900-1, incomplete.
Canadian Journal of Medicine and Surgery, 1897-8-9, 1900-1, incomplete.
Dominion Medical Monthly, 1894-5-6-7-9, 1900-1, incomplete.
Home and Foreign Record, 1863-4-5-6-8, 1870-1, incomplete.
Miscellaneous collection of French pamphlets, etc., 21 parcels in all.
One parcel German Miscellaneous Pamphlets.
The Weekly Colonist, August, 1852, to Dec., 1855, complete.
The Church (Toronto), Vol. 14, 1851-2, complete.
The Church (Toronto), 1853-4. (Incomplete, 1853.)
Toronto North American, 1852-3-4-5, incomplete.
Toronto Patriot, 1845, 1849, 1850, 1851, incomplete. 1852 and 1853 complete.
Hamilton Gazette, 1847-8-9, 1850-1-2-3-4-5-6, incomplete.
Christian Guardian, 1851 incomplete, 1852-3-4 complete.

The following books were transmitted to Mr. Fraser, Provincial Archivist, to be placed on the shelves of the Bureau of Archives, for safe keeping for the Education Department, and are not to be disposed of except upon the direct order of the Minister of Education.

Canadian Law Times, Vols. 9 to 18, 1889 to 1898.
Upper Canada Queen's Bench Reports, Vols. 1-46, 1845-82, (2 copies each of Nos. 35, 36, 37, 38 and 39).
Upper Canada Common Pleas Reports, Vols. 1-32, 1852-83.
Upper Canada Law Journal, Vols. 1-12 (New Series), 1865-76.
Ontario Appeal Reports, Vols. 1-13, 1878-87.
Ontario Reports, Vols. 1-13, 1882-7.
Grant's Chancery Appeal Reports, Vols. 1-23, 1850-1876.
Upper Canada Law Journal, Vols. 1-10, inclusive, 1855-64.
La Themis, Vols. 2 to 5 inclusive.
Supreme Court Reports of Canada, Vols. 22-24 inclusive.
La Bibliothèque du Code Civil, Quebec, Vols. 5-9, inclusive.
Lower Canada Jurist, Vols. 1 to 18 (12 and 14 missing).
Chancery Reports, Vols. 24 to 29 inclusive (1877 to 1883).
Canada Law Journals, 1877 to 1900 inclusive (1899 and 1900 unbound).
Local Courts and Municipal Gazette, Vols. 1 and 2.
Local Courts and Municipal Gazette, Vol. 3.
Local Courts and Municipal Gazette, Vols. 4 and 5.
Local Courts and Municipal Gazette, Vols. 6 and 7.
St. Alban's Raid Trial, 1865.
State Trials, Lower Canada, Vols. 1 and 2 (1839).
Upper Canada Error and Appeal Reports, Vols. 1, 2 and 3, Grant, 1846 to 1856.

Respectfully submitted,

HENRY R. ALLEY,
Librarian.

30th December, 1905.

APPENDIX J. ADMISSION OF CANDIDATES TO COLLEGIATE INSTITUTES AND HIGH SCHOOLS.

Collegiate Institutes.	Entrance Examination, June, 1905.	
	Examined.	Passed.
Aylmer	96	62
Barrie	137	86
Berlin	179	139
Brantford	234	170
Brockville	142	107
Chatham	199	153
Clinton	54	49
Cobourg	77	68
Collingwood	82	53
Galt	145	116
Goderich	72	52
Guelph	126	90
Hamilton	612	464
Ingersoll	132	91
Kingston	208	174
Lindsay	92	71
London	396	323
Morrisburg	74	13
Napanee	105	65
Niagara Falls	98	91
Ottawa	495	443
Orillia	96	64
Owen Sound	202	145
Perth	96	64
Peterborough	179	95
Renfrew	115	81
Ridgetown	50	31
St. Catharines	69	54
St. Mary's	131	92
St. Thomas	162	113
Sarnia	138	84
Seaforth	70	64
Stratford	169	108
Strathroy	111	66
Toronto (Harbord St.)	495	338
" (Jameson Ave.)	267	155
" (Jarvis St.)	499	321
Toronto Junction	103	57
Vankleek Hill	69	33
Whitby	85	70
Windsor	118	88
Woodstock	180	137
High Schools.		
Alexandria	111	42
Almonte	61	37
Arnprior	59	48
Arthur	80	47
Athens	98	58
Aurora	71	46
Beamsville	34	17
Belleville	171	144
Bowmanville	56	43
Bradford	36	30
Brampton	75	35
Brighton	37	34
Caledonia	59	41
Campbellford	81	59
Carleton Place	81	50
Cayuga	39	25

High Schools.—Continued

	Entrance Examination, June, 1905.	
	Examined.	Passed.
Chesley	45	38
Colborne	25	18
Cornwall	119	77
Deseronto	17	15
Dundas	48	32
Dunnville	74	51
Dutton	52	48
East Toronto	50	40
Elora	36	27
Essex	57	12
Fergus	64	40
Forest	57	36
Fort William	33	30
Gananoque	76	29
Georgetown	46	32
Glencoe	67	38
Gravenhurst	72	57
Grimsby	30	24
Hagersville	53	14
Harriston	27	20
Hawkesbury	36	17
Iroquois	69	32
Kemptville	64	30
Kenora (Rat Portage)	38	22
Kincardine	75	45
Leamington	51	28
Listowel	82	56
Lucan	94	56
Madoc	42	19
Markham	129	78
Meaford	44	28
Midland	37	25
Mitchell	89	70
Mount Forest	45	40
Newburg	66	58
Newcastle	31	22
Newmarket	48	34
Niagara	17	14
Niagara Falls South	28	24
North Bay	37	15
Norwood	43	32
Oakville	53	40
Omemee	43	24
Orangeville	68	42
Oshawa	70	59
Paris	51	42
Parkhill	74	50
Pembroke	127	96
Petrolea	62	40
Picton	125	59
Plantagenet	38	19
Port Arthur	35	32
Port Dover	26	22
Port Elgin	44	35
Port Hope	69	61
Port Perry	51	34
Port Rowan	35	27
Prescott	76	51
Richmond Hill	64	50
Sault Ste. Marie	77	55
Simcoe	98	49
Smith's Falls	54	34
Smithville	42	16

High Schools.—Continued.	Entrance Examination, June, 1905.	
	Examined.	Passed.
Stirling	50	25
Streetsville	25	15
Sydenham	81	49
Thorold	37	36
Tillsonburg	70	54
Trenton	66	46
Uxbridge	74	50
Vienna	49	16
Walkerton	68	40
Wardsville	30	23
Waterdown	37	21
Waterford	84	46
Watford	78	43
Welland	61	38
Weston	54	41
Wiarton	47	41
Williamstown	46	22
Other Places.		
Aberfoyle	33	18
Acton	33	30
Alliston	57	43
Alvinston	59	26
Ameliasburg	20	8
Amherstburg	41	12
Ancaster	43	16
Angus	21	6
Apsley	3	3
Arkona	33	18
Ashton	13	9
Aultsville	33	15
Avonmore	66	22
Ayr	27	22
Bailieboro'	21	17
Bancroft	33	13
Bath	42	25
Beaverton	29	14
Beeton	25	20
Belle River	20	12
Belmont	26	16
Bethany	14	11
Binbrook	44	35
Blackstock	37	24
Blenheim	78	63
Blind River	14	7
Blyth	29	22
Bobcaygeon	22	9
Bolton	36	9
Bothwell	51	37
Bowesville	14	11
Bracebridge	50	24
Bridgeburg	22	18
Brigden	23	12
Brussels	87	74
Burford	42	24
Burgessville	19	13
Burk's Falls	31	22
Burlington	28	22
Burritt's Rapids	9	7
Byng Inlet	10	7
Cannington	49	31
Cardinal	39	18

Other Places.—Continued.	Entrance Examination, June, 1905.	
	Examined.	Passed
Carp	21	18
Castleton	13	9
Cataraqui	43	25
Chapleau	2	2
Charleston	28	10
Chatsworth	26	19
Chesterville	52	13
Churchill	33	23
Claremont	17	15
Clifford	19	12
Cobden	45	36
Comber	25	9
Cookstown	36	32
Copper Cliff	11	7
Courtwright	18	9
Crediton	30	23
Creemore	17	6
Crosshill	25	20
Cumberland	38	24
Delhi	51	26
Delta	32	9
Dickinson's Landing	30	15
Dorchester Station	55	33
Drayton	54	42
Dresden	69	58
Drumbo	16	13
Dryden	8	5
Dundalk	45	27
Dungannon	44	24
Durham	70	36
Eganville	56	51
Eglinton	32	22
Elmira	31	22
Elmvale	40	19
Embro	23	17
Emo	11	7
Erin	43	27
Exeter	39	34
Fenelon Falls	55	30
Finch	63	18
Fingal	66	27
Flesherton	30	24
Florence	32	8
Fordwich	20	19
Fort Frances	6	5
Fournier	9	4
Galetta	24	22
Glen Allan	10	10
Gore Bay	28	12
Grand Valley	34	11
Guelph Consolidated School	17	10
Hall's Bridge	9	8
Hanover	33	23
Harrow	15	10
Hastings	24	20
Havelock	16	14
Hensall	29	16
Highgate	30	20
Hillsdale	27	17
Hintonburgh	56	32
Horning's Mills	14	12
Huntsville	45	27
Irish Creek	37	23

Other Places.—Continued.

	Entrance Examination, June, 1905.	
	Examined.	Passed.
Janetville	4	3
Janeville	9	2
Jarvis	31	20
Kars	12	12
Keene	25	23
Keewatin	18	11
Kilmaurs	8	3
Kimberley	15	9
Kingsville	29	20
Kintail	34	17
Kirkfield	15	8
Lakefield	52	39
Lanark	54	35
Lancaster	24	13
Laurel	12	6
Lion's Head	10	4
Little Current	17	7
Little Britain	18	8
London East	135	86
Lucknow	36	26
Magnetawan	22	13
Manitowaning	12	7
Manotick	23	21
Markdale	40	25
Marmora	20	11
Marksville	6	3
Marshville	26	20
Marsville	4	4
Mattawa	21	13
Maxville	56	27
Merivale	17	9
Merlin	45	32
Merrickville	32	15
Metcalfe	26	23
Mildmay	20	10
Millbrook	31	24
Milton	91	58
Milverton	63	46
Minden	23	12
Moorefield	7	4
Mount Albert	21	15
Mount Hope	20	7
Mountain Station	24	8
Neustadt	23	14
Newboro'	41	12
New Hamburg	33	22
New Liskeard	8	6
North Augusta	14	2
North Gower	26	22
North Lancaster	29	8
Norwich	44	24
Oakwood	24	12
Oil Springs	41	24
Orono	16	14
Ottawa East	13	12
Otterville	13	11
Paisley	54	34
Pakenham	24	14
Palmerston	23	18
Parry Sound	60	32
Pelham S. S. No. 2	20	17
Penetanguishene	39	34
Plattsville	30	20

Other Places.—Continued.	Entrance Examination, June, 1905.	
	Examined.	Passed.
Port Colborne	26	23
Port Dalhousie	59	29
Port Stanley	20	10
Powassan	51	39
Princeton	18	13
Queensville	23	14
Rainy River	6	1
Randewick	5	4
Richard's Landing	14	3
Richmond	23	18
Rideauville	21	20
Ridgeway	24	17
Ripley	40	23
Rockton	38	18
Rockwood	32	21
Rodney	28	23
Rosemount	20	12
Roseneath	15	12
Russell	30	18
St. George	12	10
St. Helen's	25	15
Sandwich	55	30
Schomberg	22	14
Schrieber	12	7
Selkirk	30	20
Sharbot Lake	35	19
Shelburne	41	22
Southampton	22	18
South Indian	26	15
South Mountain	24	5
Sparta	12	7
Spencerville	29	16
Springfield	33	15
Stayner	70	52
Stony Creek	40	28
Strabane	22	15
Stittsville	21	14
Sturgeon Falls	23	14
Sudbury	24	12
Sutton West	39	16
Tamworth	43	28
Tara	20	5
Tavistock	23	14
Taylorville	9	6
Teeswater	41	29
Thamesville	67	31
Thedford	25	9
Thessalon	31	15
Thornbury	50	27
Thorndale	20	16
Tilbury	46	26
Tiverton	15	9
Tottenham	30	22
Tweed	49	46
Uptergrove	28	19
Varna	18	14
Vernon	5	5
Wallaceburg	46	39
Warkworth	40	29
Waubaushene	53	27
Webbwood	20	6
Wellington	28	11
West Lorne	27	26

Other Places.—Continued.	Entrance Examination, June, 1905.	
	Examined.	Passed.
West Osgoode	12	9
Westport Separate School	35	13
Winchester	60	11
Wheatley	18	13
Wilkesport	18	8
Wingham	54	45
Wolfe Island	25	9
Woodbridge	26	17
Woodville	20	10
Wooler	20	17
Wroxeter	17	15
Wyoming	28	19
Zephyr	18	14
Zurich	27	16
Summary.		
Collegiate Institutes	6,997	5,016
High Schools	5,807	3,804
Other Places	7,491	4,611
Grand Total	20,295	13,431
Comparison with June, 1904.		
Increase	521	
Decrease		1,201

APPENDIX K.—THIRTY-FOURTH ANNUAL REPORT OF THE ONTARIO INSTITUTION FOR THE EDUCATION OF THE BLIND, BRANTFORD.

BEING FOR THE YEAR ENDED 30TH SEPTEMBER, 1905.

Hon. R. A. PYNE, M.D., LL.D., *Minister of Education*:

SIR,—I have the honor to transmit herewith the Thirty-fourth Annual Report upon the Institution for the Education and Instruction of the Blind, at Brantford, for the year ended 30th September, 1905.

I have the honor to be,
Sir,
Your obedient servant,

H. F. GARDINER,
Principal.

BRANTFORD, October, 1905.

THE INSTITUTION FOR THE EDUCATION OF THE BLIND.

In presenting the thirty-fourth annual report of the Ontario Institution for the Education of the Blind, I beg to refer to the appended reports of the Literary and Musical examiners, Mr. S. F. Passmore and Mr. W. E. Fairclough, respectively, who have given in detail their opinions of the work done by the teachers during the year, and of the results accomplished. Mr. Passmore found among the blind pupils "intellects as clear and minds incited by as lofty ideals as are possessed by any other persons;" he credits the pupils with "earnestness and application," and their teachers with "faithful perseverance and sympathy," while further commending the "order, discipline and deportment of the pupils." He did not look for perfection and he did not find it, but his enthusiastic language indicates that he was more than satisfied with what he found. There is no attempt in the Institution to produce a few "show pupils" to excite the amazement of visitors, and allow them to carry away the impression that the brightest and best are fair samples of the whole. On the other hand, the teachers understand the necessity of giving most attention to the mediocre and the dull, and sometimes they have to wait long for encouraging results. Mr. Passmore's suggestions about the teaching of Latin and the adoption of another spelling book will be carried out. Mr. Fairclough did not find the pupils' work at the organ as good as their piano work, but he expresses satisfaction with the records of O. I. B. pupils in the Toronto College of Music examinations and he has a good word for the vocal class. When he sums up by saying that the general "results obtained compare favorably with those of other teaching institutions where the pupils have all their faculties," no more could be asked or expected, for in the study of music, as in everything else, the blind

pupil labors at a disadvantage in comparison with the pupil who can see, and the teacher's work is correspondingly onerous.

As will be seen by the Physician's Report, pupils and teachers enjoyed exceptionally good health throughout the year, which fact was a cause of devout thankfulness and aided greatly in the production of recorded results.

I have embodied in this Report not merely the record of the year's operations in connection with the school and its surroundings, but also information gleaned from the reports of Blind Institutions in the United States, and from various other sources, which may be found useful in the improvement of the Ontario Institution, and which will be instructive to members of the Legislature and others interested in the welfare of the blind. While there is competition among the different Institutions in the endeavor to excel, there is no spirit of monopoly or idea of secrecy. Every plan that has been tested and found good is made public for the general benefit, and the flattery of imitation is invited. Thus one learns from the experience of all. A case in point: The idea of providing workshops or "homes" for the adult blind has been suggested from time to time in Ontario, and has been tried in Pennsylvania and Wisconsin, as well as in several European countries. The New York Legislature is making inquiry into this subject by means of a special commission, and the first report of that commission, of which a summary will be found in these pages, is nearly as useful and instructive to the legislators at Toronto as to those at Albany. The problem of enabling the blind to earn a living and making them independent of assistance is yet unsolved.

The attendance at the Ontario Institution is practically unchanged, notwithstanding the discovery of quite a number of children in the Province who should be enrolled as pupils. It takes protracted argument to bring many parents to a state of mind in which they are willing to entrust their afflicted children to the care of strangers. On the other hand, care and firmness have to be exercised to keep out of the Institution persons who, on account of imbecility, incorrigibility or advanced age, are undesirable as pupils, and for whom their friends would like to use the Institution as an asylum. There is another class, eligible in every respect, except that they have no friends to stand *in loco parentis*, to provide clothing and travelling expenses, to take care of them during vacations, and to receive them at the end of their school life. In the State of Washington, legislation has been enacted which throws the responsibility in such cases upon the county councils, which were probably as slow there as here to take voluntary action involving expense.

The transfer of the control of the Institution, at the beginning of the calendar year, from the Provincial Secretary's Department to the Department of Education was accomplished without friction or difficulty. Among other beneficial effects of the change, we may now hope that the public will be educated up to a knowledge that the Institution for the Education of the Blind is not a "Blind Asylum," but a school.

Attendance.

The total registration of pupils in the session of 1904-05 was 122, as against 121 in the session of 1903-04; at the opening on September 28th, 1904, there were 104 pupils as compared with 103 at the opening of the preceding session; at the close 107 as compared with 109. Of the fifteen pupils who were present during a part of the session, but did not remain until the end, one (male) was taken home because his mother missed his company, two

(males) were averse to work, three (males) left to obtain employment, one (male) became ill, one (male) was taken away by his parents who were removing to England; two (females) did not return after the Christmas holidays, one (female) became homesick after a few days in the Institution, and four (females) went home on account of illness.

Of the 107 pupils who were present at the end of the session, there were forty-seven males and sixty females.

The number of pupils in attendance at the opening on September 27th, 1905, was 107, as compared with 104 at the corresponding date in 1904, and 107 at the closing of the school term on June 21st, 1905. Of those in attendance at the end of the last term, 85 have returned; six former pupils, who were not here at the close of last term, have come back, and sixteen new pupils have been enrolled. The absence of the twenty-two who have not returned is thus explained:—

Graduated.	Male.	Female.	Total.
In piano-tuning	2	.....	2
In music (artists' diploma A.T.C.M.)	.....	1	1
In literary class (one in industrial)	.....	2	2
Other causes.			
To secure Employment	2	1	3
Domestic requirements	2	5	7
Temporary detention	2	5	7
	8	14	22

Of those classified as temporarily detained, three returned to their classes early in October.

The ages of the new pupils are as follows:—

Males.		Females.	
Thirty-eight years	1	Thirty-one years	1
Seventeen years	1	Twenty years	1
Fifteen years	3	Nineteen years	1
Fourteen years	2	Eighteen years	2
Twelve years	1	Sixteen years	1
Eleven years	1	Fourteen years	1
Ten years	1	Thirteen years	1
Nine years	1	Ten years	1
Seven years	1	Six years	1
	12		10
			12
			22

The male pupil aged 38 was re-admitted after a few weeks' absence at the close of the last term.

A casual reading of any recent report of this Institution might lead to the inference that the attendance has decreased during the last score of years more than it really has. The reports being made to cover the year ending September 30th, the figures of attendance in the tables at the end of the book necessarily include all the pupils of one term and the new pupils of the next term, because the school opens, after the long summer vacation, a few days before September 30th. Thus, while there were actually 122 pupils enrolled in the session of 1904-05, the enrollment for the year from October 1st, 1904, to September 30th, 1905, was 141. Similarly, the maximum attendance at any one period in the session of 1881 was 179, and total enrollment in that session was 189, though the attendance for the year from October 1st to September 30th is tabulated at 201.

There is gratifying reason to believe that blindness is not so prevalent as formerly, when the physicians and nurses were less well informed and perhaps less careful. But there is another reason why the attendance at the Ontario Institution for the Blind reached its maximum more than a score of years ago. The Institution was opened for the reception of pupils in 1872. For the next eight or ten years new pupils were steadily added, but very few left the school. At the end of that period, and ever since, about as many have finished their course each year, and gone away, as have been enrolled as new pupils. At the present time there are probably thirty children of school age with defective sight in the Province who ought to be in the school, but whose parents for various reasons will not consent to send them. The policy of the Department, based upon the experience of the last thirty years, is to discourage the admission of adults, except under very exceptional circumstances. Had that been the policy twenty years ago, it is doubtful if the attendance then would have been larger than it is now.

Looking for New Pupils.

Acting in co-operation with Principal Mathison, of the Institution for the Education of the Deaf and Dumb at Belleville, and with the permission of the head of the Department, we sent out in the month of March, to the nine thousand school teachers and township clerks of Ontario, copies of the *Canadian Mute*, containing illustrated articles descriptive of the two Institutions, also envelopes containing circulars and addressed postal cards, requesting information concerning children of school age with defective sight or hearing. Nearly 2,500 of the postal cards were returned, most of them stating that no blind children could be found, some expressing sympathy and admiration for our work, and about 75 giving the names and addresses of possible pupils. To all of these, letters were sent, with application blanks enclosed, together with pamphlets about the school, and in several cases personal visits were made by members of the staff.

It would have been far more satisfactory if a larger proportion of the teachers had responded, as it takes a deal of correspondence and not a little time to convince some parents of the advisability of sending their children to a school like this. I gratefully acknowledge the kindness of those who promptly made inquiries and conveyed to me the required information.

Home Training.

In my correspondence with parents, and in my visits to the homes of blind children, I have found great reluctance to let the children leave home, not

mere infants only, but children of ten to fifteen years old being considered too young to go among strangers. This idea, based upon parental love and anxiety, is natural and entitled to respect, but it is the duty of the parent, and not that of the child, to reason the matter out, and to decide that it is better to suffer the wrench of separation than to have the child grow up in ignorance. When the child approaches manhood or womanhood, it will naturally dislike to go into classes with infants, and the lost years cannot be recovered. I recited in last year's report a number of things which blind children might be taught with advantage at their homes before coming to school, and as this subject is of great importance, I quote from the Boulder, Montana, *Rocky Mountain Leader* the following article by Max W. Voss on Home Training for the Blind:—

"It has only been within the past few generations that the education of the Blind has been considered a necessary feature in completing the educational system of the world. Previous to this period the position of the blind as regards the social and industrial world was one of degradation, neglect and obscurity. Homer and Milton, though ranking pre-eminently in advance of their age, were not sufficient factors to interest their Governments in advancing the condition of the blind, and it was left for a modern civilization and a later generation to lay the foundation of this great work. To-day every representative nation of the globe and nearly all the States of our Union have equipped the most modern and up-to-date schools for the blind. Gradually but surely the teachers of this profession are increasing the courses prescribed in the curriculums of these schools, until they now are placed on an equal basis with the best High Schools of the country.

"The work is advancing, and yet at times it is seriously retarded by the lack of training before entering the schools. The physical development of a normal child is the result of a natural growth and it begins with the earliest efforts of the child and continues until the body reaches maturity. As an infant it creeps for the object it desires, and as the limbs grow stronger it does what it sees others do. Its action is the result of imitating.

"The problem with which we have to deal is of quite a different nature and requires a more complicated method for its solution. The child deprived of one of the five senses necessarily demands a greater amount of attention than one in possession of all his faculties. This training or development should begin at home and the members of the family should consider themselves directly responsible for its growth. If a child is backward, then teach him independence and self-reliance. From the earliest possible period he should be taught how to dress himself and also the use and care of clothing. The latter is a fact sadly neglected among the blind. He should be taught the proper use and care of the seven handicraft tools, such as the hammer, the saw, the rule, etc. Whenever an occasion of playing with other boys in the rougher out-of-door games presents itself, he should never fail to avail himself of this opportunity. The girls should be taught how to sew, both by hand and machine, to cook, to wash dishes and set tables, and to do all of the domestic forms of housekeeping. The child should be taught how to dance, so that the body may become agile, supple and graceful. I believe every blind child should be taught the art of dancing. I may of course be criticized for advocating this theory, but if dancing were taught with the view of strengthening and beautifying the body, time could not be more profitably spent than in this work, notwithstanding the different ideas or opinions some of the learned men of the day may have in regard to this subject.

"But the physical training of a blind child is not alone sufficient to assure a successful career. A sound mind in a sound body was the theory of the

old Greeks and that theory holds good down to the present time. There is a mistaken belief, among the parents of these children, that because of their blindness their every whim and caprice should be gratified without regard to the injury that may result from this treatment, a mistaken love that should be guarded against. Train them to be independent and self-reliant, and when backed by common sense there can be no greater stimulant for success. Too often we find among the pupils of our schools those who are weak both in mind and body, a result due wholly to a neglect in their early home training,—boys and girls who are of no practical benefit to society and who in time will become burdens to the state. This is a fact to be deplored, and when we believe that from the same material might have been made young men and women who would be an honor to their families, a credit to the community and a benefit to society, too much attention cannot be given to the early home training of the blind. The home is the kindergarten of the world and the mother is the teacher."

Changes in Staff.

Mr. J. A. Hayter resigned his position as Instructor in Piano Tuning on December 31st, 1904, on account of ill health. Mr. Thomas Usher was appointed to succeed him.

Mr. T. Truss resigned his position as Trades Instructor on May 1st, 1905, to take effect on August 1st succeeding. At the time of writing the position has not yet been filled.

Mr. George A. Ramsay was appointed Supervisor of Boys and commenced his duties in that capacity on October 1st, 1905.

Examinations.

The annual examination of the literary classes was conducted by Mr. Samuel F. Passmore, Classical Master in the Brantford Collegiate Institute, who spent five full days among the pupils, four of which were devoted to the examination. Mr. Passmore's report is appended, and attention is also drawn to his remarks at the closing concert, elsewhere reported. While embarrassed by his unfamiliarity with the methods of teaching the blind, Mr. Passmore became deeply interested in the work he was called upon to inspect, and his report shows an intelligent comprehension of the difficulties, as well as a gratifying appreciation of the successes, of the teachers. I would suggest that, when it is possible to do so, the same examiner should be appointed for at least three consecutive sessions. In that way a better idea of comparative progress can be formed.

Musical Instruction.

For the fifth time Mr. W. E. Fairclough, of the Toronto College of Music, acted as examiner of the pupils in Music, of whom he found fifty remaining at the close of the session, several having been called away by illness and other causes before the examinations began. His report will be found on another page. The Toronto *Globe* of April 14th, 1905, contained the following reference to the performance in that city of the graduate of this year:

"A very interesting piano recital was given in the Hall of the Toronto College of Music last evening by Miss Mary Williams of the Ontario Institu-

tion for the Blind at Brantford. Though quite without the precious gift of sight, Miss Williams succeeded in giving a creditable rendering of a long and difficult programme, including such numbers as the Schubert Impromptu, Op. 142, No. 2; Schumann's 'Nachtstuck,' Chopin's 'Berceuse,' and Impromptu Op. 29, and Beethoven's Sonata, Op. 27, No. 2 ('Moonlight'), besides several other compositions by Raff, Nevin, Pierne and Liszt. The performance of piano classics of such a character, with not only a beautiful clearness of tone and touch, but in a manner displaying taste and intelligent conception of the works under her attention, must have been very gratifying to the friends of Miss Williams, and to her teacher, Mr. Ernest A. Humphries, the Musical Director of the Institution for the Blind. The assisting performers were Miss Alvina Springer of Guelph, pupil of Dr. Torrington. and Miss Josephine Sheppard, of the School of Expression, both of whom delighted the audience with their selections."

The following is the list of successful O. I. B. pupils in the Toronto College of Music examinations, June, 1905:—

Associate Toronto College of Music (A.T.C.M.), First Class Honors. Miss Mary Williams.
Third Year Piano, First Class Honors, Miss Hester Ponting.
Second Year Piano, Second Class Honors, Miss Grace Kight.
Second Year Piano, Second Class Honors, Miss Anna Victoria Thomson.
Second Year Piano, Pass, Herbert Treneer.
First Year Piano, First Class Honors, Miss Ethel Peterson.
First Year Piano, Second Class Honors, Charles Duff.
First Year Piano, Second Class Honors, George Skinkle.
First Year Piano, Second Class Honors, Albert Fall.
First Year Piano, Second Class Honors, Cameron Allison.
Second Year Theory, First Class Honors, Miss Mary Williams.
First Year Theory, Second Class Honors, Herbert Treneer.

Entertainments.

The entertainments by and for the pupils were as numerous and popular as usual. The following report of the Christmas Concert appeared in the Brantford *Expositor* of December 21st:

"The popularity of the Christmas concerts at the Institution for the Blind was evidenced last evening in a marked way by the attendance of a very large audience, who filled the institution hall to the doors. That such a number of people should go such a distance on so stormy an evening must be accepted by those in charge of the concert as a very great compliment. The hall was gaily decorated with flags and wreaths in a most effective Christmas style, and formed a bright setting for the interesting work of the very apparently bright and happy pupils.

"In welcoming the friends to the school, Principal Gardiner also extended a hearty invitation to them to visit the institution during school hours instead of at times when the work of teaching was not in progress. He also reminded the audience that though the programme was largely composed of musical numbers, still music was but one branch of the institution work, and that the common school education necessarily received first attention, as is required in any school for young people.

"The programme, which was composed of bright numbers throughout, and possessed the added virtue of brevity, no encores being allowed, was as follows:

Organ—"Christmas Offertory" ..... *Jules Grison.*
MARY MACDONALD.

Recitation—"Six Little Turkeys" .....
MARY CUNEO.

Part Song—"Vesper Bells" ..... *Bonheur.*
CHORAL CLASS.

Piano Duet—"Christmas Happiness" ..... *Mendelssohn.*
HERBERT TRENEER AND CHARLES DUFF.

Recitation—"Our Christmas" .....
WINIFRED DAVISON.

Piano Solo—"Valse Brillante" Op. 34, No. 1 ..... *Chopin*
HESTER PONTING.

Two Part Song—"The Angel's Gift" ..... *Cotsford Dick.*
CHORAL CLASS (Girls).

Two Pianos—"The Dragon Fighter" ..... *Hoffman.*
VICTORIA THOMSON AND GRACE KAY, ALICE STICKLEY AND CATHARINE CURRY.

Recitation—"While Shepherds Watched their Flocks by Night" .....
IRENE FOX.

Part Song—"Song" from "Love's Labor's Lost" ..... *Nevin.*
CHORAL CLASS.

Piano Solo—(a) "Love Dream" No. 3 ..... *Liszt.*
(b) "Impromptu" Op. 29 ..... *Chopin.*
MARY WILLIAMS.

Recitation—"The Little Maid's Sermon" .....
ETHEL MCQUADE.

Anthem—"O Gladsome Light" from "Golden Legend" ..... *Sullivan.*
CHORAL CLASS.

Overture to 'Rosamunde'" ..... *Schubert.*
Piano.—MARY WILLIAMS AND GERTRUDE COLL. HESTER PONTING AND GRACE KIGHT.
Organ—MARY MACDONALD.

God Save the King.

"In an array of numbers covering such a wide range it would be almost impossible to select any of superior excellence. The recitations were all marked by that distinctness of enunciation and characteristic attention to vocal inflection which is always a feature of these concerts. In the musical numbers especial mention might be made of the work of Miss Mary Macdonald at the organ, and of the brilliant performance by two small boys, Masters Treneer and Duff, of their piano duet. The concerted pieces were also delivered in a manner which apparently delighted the audience, the closing number, Schubert's Overture to Rosamunde, rendered by five girls on two pianos and the large pipe organ, being unquestionably the crowning effort of the evening.

"The singing of the choral class is possibly the most entertaining feature of institution concerts, and last night they very ably maintained their splendid reputation. The work of the class is especially remarkable for good tone, spontaneity of attack and attention to phrasing and shading; their work last night would compare most favorably with the best trained choirs, and was notably excellent in their rendering of a "Song" from "Love's Labor's Lost," by Nevin, and "O Gladsome Light," by Sir Arthur Sullivan.

"In fact, the whole concert was remarkable for its excellence and brightness, and reflects great credit upon Principal Gardiner and his able assistants."

The Christmas Tree entertainment was held on December 26th, and it was thus described by the newspaper next day:

"The pupils at the Ontario Institution for the Blind, who were unable on account of distance or other considerations to spend the holidays with their friends at their homes, enjoyed a Christmas Tree entertainment last night. The concert decorations had been left up in the Music Hall from last week, and the good taste of Mrs. Kirk, Misses Lee and Haycock was shown in the arrangement of the ornaments and presents on the tree. First, an impromptu concert programme was given, consisting of piano solos by Herbert Treneer, Irene Fox, Grace Kight and Mary Hicks; mouth organ solo by John McDonald; violin solo by Alex. Forbes; songs by John McDonald, Anna Mulligan, Matilda Sauvé, Joseph Boudreault, Ovila Daniel —the last two in French; recitations by Harry White, Orville Frayne, Roy Goldie, Marie Sprengel, Ethel Squair, Harriet Hepburn, Nellie Catling and Beatrice McCannan. All did well, but especial applause was given to the little ones who made their first bow before an audience. The distribution of the gifts followed, and all seemed highly delighted with what Santa Claus had brought. Several friends of the pupils and teachers honored the occasion with their presence."

On March 9th the pupils were favored with a visit from the Canada Club, of Brant Avenue Methodist Church, accompanied by the pastor, Rev. Mr. Harvey. The Club members debated the question, "Resolved, That a continuance of the policy of Free Trade is not in the interests of Britain." The debaters on the affirmative were Messrs. Doherty, Matthews, Hartley and Durkee, while those who upheld the negative were Messrs. Ranson, Wood, Williams and Davies. The judges decided in favor of the negative. Before and after the debate, which was most interesting, several of the pupils gave musical selections, and at the conclusion cake and coffee were served by the matron and her staff in the dining room. The Principal thanked the young people for their visit, and he remarked that he had often wondered why the good people of the city were so seldom moved to do anything for the entertainment of the pupils, until it had been suggested to him that perhaps they were waiting to be invited. He would be glad to have many such visits.

On March 18th Messrs. James F. Egan and Fred. Jenkins, of Hamilton, who had been singing on the previous evening at the St. Patrick's Society concert in the city, made an informal visit to the institution and delighted the pupils with their songs. They promised to repeat the visit, bringing with them other capable musicians.

On March 27th the Principal, on the invitation of the Young Men's Union—an organization of pupils for mutual improvement—gave a lecture in the music hall on "Ontario Place Names." William Ryan acted as chairman.

The so-called Willow Concert was held on April 18th. Mr. Humphries manipulated a phonograph kindly loaned for the occasion by Mrs. B. C. Bell, the result being very amusing.

On May 1st the Young People's Society of St. Jude's (Church of England) church gave an entertainment to the pupils, Rev. Rural Dean Wright occupying the chair. There were vocal solos by Misses Wright, Miss M. Raymond, Miss C. V. Williams, Messrs. F. H. Adams and W. Scace; duets by Misses Wright and McKay, and by Misses Raymond and McKay; piano and organ selections by Misses Nichol, Raymond, McKay and others—an admirable programme throughout. The visitors partook of refreshments.

and spent a social half hour in the teachers' parlor after the concert, and promised to come again.

On May 16th the Young Men's Union of the Institution gave an entertainment, with Mr. John Gray in the chair. This Society admits to its membership all male pupils over fifteen years of age, and its programme of recitations, dialogues and vocal and instrumental music was prepared without assistance from the teaching staff. The result was quite satisfactory.

Closing Concert.

The closing concert of the session took place on the evening of June 15th. It was thus reported by the Brantford *Courier*:

"'Better than ever' was the verdict of the large audience that filled the music hall of the Ontario Institution for the Blind last night, to listen to the concert given by the pupils in connection with the closing of the session. The Principal welcomed those who had come out on such a warm evening to testify their interest in the welfare and progress of the pupils, and he spoke at some length on the work that had been accomplished during the year, and of the plans for improvement in the future. There had been no dangerous illness, and, with the blessing of good health, pupils and teachers had been able to do hard and steady work, without which the institution would fail of its intention. He spoke of the transfer of control of the Institution from the Provincial Secretary's Department to the Department of Education, and regretted the inability of Hon. Dr. Pyne, the Minister of Education, to accept the cordial invitation that had been sent to him to be present. Not only on account of the concert, and to meet the good people of Brantford, would he have been glad to have the Minister of Education present, but he also had an idea that if the Minister saw for himself the beauty of the Institution grounds in leafy June he would think twice before consenting to have the grounds mutilated. In his (the Principal's) interviews and correspondence with the head of the Education Department, he had received every assistance and encouragemnt, for which he felt grateful, and he also had occasion to thank the friends in Brantford who had entertained the pupils in various ways, thus relieving the monotony of their lives and putting them in closer touch with the world. He hoped that the relations between the school and the city would be even more intimate and cordial next year.

"The conduct of the programme was then handed over to Mr. Humphries, the musical director, under whose management the various numbers went off very smoothly. Notwithstanding the oppressive heat the audience listened most attentively to the performance of the pupils, and rewarded them with liberal applause. It had been, very evidently, the ambition of the musical department to present as many novelties as possible, and this desire was realized in a most successful manner. Several of the selections were quite new to a Brantford audience, and at least one number, the final concerted piece, 'Pomp and Circumstance,' by Sir Edward Elgar, had never been previously performed in Canada in the form presented. Solo numbers were the exception, only two appearing on the lengthy programme; both of these, however, are entitled to special remark for the splendid manner of their performance. These were the Wely 'Offertoire' for the organ, played by Miss Hester Ponting, evidently an organist of most promising ability, and the Concerto in E Flat Major, by Mozart, for piano with orchestral accompaniment. By the playing of this Concerto, Miss Mary Williams completed her arduous course for the degree of Associate of the

Toronto College of Music, and to say that she acquitted herself with exceptional credit would be but mild praise.

"Dr. Torrington conducted the orchestra, which was augmented by the pipe organ, and he was delighted with the clear playing of the soloist, and the precision with which she took up the piano parts after the orchestral 'tutti.'

"The singing of the Choral Class is always a delightful feature at these concerts, and Monday evening the chorus seemed to be fully up to their old-time standards, though much of the vocal material was of recent acquisition. One selection must be given special mention, namely, the Dutch Lullaby, 'Wynken, Blynken and Nod,' by Nevin. This was a decided novelty, including a soprano obligato solo and a four-hand piano accompaniment, and was sung with beautiful tone and expression.

"Four recitations were presented by as many junior girls, who certainly acquitted themselves with splendid credit to their teachers. The audience very apparently appreciated the clearness of the reciters' enunciation, and their power of vocal genuflection. Miss Irene Fox, in 'The Volunteer Organist,' probably made the hit of the evening as far as the recitations were concerned.

"Following is the programme in its entirety:

Organ—"Offertoire" ..... *Wely.*
HESTER PONTING.

Part Song—"Evening Song" ..... *Franz Abt.*
CHORAL CLASS.

Recitation—"Rover in Church" ..... *Anon.*
GERTRUDE JAMES.

Military March—"Parade Review" ..... *Englemann.*
Three Pianos—HORACE VALIANT AND GEORGE SKINKLE, CAMERON ALLISON AND ALBERT FALL, CHARLES DUFF AND FRED. JOHNSTON.

Part Song—"Wreathe Ye the Steps to Great Allah's Throne" (from "Paradise and Peri") ..... *Schumann.*
CHORAL CLASS (Girls).

Two Pianos—"Slavische Taenze" ..... *Dvorak.*
MARY MACDONALD AND HESTER PONTING.

Recitation—"The Builders" ..... *Longfellow.*
BEATRICE MCCANNAN.

Part Song—"Among the Lilies" ..... *Czibulka.*
CHORAL CLASS.

Piano with Orchestra—"Concerto in E Flat Major," "Andante" and Allegro"... *Mozart.*
MARY WILLIAMS.

Part Song—"Light as Air" (Faust Waltz) ..... *Gounod.*
CHORAL CLASS.

Recitation—"Grumble Corner and Thanksgiving Street"..... *Anon.*
EMMA ROOKE.

Concerted—"Overture to 'Tancredi'" ..... *Rossini.*
Pianos—EVA JOHNSTON AND MATILDA SAUVE, HERBERT TRENEER AND THOMAS KENNEDY.
Organ—MARY WILLIAMS.

Part Song—"Wynken, Blynken and Nod" (Dutch Lullaby) ..... *Nevin.*
CHORAL CLASS.

Recitation—"The Volunteer Organist" ..... *S. W. Foss.*
IRENE FOX.

Concerted—"Pomp and Circumstance" (Military March)..... *Elgar.*
Pianos—ANNA THOMSON AND CATHARINE CURRY, ALICE STICKLEY AND GRACE KIGHT, GRACE KAY AND GERTRUDE COLL.
Organ—MARY MACDONALD.

God Save the King.

"At an appropriate interval the Principal introduced Dr. F. H. Torrington, Director of the Toronto College of Music, who spoke in terms of

high commendation of the success of the pupils, as shown by their examination papers and the examiner's notes, which Mr. Fairclough had permitted him to see, and he said his pleasure in visiting the O.I.B. increased as the years rolled round. It did him good to find men and women in earnest in their work, not sparing themselves, but being anxious for results.

"Dr. Torrington then presented to Miss Mary Williams, of Toronto, the graduate of the year, her well-earned diploma, A.T.C.M., and gave her special praise for her splendid playing a few weeks ago in recital at the College of Music in Toronto. He also presented to their earners the following certificates of progress:

First year piano, first-class honors—Ethel Peterson.

First year piano, second-class honors—Charles Duff, George Skinkle, Albert Fall, Cameron Allison.

Second year piano, second-class honors—Grace Kight, Anna Victoria Thomson; Pass, Herbert Treneer.

Third year piano, first-class honors—Hester Ponting.

First year theory, second-class honors—Herbert Treneer.

Second year theory, first-class honors—Mary Williams.

"At the conclusion of the programme Rev. W. H. Harvey, of Brant Avenue Church, took the floor and, in a few hearty words, expressed his pleasure and satisfaction with the achievements of the pupils, giving special commendation to the performances of Miss Williams on the piano and organ. Mr. S. F. Passmore, Classical Master in the Brantford Collegiate Institute, followed Mr. Harvey, saying that he had lately had occasion to visit the Institution for the Blind, and he could assure those not familiar with the work of the Institution that the literary work was done with as much thoroughness as the work in music, which had just been exemplified. From the kindergarten up every class had interested him.

"Mr. Gardiner thankfully acknowledged the kind words that had been spoken, and the audience dispersed after singing God Save the King."

The attendance of friends from the city at the formal entertainments given by the pupils is all that could be desired or accommodated. The entertainments given to the pupils by the Young People's Societies of St. Jude's and Brant Avenue churches were highly appreciated, and it is hoped that the example thus set will be followed by other city societies and choirs, and by individuals possessed of musical or oratorical talent. Such incidents make a pleasant break in school routine, the pupils gain instruction, the spirit of emulation is excited, and the extension of their acquaintance with seeing people cannot but be beneficial.

The Adult Blind.

In last year's report I presented a number of opinions on the establishment of industrial homes for the adult blind, and as this question is still unsettled, the following items will add to the stock of information of those interested:

The blind Postmaster-General and Political Economist, Right Hon. Henry Fawcett, addressing about two hundred blind persons and their friends at South Hackney, in 1884, a few months before his death, said: "Every day I live, the fact becomes more strongly impressed upon me that by far the greatest service that can be rendered to the blind is, as far as possible, to emancipate them from the depressing feeling of dependence, and this can best be done by enabling them, as far as practicable, to live the same life as others live, cheered by the same associations, brightened by the same hopes,

sharing the same joys. . . . . With regard to those who become blind in after life, the one thing which, above all others, I wish to enforce is, do not take them away from the joys and pleasures of home life, do not keep them in the walls of institutions, do not congregate them together, but let them live as far as possible with those who can see."

The Batavia, N.Y., Daily News of Feb. 1st contained this summary of the report of a special committee appointed by the New York State Legislature: "Albany, Feb. 1. Dr. F. Park Lewis, of Buffalo; Lewis Buffett Carll, A.M., of New York; and O. H. Burritt, A.M., of Batavia, composing the special commission created by a law of 1903 to investigate the condition of the adult blind in this State and to report on the expediency of the establishment by the State of industrial training schools or other institutions, will present its report to the Legislature to-night. Dr. Lewis, who is president of the Board of Managers of the State School for the Blind in Batavia, is president of the commission; Professor Carll, who is blind, and is a noted educator, is vice-president; and Professor Burritt, who is superintendent of the State School for the Blind in Batavia, is secretary. The office of the commission is in Batavia.

"It is evident on glancing at the report that the commission has not been idle, as its findings and recommendations cover 86 typewritten pages, and a perusal of these pages convinces the reader that the commissioners have discharged their duties in a thoroughly conscientious, exhaustive and able manner, and have done work which will be of great value. The commission held seven meetings; studied and analyzed the United States census of the blind taken in 1900; studied the New York City list of blind pensioners; has caused a personal visitation to be made of about one-sixth of the entire blind population of the State, besides calling for expressions of opinion from about 1,000 more; has had correspondence with all county superintendents of the poor in the State and with all institutions for the blind in the United States and Canada, and with many abroad; has given one formal and two informal hearings to the blind and their friends, and has had correspondence and conferences with the chairman of the Massachusetts commission recently appointed for the same purpose. The commission has also, through one or more of its members, personally visited all public and private institutions for the blind in this State, the Connecticut Institute and Industrial Home for the Blind in Hartford, the Columbia Polytechnic Institute for the Blind in Washington, D. C., the Pennsylvania Working Home for Blind Men and the Industrial Home for Blind Women in Philadelphia; the St. Joseph's Home for Blind Females in Jersey City, N.J., the Perkins' Institution for the Blind in Boston, Mass., the Maryland School for the Blind in Baltimore, and the Pennsylvania Institution for the Blind in Philadelphia.

"It was concluded by the commission at the outset that if it would acquire the knowledge necessary to enable it to make wise recommendations, it must first ascertain, so far as possible, what was the general condition of the adult blind in the State, and, second, what public or private measures had already been adopted either in this State or elsewhere to improve the condition of the adult blind. The succeeding pages of the report show conclusively that the members went about their task intelligently and systematically, and that during the seven months of their official career they have performed a vast amount of labor which is bound to result in great benefit to the unfortunate people for whose sake it was done. Detailed and interesting reports regarding visits paid to people in their homes and to public and private institutions, formal and informal conferences and cor-

respondence are given in the report, and there are a number of valuable statistical reports covering various phases of the work.

"Conclusions arrived at by the commission are as follows: The blind of the State are in general very poor, and usually have as their nearest relatives persons who are not in good financial circumstances. At least 65 per cent. of them are too old to acquire and follow any industrial occupation, while another and unknown proportion are physically or mentally unsound. In the case of many who are sound long enforced idleness has destroyed the desire to work, and it would require time to overcome their indolence. Most of the blind, especially the women, do not travel far alone, hence they must live near their work, or it must be taken to them. The adult blind of Greater New York apparently are better situated than those of the rest of the State, and do not evince any particular desire for State assistance, but a more thorough investigation might show these seemingly favorable conditions to be in reality no more advantageous than those which prevail in other localities. As a result of a personal visitation to nearly 1,000 blind, and correspondence regarding them, it was found that many of the blind, especially women, are comfortably cared for in the homes of relatives or friends, and it would seem unwise to place such in industrial homes. Experience here and abroad indicates that workshops for adult blind men are better than industrial homes. Many adult blind under existing conditions become wholly or practically self-supporting. The experience of many blind men who have endeavored to follow some trade learned at schools for the blind proves that while the product of their labor would probably be of sufficient value to afford them comfortable support the time consumed in selling it prevents them from gaining support. Adults and children should not be trained in the same institution or under the same management. Some form of manual training for boys should take the place of the industrial training now given in schools. Attempts to combine industry and charity in the same establishment and under the same management have proved in every instance to be, at best, financial failures. While the giving of pensions is the simplest method of aiding those who require financial assistance, it is, in many instances, unwise and demoralizing. With all the deductions previously made, there are still many adult blind who are capable of being taught and of following some trade, for whom suitable provisions should be made.

"Recommendations made by the commission are as follows: The work of personal visitation should be completed for the blind of the entire State. Provision should be made for the industrial training of blind persons over 21 years of age, and, to that end, in Buffalo, there should be established, tentatively in a rented building, one industrial school or school-shop, and as soon as possible manual training should replace the industries now followed in the State School for the blind in Batavia. The blind should be enabled to sell their products to State and municipal institutions. Measures should be taken to determine the causes of existing blindness and such preventive measures should be employed as will tend to lessen future blindness in the State.

"To carry out its recommendations the commision asks that a permanent commission be established and it submits the draft of a bill creating such a commission and outlining its objects. This bill provides for the appointment of a commission of three persons, each to serve three years, without compensation, but to receive allowances for actual expenses. It is further provided that the commission shall complete the work of investigation begun by the special commission, aid worthy adult blind persons by finding em-

ployment for them at home or elsewhere, to furnish material, tools, etc., to the value of not exceeding $200.00 to any one individual, and to establish an exchange for marketing the products of the blind. Provision is made for the establishment and supervision by the commission of one or more industrial training or shop schools. For the year ending December 31, 1904, in addition to the unexpended balance in the treasury of the special commission, the sum of $8,500.00 is appropriated by the bill for the work of the permanent commission.

"There was appropriated for the expenses of the special commission the sum of $3,000.00. The commission reports that it expended $1,468.70, leaving a balance of $1,531.30."

The Kind of Education the Blind Require.

In my report a year ago, considerable space was devoted to the consideration of the problem of suitable and remunerative employment for the blind. The responsibility of those intrusted with the education of the blind is *prima facie* greater than that of those who teach pupils possessed of sight. The latter, even if deaf and dumb, can choose from a wide range of trades, professions and employments, and a plain living can always be obtained by the unskilled labor of a sighted man who has health and strength. The occupations open to a blind man are few in number, and in hardly any of them can he hope to do as well as his sighted competitor. He must be taught in school to do something that has a money value, and if possible a situation must be found for him when he ceases to be a pupil. I mentioned last year that Mr. W. B. Wait, Principal of the New York City Institution for the Blind, took strong ground at the St. Louis Convention against teaching trades in Blind Schools, affirming that the blind youth should be given the same kind of education as their seeing brothers and sisters, and then left to find their vocations. Mr. Michael Anagnos, Director of the Perkins Institution and Massachusetts School for the Blind, contends in his last Report that "Liberal Education is the Need of the Blind," using the following line of argument:

"By reason of their infirmity the blind are seriously handicapped in the race of life. The visible world is annihilated for them, and they are plunged into perpetual darkness, which limits the sphere of their activity within narrow bounds and disables them from the pursuit of most of the occupations in which their fellowmen are engaged. They are cut off from some of the higher privileges of the race and are obliged to toil against a flood of difficulties. True, certain manual employments, in which the work of the human fingers is still in use, remain open to them; but these are few in number and eagerly appropriated by seeing competitors. Briefly stating their case, we may say that the blind meet with mighty obstacles in whatever they undertake to do with their hands, especially in those manufacturing enterprises in which machinery is extensively used. Consequently they are shut out entirely from the wide field of varied industries, into which innumerable clear-sighted reapers put their sickles under circumstances infinitely more favorable to themselves than those surrounding the sightless laborers.

"These facts make it evident that it is worse than useless to insist upon carrying on in our schools for the blind the plan of education which was adopted for them at the time of their establishment, and in which the learning of handicrafts and the ability to work at ordinary trades were among the principal features and formed the objective point. We must bear in mind that a radical change has occurred in recent years in our in-

dustrial, economic, social and business arrangements. The old order of things has vanished and has been succeeded by a new one, which is altogether different from its predecessor. We have passsed from an individualistic to a collective type of civilization and have entered upon an era in which sordid selfishness is conspicuous and the thought of others is buried in eternal oblivion. We live in a peculiar age in which an ardent devotion to unrighteous mammon is transformed into a sort of idolatrous worship and the craving for the vulgar display of wealth and for keeping up with the procession of pleasure-seekers amounts to madness. We have entered upon a period of rapacity and absorption in the pursuit of gain, in which the moral sense is threatened with paralysis, while heartless operators and unscrupulous magnates of trusts carry on with impunity the sinister process of gaining absolute control of the sources of supplies that are indispensable to human life and comfort. We are in the midst of merciless times, in which there is no solicitude nor charitable regard for the needs and rights of the weaker members of society and in which the strife for existence is made harder than ever.

"If we consider carefully how the different classes of society are affected by these unusual and, to some extent, unnatural developments, we can easily see that the blind are placed at a greater disadvantage than those whose sight is unimpaired. Indeed, they are the principal sufferers; for while they are utterly unable to join any of the immense manufacturing companies or financial combinations for lack of capital or of assets of any kind, they are at the same time debarred from participating in great industrial occupations and mechanical trades carried on upon a large scale on account of their inability to handle the complicated machinery, which constitutes the principal force and main feature of all such enterprises. Under these conditions they can hardly hope to succeed in obtaining remunerative employment in ordinary workshops; nor is it possible for them to come into competition anywhere with seeing craftsmen, for, if they attempt to do so, they are liable to be pushed aside by the latter.

"Thus the obstacles, which hinder almost all persons bereft of the visual sense from engaging advantageously in handicrafts or from seeking to obtain employment in factories, are insurmountable, and no expedients nor devices of any sort can remove or lessen them. Hence, in our efforts to uplift the blind and equip them adequately to fight the battle of life successfully, there is only one course left for us to pursue, and that is to change front and let 'the bricks fall down and build with hewn stones.' We must persist no longer in wasting our means and exhausting our forces by trying to sail our bark against strongly adverse winds or to penetrate impenetrable barriers. We must follow the path indicated by reason and common sense and turn our attention in a direction which promises to produce better results and is more hopeful than the old one. In other words, all our efforts should be devoted to the development and cultivation of the brain. This should be made the principal object of our work. Instead of giving a prominent place to handicrafts and endeavoring to teach several of them at a great expense of both money and time, we must strive first and above all to increase the intelligence of our pupils, to awaken their insight and to strengthen their judgment, upon which their fortune depends. We must cultivate their minds in a thorough manner and make these batteries of thought, which, according to Emerson, is the seed of action and the means of shaping one's career. We must give them perfect knowledge and mastery of their own inner selves and inculcate in them the spirit of self-reliance and independence and those elements of character which are indispensable

for success in life. All our energies should be brought to bear upon these points. It is only through the adoption of a broad scheme of education like this that we can hope to put down the bars which separate the blind from ordinary society.

"These considerations have led us to pay increased attention to the cultivation of the mental faculties of our scholars and to make this the primary principle and basis of our work. Accordingly our plan of education has been entirely reorganized or reconstructed on a broader and firmer foundation than that of the past and has been brought up to such a degree of completeness as to keep abreast with the times and to meet fully the demands and special requirements of the children and youth who attend our school.

"This system as it is now stands is very comprehensive in its scope and far-reaching in its influence. It does not confine its work within the narrow limits of giving to the blind an elementary knowledge of the ordinary branches of study and of teaching them some music and one or more simple trades, but goes far beyond this. It aims to reach every faculty of the students and to develop every side of their natures—intellect, conscience as an active element of character, the sense of honor, the love of industry, the ability to devise and to do and the desire for independence.

"By this system of education we hope to produce men and women of a fine type, strong, hardy, self-reliant, brave, enterprising, discreet. We purpose to make them capable of reasoning and judging, of thinking and planning, of deciding and executing. We trust to be able to inspire them with the ambition of becoming active, interesting, valuable members of society rather than recipients of charity, which in some instances might be disguised in the form of manual occupations or industrial opportunities. Lastly, we intend to train them to use their powers intelligently and skilfully and to enable them to put themselves in as many relations with their fellow-men as they possibly can.

"In devising or adopting ways and means for carrying on the work of the school in accordance with the best and most approved methods, we never lose sight of the fact that education is a dynamical and not a mechanical process and that it is of the utmost importance to make a close union between the intellectual life and the deeper foundations of the character of our scholars.

"Having become firmly convinced that the destiny of the blind rests entirely upon the breadth of their intelligence and the strength of their character, we are earnestly laboring to provide for our pupils such advantages and opportunities as will enable them to gain these inestimable qualities. For the attainment of this end we leave nothing undone. While we pay due heed to the valuable lessons taught by the history of pedagogy and bring within the reach of the children and youth entrusted to our care the experience of the past and the best products of the human mind, so that they may profit by these, we try at the same time to give them a broad view of the world about them and to make them responsive to all that is vital in the thought and life of to-day. For it is from the ranks of persons educated and trained in this way that will come the strong men and women, who will serve both as examples to their fellow-sufferers and as active agents in leading these to a higher plane of social dignity, moral excellence and economic success."

Labor Conditions.

The ideas presented by Mr. Anagnos, based upon the experience of many years, are entitled to the greatest respect. There is room at the top; but in

every school—for the blind or for the seeing—there are many pupils whom no amount of training can qualify to fill high positions in professional or commercial life. Unless these earn a living with their hands, they will not earn it at all. What provision is made, under the Anagnos system, for the dull ones? The late Mr. H. L. Hall, Superintendent and Financial Agent of the Pennsylvania Working Home for Blind Men, wrote a dozen years ago that "it should be as far as possible the aim of institutions for instruction or education of the blind to send out the least possible number of graduates who will be compelled to make their living at a handicraft. It should be rather to show them other avenues to independence, to teach them business methods and customs, and give special training in anything for which an aptitude is shown." This is the conclusion of a man who had made a life-study of methods to make the blind self-supporting. In his paper read at the Columbian Exposition, Mr. Hall said:

"It is, of course, a truism to say that nothing has more constantly or earnestly engaged the attention of friends of the blind than the search for some trade or calling in which they could engage with a fair chance of self-support. One industry after another has been brought forward, tried and thrown aside; bead-work, mats, baskets, ropes, brushes, nets, mattresses, with a long list of other things, have been attempted, and at some places one or other has been pronounced fairly successful, while at others it is reported as a failure. Is this from inherent defectiveness in the blind? Is it from changed conditions of labor? It goes without saying that a blind man will not be as dexterous in the use of tools, or in manipulating a piece of work, as he would be with the possession of sight. It is also true that institutions will sometimes judge of a trade by the financial results to themselves. Now it is a difficult thing to enforce in an institution workshop the same rigid discipline that exists, as a matter of course, in outside factories. The pupil, as a rule, is engaged in work for only two or three hours in the day, and there is a not unnatural tendency to look on this time as a relaxation from mental labor rather than a training for the important work of life.

"The vacations, necessary though they be, are a loss to the workshop, and a serious hindrance to the future workman, and finally, just as he becomes skilful with his hands, it is time to graduate, and give his place to a new-comer. Necessarily, therefore, the work in an institution shop is on the average that of learners, or apprentices, and the value of the goods in the market will correspond. Instead of there being any surprise that a fair balance sheet in an institution workshop shows a loss, it would be a matter for great surprise if it did not. Education always means expense. It is also an acknowledged fact that the whole tendency of modern times is toward centralized labor. Town after town, and city after city, can be named which are practically huge factories, whose product floods the country, and has swept out of existence the groups of individual craftsmen who fifty years ago were found in every country town and village. Our hats and shoes, carpets, stockings, furniture and crockery come from one or other of these large establishments, and the individual workman is at a great and increasing disadvantage. How can this changed condition of labor be met by a man whom we admit to be defective?

"There are two distinct classes of the blind: The first consists of those born without sight, or who have lost it in early childhood. To those, blindness, although acknowledged as a defect, is a natural condition, they have gained no knowledge from sight, and have, therefore, nothing to unlearn. Experience has come to them unconsciously, and judicious training has

given their other senses a quickness and delicacy that almost compensate for sight, and to their mental faculties, especially memory, a wonderful strength and tenacity. This class is the special province of institutions for the education of the blind. It is for them to develop these minds, supply them with material, discover latent possibilities, train and discipline their powers, and where a special aptness is found, to give such special instruction as will best qualify them for the pursuit in life indicated. From this class come the lawyers, ministers, musicians, mathematicians, teachers, etc. —men occupying honorable positions for which their fitness has been discovered, and whose lives show that blindness is not an insurmountable barrier to a man of determined purpose, but even of this class, the larger number have nothing to distinguish them mentally above their fellows, and must look forward to support themselves in some other way. Is that way necessarily in all cases manual labor? This is a question that can be answered only by the institutions themselves. In our day the tendency in all kinds of business is towards specialization. Large manufacturers are making one class of goods, business firms are known as agents for a single kind of ware. In workshops men spend their lives making one pattern of wheel, salesmen are selected for their knowledge of a particular line of goods. Generally the 'all-around' man is being pushed aside, for the reason that he cannot be equally good in all departments, and business will make no allowance for mistakes. So, too, new trades, as they may be called, are coming forward and finding a footing in our modern civilization. Is it not possible for a young blind man with proper training at the institutions to find a place which he can fill? There are special lines of business calling for quick and delicate senses, such as the preparation of perfumes or the art of coffee-blending. Might not a blind man become an expert tea-taster, and earn more thousands than the average mechanic does in hundreds? Travellers say that in Japan all massageurs are blind men, and earn a livelihood even in that cheap country. There is a report in newspapers that this experiment has been lately tried in England with satisfactory results, and it might be taken up here also. One would think that the delicate sense of touch would peculiarly fit them for this business, and their infirmity would be not at all to their disadvantage. Especially would such be the case with blind female massageurs, dealing with their own sex, for the business can be learned and practiced fully as well by a woman as by a man. These are merely given as illustrations, that have presented themselves, and would, of course, be practicable only in the larger cities, but a close and intelligent inquiry may find other nooks and corners of special work which could be filled satisfactorily by a blind man, and where knowledge, energy, a good address and perseverance are the requisites.

"After all that can be done, it is clear that the large majority even of graduates of institutions must earn their bread by manual labor, but every one who takes up and successfully carries on some other business becomes a stimulus to those who are still looking forward to their entry into the active world.

"The second class of blind men consists of such as have lost sight later in life, after dependence upon it has become a habit. Whether lost by disease or accident, they find a difficulty in supplying its place by touch, and rarely become reconciled to their disability. They form the large majority of blind workmen. Of course, among them are some with mental as well as physical qualifications which enable them not only to become good workmen, but, with a little training added to their own knowledge of the world, to qualify themselves for more responsible positions; but the

very large majority of those men can look forward to nothing except manual labor for support, and even there they are at a disadvantage. Probably ninety per cent. of those blind from accident have been laborers,—men employed in coal or iron mines, operatives in blast furnaces, rolling mills, etc.—who have earned their living by main bodily strength, and have no aptitude for anything else. They have rarely thought intelligently even about their work, but have merely obeyed orders from their foreman; such men at any trade where dexterity in fingering is called for are awkward and incompetent.

"Of the working blind, then, that is of those who depend upon manual labor, there are what might be called three grades: 1st, graduates from institutions who are not fitted for a profession or some higher form of business; 2nd, such as have lost sight in adult life, and may have considerable mental and physical aptness; and 3rd, the large majority of those adult blind, who are hopelessly slow both in thought and movement. Now to name any trade at which every one of this body of men, so differently qualified, could achieve independent self-support, is clearly an impossibility. What the first grade might do without difficulty would be embarrassing to the second, and entirely out of the question with the third. In one of our large magazines, a few years ago, the fact was mentioned that a young blind man had taken up the business of cleaning and repairing watches, and had built for himself a paying trade. The writer naively wondered why special attention was not given in institutions for the blind to this kind of business, as peculiarly adapted to their delicacy of touch. Now we can all understand how the pupil of an institution, with trained senses and a natural bent for mechanics, may become a skilful watchmaker; but can anyone even dream of a horny-handed miner, or a laborer accustomed to heave at rocks with a crowbar, taking a watch in hand for repairs? Yet the trade that is best for the blind as a class must be one at which all the blind can make their living, and the lowest grade of workmen can learn and practice.

"Such a trade, therefore, must be simple, and the machinery in connection with it not complicated. It must be for a staple article, 'something in general and constant demand. To set a blind man or woman at making bead-work is purely waste of time. It must be such as to allow the largest margin of profit to labor, and therefore a trade that requires two or three distinct operations is better than where there is but one. It should be near its supply of material, and must be near its market. It would be contrary to sound business principles to set up a rope-walk on a western prairie, and it is as injudicious to introduce a trade into an institution so placed that the local demand will not absorb the product, or for a blind man to learn some craft which is not called for by the people among whom he expects to live. It should be subject to the least possible competition. Competition will always exist, but in one business it will be limited to our own country, while in another it extends over the whole world. Lastly, the demand should be uniform, so that the workmen should be steadily employed. A business that is dull at one time and under high pressure at another is not good for a blind man to learn. As a rule he cannot afford to pile up stock for a future demand. These appear to be necessary conditions for a trade that can be advantageously taken up by the blind, and the question remains, which of those actually taught best fills these conditions? It is hardly possible for any one person to pronounce authoritatively whether a given trade or business is or is not good for all places, or in fact for any point, except that which he himself occupies. Every city

has its own business horizon, and an industry that at one place is fairly profitable may have no existence at another, a few hundred miles away. The practice, therefore, of introducing a trade among blind men in one institution, solely because it has been successful at another, is open to criticism. Are the conditions at both places the same? Is there the same demand, the same cost of material, the same value in the market? An institution in one of our largest cities, in a special report prepared some years ago on the subject of labor, stated that mattress-making had been there maintained successfully for thirty-four years. But that city has an immense hotel demand and almost as large a call from its steamship trade. The success of this particular employment at such a place is no sufficient reason for its being taken up where similar advantages do not exist. The vital question is not what trades can be learned by blind men; but at which can they have the best chance of making a livelihood, or the nearest approach to a livelihood, at the least possible cost to others? And now, what one of the handicrafts taught the blind will fill the conditions of the most satisfactory trade, as defined above?

"The plaiting of straw as covering for bottles, etc., requires a delicacy of touch which makes it unfit for the adult blind, and the profit to labor is absurdly small.

"Basket-making is open to the same objection to a less extent so far as touch is concerned, but foreign competition keeps the price so low that a blind workman could succeed only in some country place where a supply of willow might be gotten very cheaply, and a demand existed for packing fruit or vegetables.

"The weaving of carpet rags was once a valuable industry. Domestic and foreign factories are now filling our country with their product, not so good in quality, not so durable as the old rag carpet, but infinitely superior in appearance, and at not greatly increased cost.

"Brush-making was some years ago the favorite handicraft in American institutions, but it is one in which the competition is almost ruinous to labor. The stores are selling foreign-made tooth brushes with bone handles and fairly good bristles, which have passed through two or three hands, and paid duties in addition, and the retail price is ten cents. The blind workman must, therefore, confine himself to the common run of goods, where he can work more quickly, and here he is met by machine-made brushes as good as his own, and at a price which leaves him in the large cities little, if anything, for his labor.

"Cane-seating of chairs is another trade that can be favorably mentioned, or rather, it should be qualified as the re-caning of chairs. In the factories where the first work is done, it is in the hands of experts, and the wages are so low as to put competition from the blind entirely out of the question. The re-caning of chairs, after seat and back wear out, gives a fair profit, and may be practiced to advantage away from the factories. The competition is small, there is no machinery of any kind; the material is not expensive, so that the profit to labor is comparatively large, and a blind man, in the smaller towns, may do well if he can join some other trade with it. This would be almost necessary, as the demand for re-caning is not steady, and there would be much idle time.

"Mattress-making should be classed among trades for the higher grades of blind workmen. As a business it is irregular, and sometimes excessive in its demands.

"The making of corn brooms can be learned quickly and all there is of it can be done by blind men. There are three operations, so giving a

large margin of profit to labor. An expert, and even the average workman, can master all these, and, with facilities for selling, support himself at his home; and there is no blind man so slow or awkward who cannot learn quickly two, or at least one, of the operations, and so contribute to his own support in a factory where the work is specialized. The demand is steady, there is no idle time the year round, and no competition outside of our own country."

It will be observed that Mr. Hall mentions massage as a suitable occupation for some blind men and women. In March, 1904, I received a letter from Mr. Arthur Martineau, of New York, an ex-pupil of this institution, asking for a recommendation to be used in connection with the study of massage. Nothing was heard directly from him, except a grateful acknowledgment of the receipt of the testimonial, but I subsequently received from Dr. B. E. McKenzie, Senior Surgeon of the Toronto Orthopedic Hospital, a copy of the following paper on

The Employment of the Blind for Massage.*

(*Boston Medical and Surgical Journal*, April 27th, 1905).

The object of this article is to stimulate interest in supplying the blind with another profitable means of livelihood, massage.

I am not going to take up your time by quoting a mass of statistics in order to show you how many people in the world are blind and so unable to support themselves, nor do I intend to expound either the theory or the practice of massage, but what I do wish is to give you a brief outline of the work which has already been accomplished in training blind masseurs, and to suggest a few ideas, so that some of you may be interested to help.

I had planned to have at this meeting a blind man whom Mr. Hallbeck has been kind enough to teach massage, so that he could show you practically how expert and skilful a masseur a blind man can become, even after a comparatively short and imperfect training. Unfortunately, however, this man, in whom Mr. Hallbeck and I have been interested, is in Canada, sick. I shall, therefore, give you a brief summary of some of the results of teaching massage to the blind in other places and then relate the main facts about his teaching, and tell you how expert he has become.

Many if not most of the efforts directed toward utilizing blind people for giving massage have naturally been stimulated by the custom, which has existed in Japan for a great many centuries, of employing blind masseurs. There, the blind have enjoyed a special protection and indulgence from the emperor. They have been exempt from taxation; they have formed a sort of guild. Practically all the massage employed in Japan is given by the blind. Most of them learn massage when quite young. There, a very complete treatment is within the means of a jinrikisha man or ordinary laborer. A treatment costs a European ten to twenty sen. The masseurs can be found in almost any street of a town and summoned to the person's house, or their services secured at various depots, or at the large hospitals and clinics.

Although this universal custom of employing massage by the blind in Japan has existed for a great many hundred years, comparatively few well-organized attempts have been made in other countries. Most of such

*Read before the Medical Section of the New York Academy of Medicine, by Nathaniel Bowditch Potter, M.D., New York, Attending Physician to the New York City Hospital and to the French Hospital, Consulting Physician to the New York State Hospital for the Insane at Central Islip, Tutor in Medicine, Columbia University.

attempts have been made in quite recent years and a few of them have been reasonably successful.

In Russia, A. V. Goustowsky (Congrès International pour l'amélioration du sort des aveugles à Paris. August, 1900, quoted in Zeitschrift fuer Diaetetische und Physikalische Therapie. 1902. Band v. Heft 2.) mentions that at the time of writing (1900) the only school in Europe where the blind were taught massage was in St. Petersburg. In this school the pupils were taught anatomy, physiology and massage technic.

Dr. V. Naedler, director of the Alexander-Marien Blind Asylum for Children at St. Petersburg, has also attempted to have appropriate blind pupils taught. He regards two years as necessary for the study, and considers it advisable to teach the pupils another occupation as well. Their teacher is a medical student who became blind when studying medicine, went to Japan, and learned massage within two years.

Mrs. Z. I. Venguéroff began teaching massage to the blind in St. Petersburg, May, 1903. She selected a young girl who was born blind, who learned so quickly and became so adept that Mrs. Venguéroff was encouraged to continue her work with the blind. At the time of publication of her article, (quoted from her pamphlet, page 16, on the "Enseignement du massage aux aveugles," 1904,) there were eleven blind pupils at the school. Apparently her results have been very satisfactory. Her exhibition of photographs of the blind pupils at work evoked considerable interest last year at the Congress in Paris.

"The 16th of May, 1903, I was called to a blind patient who had a fracture of the arm. The plaster being removed, I began massage. After having had a long talk with my patient I asked myself if it were not possible to give the blind the possibility of learning massage, in order to make them able to help their fellowmen. I went to the Curator of a Blind Institution and expressed my intention. Soon after a young girl, Miss B., came to me and expressed a desire to learn massage. Miss B. was born blind, but the difficult task that she undertook was facilitated by the extremely developed feeling that she possesses, a feeling that we who see find almost supernatural. After having once been present at the dissection of a corpse Miss B. was able the second time to distinguish the different organs, the muscles, etc. As to the bones of the skull and the face, she could show the very smallest, and astonished the examiners by her answers. The press says of this case as follews: 'Yesterday at the school of massage founded by Mrs. Z. I. Venguéroff took place the first examination of the pupils finishing their course of studies. The pupils knew anatomy and physiology exceedingly well and skilfully performed the practical massage at the Infirmary of the school. The inspector especially noticed the detailed and judicious answers of a blind pupil, her explanations of anatomical preparations, and her technical knowledge of massage. Evidently this specialty may help those unfortunate creatures to work for their own and for others' benefit.' As to the technical ability of this blind pupil, I always heard the patients in speaking of her say, 'Oh, madam, do not deprive us of our blind angel. They are not hands, but the balm of life.' As to her accuracy and her interest in her calling one would wish these qualities were as well developed in thousands of masseurs and masseuses with sight. My first experiment having succeeded so well, I have now eleven blind pupils at my school. I have still noticed that the blind possess an astonishing capacity of guessing the sensibility of the patients. Having made different experiments on a patient suffering from neuralgia in the face, I found that the blind pupil after only three or four trials could soothe the pain. Not only

do I think, I am convinced, that massage executed by the blind possessing so subtle a feeling will give the best results, and the pains taken by their masters will be recompensed by the consciousness of having done a good deed."

In Sweden, the home so to speak of massage, less encouraging results are recorded. Professor Nycander (Goetenborg) (Zeitschrift fuer Diaetetische und Physikalische Therapie, 1901-1902, page 124,) attempted to teach the blind or partly blind for about six years, but without much success. He found it difficult to instruct them in the elementary anatomy and physiology, because he had no text-books with raised letters.

I have not found any later or more encouraging accounts from Sweden.

A Monsieur Stier, (Troisième Congrès National d'Assistance publique et de bienfaisance privée, Bordeaux premier au 7 Juin, 1903. "Assistance et Education des Enfants Aveugles," par M. Albert Léon) a blind man, studied massage in a private hospital at Bordeaux for about a year, and then settled in Paris, practising there under the patronage of the "Association Valentin Hauey pour le Bien des Aveugles." He became very successful and was highly recommended, receiving as much as twenty francs for a single treatment. He died suddenly a few months ago.

The Association Valentin Hauey sent me an illustrated postal card showing a number of different ways of employing the blind. One of the illustrations was of a masseur giving massage.

Major J. Batignon, in a short article in Le Journal de Medicine de Bordeaux, Nov. 22, 1903, No. 47, page 755, appeals for interest in the subject, and quotes some of the results obtained in Brussels.

A free school has been started there by a Dr. Daniel. At this school both massage and medical gymnastics are taught to appropriate blind persons. A committee of six gentlemen, some of them physicians, recently examined a small class of these pupils and pronounced their work excellent. (Troisième Congrès National d'Assistance publique et de bienfaisance privée, Bordeaux premier au 7 Juin, 1903, page 13.)

In Denmark, Dr. Moldenhawer, in the King's Blind Asylum at Copenhagen, has attempted the instruction of the blind and has had some success. The course of instruction requires about ten months.

In Austria, a woman was taught by Dr. Kofranyni in Bruenn. After four months' instruction and a certain amount of practice she found a situation in an institution and managed to earn about four hundred marks a year.

In Germany we find several isolated attempts, none of which are very striking, except in Leipzig. There, Dr. E. Eggbrecht, in 1899, began instructing the blind in massage, and some of his experiences and results are worth attention. In the first place he attempted to instruct them both theoretically and practically, quite as thoroughly as if they had had sight. He selected twenty-four persons, six women and eighteen men. Thirteen of these completed their course, four women and nine men. In selecting the pupils he chose those twenty years of age or older, who were energetic, patient, not nervous, and affected by no other difficulty such as tabes, tumor, weakness, or paralysis. A pleasant appearance was required and the eyes were concealed by a pair of smoked glasses. He naturally attempted to select persons of good muscular development, with strong hands, soft fingers, and a fine sensitive touch, which had already been trained and developed in some other occupation. The pupils were required to keep their hands and nails perfectly clean. They were first instructed in the elementary facts of anatomy and physiology. A text-book for nurses and masseurs was transposed into raised type. The skeletal parts were explained while

the pupils felt the bones directly; and afterwards the living model, one of the class, was employed to apply their knowledge. The muscular system was studied first from plaster models and then upon the living body. The circulation and heart, nervous system, joints and other parts were studied from papier maché models. After several months the pupils were sufficiently trained to be able to undertake practical massage. They were shown the various movements upon their own bodies and then made them themselves with the instructor guiding their hands. He also had them give him massage while he corrected their manipulations. Active and passive movements were also taught. Dr. Eggbrecht was struck by their dexterity and by the fine sensitive touch which they possessed. In all they received about seventy-five hours of instruction before they began their practice upon real patients. They then went daily to various clinics and there massaged surgical, neurological, and gynecological patients. At the end of four months they became quite expert and gave complete satisfaction to both patient and physicians.

The effect of the massage upon the blind persons was excellent; they stood the exertion very well, gained in weight and strength, and developed a great interest in their work. The solution of the problem, where and how they were to obtain regular employment, has not been so easy. The author emphasizes the importance of having a blind masseur connected with each of the various clinics, hospitals, gymnasia, baths and other institutions, of having a certain place in a town where the patients can come to the masseur for his treatment, and of having telephone calls to a central bureau when massage at people's houses is desired. He speaks also of the advisability of supervision over the calls for the masseuses.

It is in Great Britain that the most perfectly organized attempt has been made to provide for the education, and more especially for the subsequent maintenance, of the blind as masseurs. There have been numerous individual attempts recorded, some more and some less successful. On the 21st of May, 1901, an Institute for Massage by the Blind was incorporated in London. The enterprise has already successfully trained a number of blind people, just how many I have not learned. At present they are in need of more financial help in order to secure a permanent central bureau, where the blind masseurs may *practice* their treatments, where some of them may reside, and where calls for their services may be received and responded to. Dr. J. Fletcher Little, who has personally superintended their teaching, informs me by letter that almost all the women whom he has taught have done well, but that greater difficulty has been experienced in regard to the men, and that but few of the latter are now self-supporting. In vol. 2, No. 6, of THE BLIND, April 20, 1904, Dr. Little published an article embodying his experience. He says the Institute needs more financial help, and appeals for special interest in individual masseurs by groups of ladies and gentlemen, so that they may obtain more regular employment. He regards a three to six months' course long enough to fit them for this occupation, and considers them then capable of competing with those who see.

Turning now to America we find that in Boston there are two blind women who have been successful in their efforts at massage. One of them is not entirely blind; the other, Miss S., lost her eyesight at the age of ten. From the age of thirteen to twenty she resided at the Perkins Institute, where she was thoroughly well grounded in elementary science, anatomy and physiology. She paid sixty dollars for twenty class lessons in massage (with seeing pupils) and also took a course in regulation gymnastics

and another in medical gymnastics. She subsequently instructed nurses in massage at the Danvers Insane Hospital. Dr. Page, the superintendent, speaks of her work in the highest terms. She has worked for several years twice a week at the Out-Patient Department of the Massachusetts General Hospital, under Dr. James M. Jackson. She now gives corrective gymnastic instruction at the Perkins Institute three times a week and finds that she can give, without over fatigue, from three to five treatments a day to patients at their homes, receiving two dollars per treatment. She works about eight months a year, and says that she is stronger than when she began. She thinks that people at first are apt to be rather prejudiced against the blind, but that later on they seem to overcome this prejudice. She thinks the general training is very important and that it is better for the blind to be trained in classes with seeing pupils. Miss S. is, of course, a remarkably bright woman and would have succeeded in any work she undertook.

Mr. E. E. Allen, principal of the Pennsylvania Institution for the Instruction of the Blind at Overbrook, Pa., informs me that eight of his pupils have been trained in massage either at the Polyclinic or at the Orthopedic Hospital in Philadelphia. I wrote to the pupils and obtained replies from seven of them.

(I) E. L. C., twenty-five years old, blind at eight, from an injury. Entered Philadelphia School for the Blind at ten, took a literary course, piano lessons, and learned three trades. Spent six months at the Orthopedic Hospital and began to practice massage at Cambridge, Ohio, May, 1902. Nine-tenths of his work he does at patients' houses, and except for the first visit requires no guide. Is earning about $100 a month.

(II) H. L. McD., recovered his eyesight four months after finishing his course of massage at the Philadelphia Orthopedic Hospital. Is now a successful masseur.

(III) G. C. R., age twenty-six, blind at the age of twenty-three. Studied four months at the Orthopedic Hospital in Philadelphia and settled six months ago in Hartford, Conn. Is now paying about half his expenses.

(IV) W. J. N., age twenty-nine. Lost his eyesight at the age of twenty-six, just before graduating from Jefferson Medical School. Studied massage for three months and began massage in Philadelphia, February, 1902. Has been self-supporting for over a year and has also taught massage and electrotherapy. He employs a boy as a guide.

(V) J. S., blind at the age of thirteen. Began to study massage in September, 1903. Took three months' private lessons. Last winter was reasonably successful. Goes to patients' houses sometimes with and sometimes without attendance.

(VI) W. W. L., became blind at the age of eleven. Studied in Philadelphia, worked both in hospital and outside for three years with the help of a friend who is a masseur. Was reasonably successful at massage, but went into business and has been fairly successful in business.

(VII) E. W. E., has a little vision in one eye, enough to get about comfortably. Studied at the Polyclinic and the Orthopedic Hospital in Philadelphia for three months. Practiced for three months at the German Hospital, settled at Williamsport, and did fairly well. Has since moved to Washington, D. C.

In New York I have been able to find an account of only one person, a Miss P., who studied and practiced massage for a short time here. She gave it up, for what reason I am unable to learn.

My own limited experience is about as follows: I applied to the superintendent of the New York Institution for the Blind, some three years ago, in order to find the appropriate blind people to teach. He suggested my searching some of the charitable blind institutions of New York City and I did so. I was unsuccessful in finding a suitable pupil at the Blind Asylum upon Blackwell's Island, and I then interviewed some seventy or more individuals from a list of the blind poor who receive a small yearly allowance from the city. Among these people I was unable to find a single person who was both willing and, in my opinion, fitted to start the occupation. I had already consulted Mr. Axel C. Hallbeck, a masseur who has been very successful here in New York, and in April of last year he sent me Mr. Arthur Martineau, a French Canadian, thirty-six years of age, blind for about ten years, fairly well-educated, intelligent, formerly a bank-note engraver. After a week of preliminary trial, Mr. Hallbeck was convinced that he could be taught, and gave him daily one or two hours in lessons and practice for two months, until the twentieth of June, when he began actual practice in the wards at the New York City Hospital upon Blackwell's Island. I quote Mr. Hallbeck's account of his instruction: "While teaching him at my home, I always had some of his male relatives present, who were the material for work. At first I taught him general massage by doing the manipulations myself and having him put his hands on mine. After he had mastered the general massage I taught him local massage for special purposes. While teaching local massage, the greatest difficulty I experienced was to make him confine himself to the necessary region. I used to make him place his right hand as the upper limit for massage and the left hand as the lower limit. We applied massage for imaginary cases; for instance: False anchylosis, sprains, muscular rheumatism, lumbago, neuralgia, constipation, etc. At the same time I taught him anatomy and physiology, at least the most necessary points for him to know. I taught him the form of the skeleton, excepting the inner cranial bones; I taught him the construction of the joints with ligaments and cartilages, also about one hundred muscles and the principal motor and sensory nerves. In regard to physiology I explained to him the process of the digestion, the circulation of the blood, and the function of the nervous system. When he came to the City Hospital, after having practiced with me one or two hours every day, during two months, he commenced real work and soon attempted as many as nine cases every day. He treated patients of hemiplegia contracture, of tabes, of neuralgia, of progressive muscular atrophy, of dyspepsia, constipation, muscular rheumatism, lumbago, gout, sprains, false anchylosis, stiff joints, etc., in great varieties. As the house physicians can testify, Mr. Martineau was very useful and successful in many cases, and I believe that, as an assistant to a physician or surgeon and working according to their instructions, Mr. Martineau will be of great value as a masseur."

Dr. A. G. Bennett, (Philadelphia Medical Journal, Vol. I, No. 10, March 5, 1898, p. 426,) in a paper read before the New York Medical Association in October, 1897, brought out an interesting point from his correspondence with the directors of a number of the blind asylums throughout America, namely, the very small percentage of blind people who are self-supporting. The figures he quotes are at such variance that it seems hardly worth while to read them, but an especially suggestive fact is that a much smaller proportion of blind women are able to support themselves than blind men. This would seem to add some importance to our idea of employing them in massage, because, as is quite evident from the few instances

which I quote, the women have been especially successful. Dr. Bennett also urges the importance of one or more blind masseurs in all hospitals, dispensaries, sanatoria, insane asylums, private retreats, gymnasiums, Turkish baths and the like.

In what I have already quoted, I believe that I have covered, or at least suggested, most of the essential points in the difficulties of teaching the blind massage. I only wish to emphasize the very special importance of a most careful selection of the person who is to be taught, since upon that the success of the project will most intimately depend. This selection can, of course, be made only by teachers in blind asylums, who are thoroughly interested in the plan and in perfect sympathy with its aims. The great necessity of a thorough fundamental training, in order that the blind masseurs may be quite as intelligent and well trained as seeing masseurs, is a point which cannot be too thoroughly emphasized.

The compensation which the blind masseur should receive for his services in private practice is a detail which I do not feel can be decided offhand. In many more or less novel business undertakings the most efficient plan to introduce the business is to underbid the other competitors. There is one thing to be considered, and that is, a great many patients who are unable to pay large fees would employ massage, and very gladly, if the expense were less.

The necessity for a guide if the masseur is to go about from patient to patient is also a detail which would depend entirely upon the individual and the place where he was located, as you may well judge from the examples which I have quoted. My own idea of the special utility of the blind as masseurs is, however, that they should be employed largely in stationary places, such as clinics, hospitals, bath resorts, gymnasiums, sanatoria, and the like. There, at least, they are quite as independent of locomotion as the seeing masseurs.

No doubt, as Miss S., of Boston, writes, nervous people, the class of patients who are especially apt to require massage, might feel a certain repugnance to employing blind people, and might quite naturally be made more nervous than before the treatment. You will note, however, that Miss S. mentioned that this difficulty usually vanished after the first visit. Moreover, this is a point upon which custom would undoubtedly alter most prejudices.

In one country, Japan, the blind have a practical monopoly over massage. There, massage is cheap and within the means of all classes. The blind are protected by the government, self-supporting and contented with their lot. This condition has persisted for centuries.

In four countries, Russia, Belgium, England and Germany, we have read of well-organized and reasonably successful attempts to teach selected blind people massage.

Here in America, the only definite series of attempts in this direction which I have been able to learn have been made by Mr. Allen; but there is, it seems to me, very strong reason for expecting renewed and more persistent efforts. I am presenting this communication to the New York Academy of Medicine merely in the nature of a preliminary report, in the hope that further information and assistance may be forthcoming; in the hope that a well-planned scheme may be devised for providing suitable blind people with instruction in massage and for furnishing a practical organization, so that they may obtain continuous employment after they have learned; in the hope that you, the physicians to the various hospitals, dispensaries, sanatoria, and homes in New York, may be sufficiently interested

in the problem to find places in some of these institutions for blind masseurs to work and prove their efficiency, and in the hope that some of the directors or superintendents of blind asylums may see this communication and select appropriate blind people for instruction.

I have purposely refrained from expressing any personal views as to the selection of appropriate candidates for such instruction, because it seemed to me the few hints which I have incorporated from England and Germany are much more suggestive than any I might make myself. In closing let me tell you how thoroughly appreciated by patients with the chronic ailments at the New York Hospital, were the services of this blind masseur whom Mr. Hallbeck was kind enough to teach for me, and how keenly many of them missed his services when he left the institution. You are all too well acquainted with the value of massage in such ailments to warrant me in emphasizing its utility. I only wish to beg of you to give this matter your attention and your co-operation whenever in the future an opportunity occurs to further its accomplishment, and so gain the satisfaction of having aided some poor blind person to become an active, useful, interested, occupied and, best of all, independent individual.

Higher Education.

This report I read to the pupils, assembled in the Music Hall. Many of them had known Mr. Martineau during his term in the Institution, and they were deeply interested in the story of his success, and also in Mr. Hallbeck's statement of the course of study taken by Mr. Martineau. From this, and also from the requirements of another pupil who proposed to take a course in Osteopathy at the College in Kirksville, Missouri, it was suggested that a class in physiology might be usefully added to the O. I. B. curriculum, though the number of pupils possessing the physical and other qualifications for success in these lines is not large.

In the fall of 1904 a pupil of the O. I. B. entered another school to prepare for an Arts course in the University. Subsequent communication with him made it appear that his path might have been made easier if he had had some instruction in Latin while he was here, and it is probable that that language will be taught during the current session. The *West Virginia Tablet*, in reviewing the O. I. B. Report of last year, says: "They attach great importance to the substantial primary education in the Ontario school, and seem not to have pushed very far into the mere accomplishments. The strength of the staff would seem to indicate that the courses are limited by preference rather than necessity. The American schools generally push the intellectual training farther, and, I am pleased to think, with no disadvantage."

Hugh Buckingham, formerly a totally blind pupil of the California Institution, is now in his Sophomore year in the State University, and has taken a leading position as debater, which argues well for his future success in the law, which he intends to follow as a profession. This leads the writer of the Biennial Report of the California Institution to say "that for the blind we must try to prepare our pupils for those employments where brain work is demanded rather than hand work. It seems hardly necessary to defend this statement. In these days of sharp commercial competition and when the machine plays so large a part in what used to be handicrafts, the blind man who tries to get a living by manufacturing, except as employer, is at a disadvantage. There is no sentiment in business. The dealer buys where he can buy cheapest and with the largest profit to himself, and the consumer follows his example.

"But I am glad to say that there are many occupations where the educated brain, plus energy and perseverance, can overcome the handicap of blindness. Besides music-teaching and piano-tuning, which are arts rather than trades, there are many small business ventures, solicitorships, middlemen between producer and consumer, book and insurance agents, newspaper vendors, and many other occupations which offer opportunity for the exercise of business tact and energy. Many of our boys are working this field with success.

"And yet there will always be a percentage of the blind who will need a helping hand. Some lose sight in adult years, and find it hard to adjust themselves to new conditions. Some lose heart in the struggle for existence, and give up the fight. Some have no initiative, no capacity for business; they are willing to work, but don't know how. They need executive direction and skill, and public assistance to eke out the difference between earnings and support. To supply this deficit working homes for the adult blind have been established in various States, and are serving a most beneficent purpose."

Libraries.

The following books have been procured for the Teachers' Library:

University Collection of the World's Great Classics, 30 vols.
America, Notes on North, 2 vols.
Annals of the Parish, John Galt.
Book of Days, 2 vols.
Brock, Life of Sir Isaac, by F. B. Tupper.
Canada, Life in, Canniff Haight.
Canada, Statistical Account of Upper, Robert Gourlay, 3 vols.
Canadas, the, John Galt.
Canadians, Celebrated, Morgan.
Composers, Famous, 2 vols.
Dancing in all Ages.
Dictionary of Thoughts.
Edward the Black Prince, 2 vols.
England, Pictorial History of, 8 vols.
English History, Half Hours of.
English Literature, 2 vols.
George the Third, Life of.
German Dictionary.
Gould, Joseph.
Hymns, History and Development.
Italian Dictionary.
Literature in Letters.
Mackenzie, William Lyon.
Music, Phases of Modern.
Music, the Story of.
Poets, Lives of the English, 2 vols.
Prima Donna, the, 2 vols.
Rebellion, the other Story.
Southey's Poems.
Spectator, the.
Story of My Life. Helen Keller.
Sullivan, Sir Arthur, Life.
Veteran of 1812.
Wagner, Richard.

White Chief of the Ottawa.
Wild North Land.
Blindness and the Blind, Levy.
Achievements of the Blind, Artman.
The St. Lawrence, Dawson.
Barnard's Journal of Education, 2 vols.
MacGeoghegan's History of Ireland.
European Languages, Murray, 2 vols.
Applied Psychology, McLellan.
First Latin Book, Henderson.
High School Bookkeeping.
Physiology and Hygiene.
Practical Physiology.

The following have been added to the Pupils' and Circulating Libraries:—

(In Line Type.)

Kneass Magazine, 12 vols.
Story of Siegfried.
Children's Fairy Book.
Cyr's Interstate Primer and First Reader.
Pickett's Gap.
Stories for Little Readers.
Through the Farmyard Gate.
Wild Animals I Have Known.
Turner's First Reader.
Longfellow's Birthday.
Odysseus, Hero of Ithaca.
The Pilot.
Gods and Heroes.
Selections from Ruskin.
Sesame and Lilies.
Paul and Virginia.
In Memoriam.
George Eliot, Biographical Sketch.
Freeman's History of Europe.

(In New York Point.)

Christian Record, 14 vols.
Progressive Course, 2 pamphlets, 15 vols.
Rational Spelling Book.
Word Primer.
King Richard III., 2 copies.
Pioneer History Stories.
Napoleon, 2 vols.
Second Jungle Book.
Leading Facts in French History.
Life and Writings of Addison.
Walsh's New Primary Arithmetic.
Joy's Arithmetic Without a Pencil.
Maine Woods, 2 vols.
Mozart—Prout.
Foundations of French.

Six Select Stories.
Daphne.
Pioneers of France in New World, 2 vols.
Golden Age.
How to Knit and Crochet.

The following Catholic books were donated for the use of pupils and subscribers to the circulating library by The Xavier Free Publication Society for the Blind, 27 West Sixteenth street, New York:—

(In New York Point.)

The Bible and its Interpreter.
Consoling Thoughts of St. Francis de Sales, 2 vols.
The Following of Christ, 3 vols.
Golden Sands, 4 vols.
Hail Full of Grace, 2 vols.
The Heart of Jesus of Nazareth.
Leading Events in the History of the Church, 3 vols.
Life of Christ, 2 vols.
Little Lives of Great Saints, 2 vols.
Mary in the Work of Redemption.
The Sacrifice of the New Law.
Selections from Cardinal Newman, 2 vols.
Spiritual Pepper and Salt.
Wayside Tales, 4 vols.
What Christ Revealed.
Workings of the Divine Will.
Who and What is Christ?
Catechism.

A large quantity of old books—the accumulation of years— was sent to the bindery, and brought back in condition to ensure a new term of usefulness.

The cost of books for the blind, purchased at Louisville or Boston, is heavy, and it is worth considering whether an effort should not be made to include book-making among the employments of the senior pupils. Blind institutions in the United States get many free books under the provisions of the Act of Congress of 1879, entitled "An Act to promote the Education of the Blind," which, of course, has no application outside the boundaries of the Union. The extent of the home market in the States makes the problem simpler there than here. Thus Mr. J. H. Freeman, Superintendent of the Jacksonville, Illinois, Institution for the Education of the Blind, says in his Report that in the printing department "not only do we work for the benefit of our own pupils and graduates, but we are supplying a demand for music suitable for the blind throughout the country. To illustrate the extent of this demand I would mention that more than 300 orders for sheet music printed by us were received during the last school year from 17 institutions for the blind and individuals throughout the country, 33 different States being represented by our customers. We are now publishing annually more music for the use of the blind than any other institution or printer in the world. Primarily we publish it for our own pupils, but we are very glad to send the music to outside parties at cost. In addition to sheet music we also print (and sell to outside parties) certain text books and books fitted to supplement the school branches. The demand for these works is growing and we are constantly making additions to our catalogue. At the present time it con-

tains the names of 70 publications printed by us. In order to do this printing necessary for publishing the music and the books found in our catalogue, our printer—a blind man—has stereotyped nearly 17,000 brass plates, which we safeguard in a fireproof vault. From the number of applications we receive from different parts of this country, it is very evident to us that our literary and musical contributions contribute very materially to the intellectual advancement not only of our own pupils, but to the sightless in this and other States."

In China the products of the blind printer's labor are available for the use of sighted readers, and the market is therefore practically illimitable. Rev. W. H. Murray first invented the system of Numeral Type with Braille dots as a basis, and then connected the dots by straight lines for sighted readers. Miss C. F. Gordon-Cumming makes the following statements at page 100 *et seq.* of her book descriptive of Mr. Murray's invention and its results:—

"Another very important point is that in the new type most of the work is done by the blind students in school, all correcting of proofs is done on the spot, and the cost of a complete Bible, with the 'tones' and aspirate of each word perfectly rendered, will be about one-third that of a similar book produced alphabetically by specially-trained sighted compositors and proof-readers.

"Mr. Murray considers that it is now fully proved that the new type is not only the easiest conceivable form to read and write, but that it is by far the cheapest to produce.

"Best of all, it promises a solution of one of his gravest problems, in the provision of almost inexhaustible stores of remunerative occupation for the blind, as compositors, printers, binders and teachers.

"He has done his best to teach them certain trades, and has found his pupils very successful in making doormats and coarse matting for passages, while the women learn knitting and sewing mattresses and pillows. Various other work has been tried, such as shoemaking (the Chinese cloth shoe resembling a shapeless boat). The latter, however, has not proved successful.

"And, indeed, as regards making them self-supporting by instruction in any of the usual industrial arts, Mr. Murray despairs of the blind ever being able to compete against the legions of sighted Chinese who already overcrowd the market for basket and cane work, knitting, weaving, etc., and who would inevitably undersell the produce of the blind. Even in England, what would become of their industries apart from hearts in sympathy and open purses to help?

"So it appears that embossing, stereotyping, and bookbinding, piano and harmonium tuning and teaching, knitting, and matmaking are the most promising industries of the class usually considered suitable for the blind, and that their employment must lie chiefly in literary and musical work. They also write out books of embossed manuscript music, which they stitch and bind very decently.

"A friend, who had seen how many blind men in Japan earn their living by massage, suggested that Mr. Murray should introduce this as a profession, but he finds that the Chinese do not use it, at least not in North China.

"Though there seems so little hope of the students in the Blind School becoming self-supporting by ordinary industries, they are unwearied in their exertions on behalf of their sighted brothers and sisters."

Mr. Murray thus describes his hive of busy blind bees at their work:—

"With the exception of two, who are making rope doormats, two boys who are at the Braille stereotype, one reading, and the other punching at his dicta-

tion, making the brass sheets from which the embossing is done for blind readers, and some who are retuning the piano, all hands are busy preparing books for sighted readers; boys or girls are composing or distributing; the Chinese scholar is reading proofsheets; one man is preparing the papier-mache with which to take a mould; another is boiling the zinc to pour on to other moulds; two men are at the press, printing the Gospels; two are in the shop, printing the London Mission Hymnal.

"One of the boys has just finished tuning the shop piano. He has replaced a wire that snapped, and also all the felts and flannels. The latter was supplied by tearing an old red flannel garment into strips, while my last year's felt slippers were likewise turned to account.

"Two girls at a time work part of each day as compositors. They work in this way: the first girl reads with one hand on her Gospel in raised type for the blind, while with the other hand she lifts the two types representing each word in the type for the sighted, and hands them to the second girl to place in the form for printing. Thus the two blind girls work till a paragraph is finished. Then the second girl reads from the type just set up (of course it is all reversed, but to the blind this is just as easy to read, as their every-day writing with punctured dots is all written backward, and when taken off the frame has to be turned over, and then is right for the reader). While one girl reads, the other follows with her finger on the Gospel in the raised Braille type, and so checks any mistake.

"In this way we have set up and printed 100 copies of smaller Epistles; 400 copies of the Gospel of St. Matthew; 400 copies of St. Mark; 400 copies of St. Luke; 1,200 copies of St. John as far as the 10th chapter; 1,400 sheets of reading exercises; 100 hymn-books, all for the use of sighted persons, and now ready for distribution as the demand arises.

"We have had the 408 sounds of the syllabary arranged according to our primer, and lithographed, making four pages in large type of about half an inch in size. These are stitched in the form of a book, and are supplied to beginners. A large number of these are now in use, and I have sent them to missionary friends who wished to study the lessons. So our school this year has been like a wholesale publishing house. And if all could see the joy which lights up the blind faces to find themselves both useful and important, I think that from the Emperor downward all would give us their sympathy and help. All the pupils have had a trial as compositors, distributors and proofreaders, each has had a sighted pupil to teach, and all feel the utmost confidence in their prospects of success as teachers. This, indeed, has already been so amply proved that all theoretical objections should now be silenced."

Exchange List.

Desiring to obtain all the available information of value to the blind and to those interested in their welfare, I mailed copies of the thirty-third annual report of this Institution to the following schools, with the hope that their directors would reciprocate by sending their reports to me:—

School for Blind, Boulder, Montana, U.S.
School for Blind. Lansing, Michigan, U.S.
Institution for Blind, Indianapolis, Ind.
M. Anagnos, School for Blind, South Boston, Mass.
Institution for Blind, Jacksonville, Ill.
Institution for Blind, Nebraska City, Neb.
School for Blind, Baltimore, Maryland.
Institution for Blind, Kansas City, Kansas.

Academy for Blind, Macon, Georgia.
School for Blind, Janesville, Wisconsin.
Institution for Blind, Raleigh, North Carolina.
Institution for Colored Blind, Austin, Texas.
School for Blind, Ogden, Utah.
Institution for Blind, Staunton, Virginia.
School for Blind, Faribault, Minn.
Institution for Blind, Cedar Springs, South Carolina.
Institution for Blind, Baton Rouge, Louisiana.
Institution for Blind, Columbus, Ohio.
W. B. Wait, Institution for Blind, New York City.
Institution for Blind, Overbrook, Penn.
School for Blind, Gary, South Dakota.
Institution for Blind, Jackson, Miss.
School for Blind, Romney, West Virginia.
Institution for Blind, Vancouver, Washington, U.S.
Institute for Blind, Salem, Oregon.
School for Blind, Nashville, Tenn.
Institution for Blind, Pittsburg, Penn.
Blind Institution, St. Augustine, Florida.
Institution for Blind, Talladega, Alabama.
Institution for Blind, Berkeley, California.
College for Blind, Vinton, Iowa.
Institution for Blind, Louisville, Kentucky.
School for Blind, Batavia, New York.
Institution for Blind, Austin, Texas.
School for Blind, St. Louis, Missouri.
School for Blind, Fort Gibson, Indian Territory.
Academy for Blind, Talladega, Alabama.
School for Blind, Colorado Springs, Colorado.
School for Negro Blind, Talladega, Alabama.
Institution for Blind, Hartford, Connecticut.
School for Blind, Little Rock, Arkansas.
Institute for Blind, Stockport, Eng.
Royal Victoria Asylum for Blind, 79 Northumberland street, Newcastle on-Tyne, Eng.
Institution for Blind, Clarendon street, Nottingham, Eng.
Catholic Blind Asylum, 59 Brunswick road, Liverpool, Eng.
Yorkshire School for Blind, York, Eng.
Institution for Blind, South Hill Place, Swansea, Wales.
Institute for Blind, Glover street, Preston, Eng.
Association for Blind, 28 Berners street, London, Eng.
School for Blind, Norwich, Eng.
Society for Blind, Darlington street, Wolverhampton, Eng.
School for Blind, Manchester road, Sheffield, Eng.
Institution for Blind, North Hill, Plymouth, England.
Gardner's Trust for Blind, 1 Poets' Corner, Westminster, London, S.W England.
British and Foreign Blind Association, 206 Great Portland street, London, W., England.
National Institution for Blind, Dublin, Ireland.
Royal Normal College for the Blind, Westow street, Upper Norwood S.E., London, England.
Asylum for Blind, Infirmary road, Cork, Ireland.

Hetherington's Charity for Aged Blind, Christ's Hospital, Newgate street, London, E.C., England.
Henshaw's Blind Asylum, Old Trafford, Manchester, Eng.
Asylum for Blind, Queen's road, Park street, Bristol, Eng.
School for Blind, Hardman street, Liverpool, Eng.
Association for Blind, North Parade, Bradford, Eng.
Institution for Blind, Albion street, Leeds, Eng.
Institution for Blind, Edgbaston, Birmingham, Eng.
Asylum for Blind, Eastern road, Brighton, Eng.
Ulster Society for Education of Blind, Belfast, Ireland.
Blind Institution, Kingston Square, Hull, England.
Institute for Blind, Glossop road, Cardiff, Wales.
Institute for Blind, 81 Castle street, Inverness, Scotland.
Institution for Blind, St. David's Hill, Exeter, Eng.
London Society for Blind, Upper Avenue road, Regent's Park, London, N.W., England.
Blind School, Nicolson street, Edinburgh, Scotland.
Home for Blind Children, Goldsmiths' Place, Kilburn Priory, London, S.W., England.
School for Blind, St. George's Fields, Southwark, London, S.E., England.
Institution for Blind, Magdalen Green, Dundee, Scotland.
Asylum for Blind, 102 Castle street, Glasgow, Scotland.
School for Blind, Sydney, Australia.
School for Blind, Melbourne, Australia.
School for Blind, Oporto, Portugal.
School for Blind, Lisbon, Portugal.
School for Blind, Milan, Italy.
School for Blind, Naples, Italy.
School for Blind, Madrid, Spain.
School for Blind, Grenada, Spain.
School for Blind, Prague, Bohemia.
School for Blind, Lintz, Austria.
School for Blind, Vienna, Austria.
School for Blind, Leipzig, Germany.
School for Blind, Munich, Germany.
School for Blind, Dresden, Germany.
School for Blind, Berlin, Germany.
School for Blind, Soissons, France.
School for Blind, Marseilles, France.
School for Blind, Paris, France.
School for Blind, Brussels, Belgium.
School for Blind, Antwerp, Belgium.

From quite a number of these Institutions reports have been received; from others have come courteous acknowledgments, with a few newspaper reviews, of which the following is a sample:—

"The Thirty-third Annual Report of the O. I. B. is before me. It has some features that have not been seen by me for a long time, if ever. I note that the Principal, Mr. H. F. Gardiner, has incorporated with his report on the present needs and state of his school an extensive collection of excerpts from the reports of various American institutions, and from the proceedings of the Association of Instructors of the Blind, bearing on the topic he discussed so wisely at St. Louis last summer, which he publishes also with the report under consideration; together with the discussion which followed the

reading of the paper. This feature makes the present a very valuable document, and the subject thus treated will have the advantage of reaching more persons than would be likely to be reached by the proceedings of the meeting itself.

"The modesty of Principal Gardiner in giving credit to his teachers and officers for the signal success of the school during his first year of service betrays a sagacity scarcely to be expected of so young a man in the work. He reveals unconsciously to the initiated how very largely that success has been secured by the gentle pressure of the guiding hand. He shows plainly that he is not to be swept from a sound conservatism by the spasms of novelty that sometimes sweep over the country and carry everything that is movable with them.

"The matter that seems to rest with most weight on the Principal's heart is the question of affording to his pupils a means of livelihood that they and their friends can depend on when the school days are over and the boys and girls as men and women take up the real burden of life. He notes with some apparent misgivings that are not to be wondered at, that two of the great American Institutions have repudiated the trades in their shops and substituted manual training under the theory, and what else I cannot certainly say, that youth in the schools is the time for acquiring the mere principles of knowledge, and that the practical application ought to be secured in the ordinary way by substantial apprenticeships after the school days are past. The theory is sound, but the practice is at least questionable and uncertain. No one trade will suit all pupils, and no one boy will suit all trades; but the right boy with the right trade, and sense and address enough to work it, will succeed at any trade, and New York and Boston have proved it over and over again. Still, it must not be forgotten that the wisdom of the school must be shown in arranging for those who have to be helped to success. The others will take care of themselves. The homely wisdom of Sir Roger de Coverley commends itself at all times, 'There is much to be said on both sides of the question.'

"The Institution is taking the Toronto College examination for its promising music pupils, and thus giving them a very handsome advantage, as Mr. Wait has long been doing for his pupils of both the music and literary part of their courses in his school."

Farm, Grounds and Buildings.

No new buildings were erected during the year, but a considerable sum was expended upon necessary repairs, and similar expenditure will be needed for some time, as the buildings are now over thirty years old. The teachers' and officers' parlor was tastefully refurnished during the vacation, the usual repairs were made in class-rooms and corridors, and some needed changes were made in the plumbing.

A plan to improve the heating system is under the consideration of the Public Works Department.

A large quantity of road material has been drawn from the pit and used to good advantage upon the grounds.

The appropriation for trees was not available in time to be used this year.

Three thousand square feet of cement walk was constructed, the plan being to replace the most badly worn portions of the board-walk with cement.

The planting of willows near the river, to prevent the washing away of the gravel bank, was undertaken on a small scale, but the cuttings did not thrive. An experiment will be made with poplar or silver maple.

A plot of ground was graded and sodded for lawn-bowling by the employees of the Institution.

Rain was abundant during the growing season and the farm crops were unusually good; wheat, oats and corn above the average; roots, with the exception of potatoes, good; apples scarce, and the quality poor. An attempt was made in the spring to graft winter apple cuttings upon the summer apple trees, the latter being proportionately too numerous. Another experiment was the use of nitro-culture with a bushel of clover seed, the microbes being supplied by Prof. F. C. Harrison of the Bacteriological Department of the Ontario Agricultural College, Guelph. Although the results were not as wonderful as those described in the *Century Magazine* of October, 1904, they were positive enough to warrant further experiment on the same line.

Visitors.

Many visitors continue to come to the Institution on Saturdays, or after school hours on the other days of the week. They are welcome from Monday morning till Friday afternoon, between the hours of 9 a.m. and 4 p.m., when the classes are in session and the Visitors' Attendant and the teachers are on hand to explain the work done. But it seems like a waste of time to show people through empty rooms, when a little forethought on their part would make it possible to exhibit something really interesting for their inspection. Of course there is no objection to pupils' parents taking advantage of cheap fares to spend a few hours with their children on public holidays.

I have again to thank the city ministers who held special services in the Music Hall on Sunday afternoons.

H. F. Gardiner,
Principal.

Brantford, October, 1905.

Physician's Report.

Hon. R. A. Pyne, M.D.,

Minister of Education for Ontario:

Sir,—I have the honor to submit my annual report as Physician to the Ontario Institution for the Blind.

The past session has been an unusually healthful one among both officials and pupils. The pupils came from home for the year's work in an unusually fit condition and maintained this, with very few exceptions, throughout the term.

The female side of the house has always been the most troublesome. Girls develop coughs and colds, become anæmic, etc. The cause of this, it appears to me, is due partly to natural susceptibility, but largely to the lack of a proper room for recreation and relaxation. After classes, girls are found sitting about in their dormitories reading or knitting, because they have no other room where they can go. The lack of this proper accommodation, together with the existing high-pressure system of heating, gives rise in many cases to unnecessary discomfort and avoidable diseases.

Another serious and unsanitary feature is that there is no sick-room or suspect-room on the girls' side. Contagious diseases cannot be properly guarded against on this account.

Trusting that these minor wants may appeal to you sufficiently strong, and that your liberality may correct what in my opinion are serious matters to those placed under our charge,

I have the honor to be,
Sir,
Your obedient servant,

J. A. MARQUIS.

Brantford, 19th July, 1905.

OCULIST'S REPORT.

To Hon. R. A. PYNE, M.B.,
Minister of Education:

SIR,—I have the honor to submit my Report as Oculist to the Ontario Institution for the Blind.

Five years ago I examined all the pupils then attending the Institution, going into the eye conditions pretty thoroughly, and preparing a rather exhaustive report, classifying these conditions. Each succeeding year my examination was more particularly of the new pupils, and in one of my subsequent reports I believe I advised an examination of all the pupils, with a classified report on the disease conditions, after an interval of a few years, when in fact a sufficient number of new pupils should have come in to show some effect on those classifications. In this report you will find the results of the examination of all the pupils again tabulated similarly to that of five years ago, rendering comparisons easy.

——	Males.	Females.	Total.
Number of pupils examined	52	59	111
New pupils, examined for first time	12	9	21

Divided into five classes.

——	Males.	Females.	Total.
I. Without perception of light in either eye	18	6	24
II. With perception of light only, in one eye	4	9	13
III. With perception of light only, in both eyes	6	10	16
IV. With limited objective vision in one eye	14	8	22
V. With limited objective vision in both eyes	10	26	36
	52	59	111

In the last class one girl and two boys are included who were found to have sufficient vision to render them ineligible for admission.

Diseases causing blindness, number of cases, and percentage affected by each:—

	Males.	Females.	Total.	Percent.
Optic Atrophy	10	13	23	20.7
Ophthalmia Neonatorum	9	13	22	19.8
Cataract (Congenital and Lamellar)	8	8	16	14.4
Injury of one eye followed by Sympathetic Ophthalmia in the other	6	2	8	7.2
Injury by powder explosions	5	.....	5	4.5
Injury by other means	2	1	3	2.7
Aniridia and Coloboma	3	2	5	4.5
Interstitial Keratitis	.....	5	5	4.5
Retinitis Pigmentosa	1	3	4	3.6
Degenerated eyes, cause unknown	1	3	4	3.6
Keratoglobus	1	2	3	2.7
Refractive errors	1	2	3	2.7
Microphthalmus	1	1	2	1.8
Albinism	.....	2	2	1.8
Brain Fever	1	1	2	1.8
Undeveloped Optic Nerves	1	.....	1	.9
Intra-Uterine Keratitis	.....	1	1	.9
Scarlet Fever	1	.....	1	.9
Pneumonia	1	.....	1	.9
	52	59	111	

It might be noticed that the first three diseases on the list are responsible for sixty-one cases, over half of the total.

The majority of the pupils with Optic Atrophy were affected at birth or in early childhood; while in a few it was due to injuries, mainly to the head, received later in life.

As usual, Ophthalmia Neonatorum stands high as a causative factor in the blindness of the Province. In most cases it has left very little sight to the unfortunate children because of the great destruction it so frequently causes in the organ.

The Cataractous pupils have nearly all had one or both eyes operated on with rather indifferent results. Naturally, if the results had been as brilliant as they are in uncomplicated Cataract cases, these pupils would be getting their education elsewhere; but the trouble is that many of these Cataracts have been successfully removed only to find other serious defects.

Injuries to one eye followed by Sympathetic Ophthalmia in the other:—It is a difficult thing to persuade a patient or his parents that it is better to sacrifice a badly injured eye by having it removed than to take the chance of losing the sight of both eyes by Sympathetic Inflammation in the other. This fact accounts for this deplorable class.

Injuries by powder explosions were all in male pupils, and all but one due to accidents in mines.

In all the cases of Interstitial Keratitis there is evidence of inherited syphilis, and these all females. Only one other case of syphilis was detected, which was in a girl with Optic Atrophy.

Four pupils have eyes too degenerated to reveal the cause, and did not know themselves what the primary trouble had been.

Two of the cases of Refractive Errors are of such a nature that glasses benefit but little, while the third gets normal vision with properly fitted glasses, and was reported ineligible.

During the past year a few cases required treatment, including operations where found necessary or where there was promise of improving the vision; these latter gave very gratifying results.

Ear troubles required some attention, but there was nothing of a serious nature.

My sincere thanks are due to Principal Gardiner for his courteous assistance.

Respectfully submitted,

B. C. Bell.

Brantford, 15th September, 1905.

Literary Examiner's Report.

Hon. R. A. Pyne,

Minister of Education:

Sir,—In submitting the report of my examination of the literary department in the Ontario Institution for the Education of the Blind, it gives me pleasure to state that there is much to commend, little to criticize.

The education of the youth of our country is a subject of paramount importance, which, however, becomes more involved and somewhat perplexing when considered in relation to the blind. In this class we find intellects as clear and minds incited by as lofty ideals as are possessed by any other persons. Such being the case, the question may with propriety be asked, how far the senior work of a literary character should extend. At present good work is done in English Grammar and Literature, but interest in this branch would no doubt be increased, and a more thorough and rational grasp of the language be obtained, if Latin were added to the curriculum. The knowledge of this subject would enable some to prosecute more advanced study, and eventually even to matriculate in a university.

While this Institution is intended for the education of the pupils, a visitor may obtain a good deal of instruction and have many erroneous views corrected. Many a parent would be amply repaid for the time taken in visiting the classes at work by the valuable object lessons received in patience, perseverance and sympathy. One cannot fail to be impressed with the earnestness and application of the pupils on the one hand, and the faithful perseverance and sympathy, on the other hand, on the part of the instructors. From the kindergarten classes, where the little ones receive their elementary ideas, to the senior pupils in mathematics and literature, the same spirit of faithful work is manifest. The order, the discipline and the deportment of the pupils are excellent.

In the matter of text-books the only change I would recommend is that a Canadian edition of the Speller be adopted in place of Blaisdell's Speller, a work published in the United States.

The work of the various classes during the four days' examination held from June 13th to 16th inclusive will appear in the following detailed statement:—

Mr. W. Wickens' Classes.

Arithmetic.—Simple problems in fractions. In this class there were eight boys and eleven girls, the majority of whom showed marked ability, no less than five receiving full marks. The lowest was 34 per cent., the average being 78 per cent. This is certainly a bright class.

Geography.—England and Ireland. The class consisted of ten boys and thirteen girls. The answers showed much variety of merit; many were excellent; some were poor. The marks assigned were from 20 per cent. to 100, the average being 69.

Reading.—There are three divisions in this class, the work of the seniors being the selected poem "Horatius at the Bridge," in point print. The second division used the Fourth Reader, in point print; and the third division the First Reader, also in point print. In the senior division of thirteen pupils the marks averaged 75 per cent., ranging from 50 to 85 per cent. In the second division of three pupils the marks were 60, 75 and 100 per cent. In the third division of five pupils the marks ranged from 40 to 80 per cent., averaging 54 per cent.

Writing.—Short extracts of prose and poetry from dictation, using capital letters, punctuation marks, etc. This writing is in point print. Twelve pupils in the class; work very creditable. Marks were from 34 to 100 per cent., one pupil receiving the latter mark; average 71 per cent. In addition to the twelve pupils mentioned, there were two others whose writing was in pencil. They received 60 and 80 per cent.

Bible Geography and History.—Eleven seniors and six juniors, all boys. The ground covered was the history of the Jewish nation to the end of the Old Testament. The marks, generally, were high, ranging in the seniors from 67 to 100 per cent., with an average of 82; and in the juniors from 75 to 100 per cent., averaging 90.

Spelling.—Two divisions of boys. The seniors have Part III. of Blaisdell's Speller; the juniors, embossed Speller. In the senior class of fourteen the marks ran from 50 to 100 per cent., with an average of 88; in the class of six juniors from 50 to 100 per cent., average 83 per cent.

Mr. Roney's Classes.

Arithmetic.—This is a promising class of 17 junior pupils with varying ages and degrees of merit. The work covers Addition, Subtraction and Multiplication to 20 times 20. It is somewhat novel to hear a child of nine years of age repeat 14 times 16 and 14 times 17 as readily as 8 times 9 or 11 times 12. The marks ranged from 50 to 100 per cent., with an average of 84 per cent.

English Grammar.—Limits, the parts of speech and the analysis of simple sentences. The class contains nine boys and fifteen girls. Some have done poor work, but many of them very good. In ranking such pupils one must take into consideration the size of the class and the varying attainments. One pupil being French, can speak very little English and the progress in this case must necessarily be slow. Marks ranged from 0 to 100 per cent., with an average of 64 per cent.

Geography.—Canada and Ontario, map and book work of the Public School Geography. This is a good class of juniors, two boys and nine girls. The ground has been well covered. The average of marks given was 94 per cent.

Reading.—This class of six boys and seven girls uses Embossed Readers I., II., and III. As junior pupils they have made very satisfactory progress. Average marks, 79 per cent.

Writing.—This division of six boys and fourteen girls is the senior class in pencil writing. This subject may perhaps be considered the most valuable in the curriculum, and is one that requires great patience and perseverance. The marks varied from 35 to 75 per cent., with an average of 60 per cent.

Miss Walsh's Classes.

Arithmetic.—Limits, Compound Rules, Sharing, Measurements, Papering, etc., Fractions, Four Simple Rules. In this class of four boys and seven girls, the marks ranged from 15 to 88 per cent., with an average of 47.

English Grammar.—Definitions, Indicative Mood, Parsing Simple Sentences. This class of seven boys and fifteen girls gave evidence of excellent training with corresponding results, the average being 91 per cent.

Geography.—Limits, Definitions, Map of Ontario. This class was made up of thirteen boys and ten girls, some very young. Several received full marks, the average being 82 per cent. Great efficiency has been attained. The dissected map is very valuable in teaching the relative positions of counties and the physical features of the various sections. The pupils find very little difficulty in dissecting the map and putting it together again. thereby gaining a lasting knowledge of the Province as a whole and of each portion in particular.

Reading.—Four senior pupils and five juniors. Good work is done. The seniors, who use the Fourth Reader, averaged 75 per cent., and the juniors, who use the Third Reader, averaged 81 per cent., the average for the class being 79 per cent.

Writing.—The number in this junior class is seven, and the work consists of capital and of small letters, as well as simple words, with the use of the pencil. For a junior class the results are good; average of marks, 69 per cent.

Object Lessons.—In this class of twenty-seven young pupils, the study of spices and fruits is made very interesting. The scholars enter very heartily into the consideration of the growth and uses of such articles as cloves, cinnamon, ginger, etc., as well as the manufacture of pottery, porcelain and other useful things. Some received very high marks, and others a low rating, as might be expected from such a mixed class, the average being 59 per cent.

Bible History.—The class examined consisted of eleven Roman Catholic children, mostly girls. The work was the twenty-first to the twenty-eighth chapter of Acts, and the parables and miracles of St. Luke's Gospel. The marks assigned averaged 78 per cent.

Spelling.—In this class nine Roman Catholic children were examined on Blaisdell's Speller, with creditable results, two obtaining full marks, the average being 74 per cent.

Miss Gillin's Classes.

Arithmetic.—The work includes the Multiplication Table to twenty times twenty; weights and measures, definitions and simple problems. There were five boys and seven girls in the class and the average marks assigned were 52 per cent.

English Grammar.—This is a good class of six senior pupils. The answers were clear and to the point, showing a grasp of the work which embraced the history of language in general, with particular reference to English, and also False Syntax, Parsing and Analysis. One pupil received full marks, the average being 76 per cent.

Geography.—Limits, the United States of America, Central America, South America, and the West Indies. This class of five boys and eight girls has covered the prescribed ground accurately. There was considerable variety in the grading of the pupils, the marks ranging from 25 to 100 per cent., two receiving perfect marks, the average being 71 per cent.

Writing.—A junior class of six boys and eleven girls. The work is done with pencil and consists of letters and short words. The average, 42 per cent., apparently low, is good considering the ages and attainments of the pupils.

English History.—Reigns of George III., George IV. and William IV. This is a particularly bright class, composed largely of seniors, five boys and nine girls. The work is well done. Marks ranged from 63 to 100 per cent., averaging 90 per cent.

Canadian History.—The pupils in this class are the same as in English History and have covered the ground well, extending from the War of 1812 to the present time. The marks ranged from 38 to 100 per cent.; average, 85.

English Literature.—This class would do credit to any institution of learning. Although the ground covered is extensive, the work has been excellently done, embracing English literature from the Restoration to the beginning of Queen Victoria's reign, Canadian writers from Judge Haliburton to the present time, and a history of Canadian Universities. In addition to this Shakespeare's play, King Lear, was studied critically. The pupils displayed marked ability in delineating characters represented in this tragedy and their apt quotations were quite refreshing. King Lear is by no means the easiest of Shakespeare's plays to read, a fact that renders the examination passed by the pupils exceedingly creditable. The marks varied from 59 to 100 per cent., with an average of 90 per cent.

Bible Geography and History.—The portion studied included the books of Daniel, Ezra, Esther and Nehemiah. Good work is done in this class of three boys and twenty girls, advanced pupils, the marks assigned averaging 89 per cent.

Spelling.—Parts III. and IV. of Blaisdell's Speller. This is a promising class of twenty-four girls. Marks from 63 to 100 per cent.; average, 92 per cent.

Miss Lee's Classes.

To a visitor there is as much to interest in these kindergarten classes as in the highest. One cannot but seriously ponder in the presence of such pupils—mere children, it is true, but for all that the coming men and women. The foundation of education is here laid; how important that it be thorough and true.

Great interest was shown in the work, which is of a varied character—sewing, bead-stringing, cutting and matching, weaving, etc., as well as making models in clay. These exercises are varied by singing, in which most of the children enter heartily.

In addition to the kindergarten branch, the pupils were examined in the following literary subjects:—

Arithmetic.—Limits, Addition, 1 to 13; Subtraction, Multiplication to five times. In this class of nine boys and seven girls the marks assigned were from 10 per cent. to 100, with an average of 81 per cent.

Reading.—Some are just learning the letters and the teaching is individual. Class of eleven boys and eight girls. Marks, 40 per cent. to 95; average, 79.

Bible Geography and History.—A class of nine boys and seven girls. The pupils were examined on the names of the Books of the Bible and on Psalms I., XIX., XXIII., CIII, CXVII., and answered very well. The marks assigned averaged 90 per cent.

Spelling.—Limits, simple words of two syllables. Some pupils were so young that they were not beyond words of two letters. Average of marks, 91 per cent. in a class of eleven boys and seven girls.

Miss Haycock's Classes.

Spelling.—This class of fifteen girls passed an examination in words found in the first twenty-three pages of Gage's Speller, and the result was very satisfactory, the majority of the pupils gaining perfect marks, the average being 97 per cent.

Bible Geography and History.—The pupils, fifteen girls, passed a very creditable examination on Bible History from Genesis to the Division of the Kingdom, one obtaining full marks, the rest from 50 per cent. to 90, with an average of 77 per cent.

Miscellaneous.

In addition to the writing exercises of the classes previously mentioned, seventeen samples of typewriting were presented. One of these was free from mistakes of any kind, and some others were nearly perfect.

This concludes the report of the examination in literary branches, but there are other studies prosecuted by the pupils under the direction of the instructors previously mentioned, the results of which I was requested to examine. Subjoined is a brief report:—

Miss Haycock's pupils exhibited some very fine work in wool, linen and silk, the finish of which was excellent. From house-slippers to jackets, with table mats and other useful articles, the samples deserved the highest commendation.

Miss Lee has a class of six girls whom she instructs in Plain Housekeeping, Care of Kitchen, Theory of Proper Diet, and Practice in Cooking, which must prove of great practical value.

Classes are conducted by Miss Loveys in Sewing and Netting; by Miss Cronk in Bead-work, with Miss Hepburn—a pupil-teacher—as assistant, and Miss Burke in Knitting and Sewing, all of which will be of much benefit in after life to those so ably instructed.

In Physical Culture Mr. Roney has classes, some for boys and others for girls, all of which are attended by good results. Mr. Roney has proved himself a successful instructor in this department.

In conclusion, I beg to acknowledge the courtesy extended to me by Principal Gardiner and the Faculty, and to give expression to the great pleasure and profit I have derived in the discharge of my duties as examiner.

I have the honor to be,
Sir,
Your obedient servant,

S. F. PASSMORE.

Brantford, July 3rd, 1905.

REPORT ON MUSICAL INSTRUCTION.

Hon. R. A. PYNE, M.D.,
Minister of Education:

SIR,—I beg to submit my report on the musical instruction given at the Ontario Institution for the Blind, Brantford.

The examination was held on June 6 and 7, 1905, and, as in former years, was conducted under the following heads: Theory of Music (including Harmony, Counterpoint and Musical History), Piano, Organ and Vocal

Class. Specimens of the work in piano-tuning were also heard. As this was my fifth year to visit the O. I. B., the pupils, for the most part, were no strangers to me, nor I to them. We met as friends and the examination proceeded pleasantly. Fifty pupils are studying music, and each one (except three who could not be examined because of illness), was heard separately. All of the pupils study the piano, six the organ, and eleven musical theory. Ten of the pupils tried the piano examinations of the Toronto College of Music this year. These candidates were heard by me, as one of the examiners of the College, and the results are embodied in this report.

The course in Piano Playing at the O. I. B. is a well graded one. During the last few years many pupils have passed through and graduated with distinction. There are five grades, each subdivided into Classes A, B, and C.

In grade I. (the lowest) there are eight pupils in Class A, four in Class B, and six in Class C. The young beginners in Class A are being carefully taught; two of them are particularly bright and promise well, four others show fair talent, and the remaining two are slower. A good feature in connection with this class is that nearly all of these pupils have a good touch—a most important matter, which speaks well for the care the teachers take with pupils at this stage. Of the four pupils in Class B, two are fair and the others slower. In Class C are six pupils; one shows talent and is doing nicely, three are fair, and the other two, adults, show some musical feeling, but have no technique.

In the second grade there are seven pupils in Class A, one in Class B, and three in Class C. One of the pupils in Class A promises well, two are fair, and the remaining four slower. The single pupil in Class B does fair work; she has a quick ear. In Class C are three pupils; one shows decided talent and should become a good musician; another passed the first examination of the Toronto College of Music; the third was found to be weak and had a bad touch.

There are fifteen pupils in grade III.; five in Class A, seven in Class B, and three in Class C. Of the five pupils in Class A, four of them tried with success the first examination of the Toronto College of Music, one with first class honors, and the other three with second class honors; the other pupil in this class plays fairly well. In Class B are seven pupils; two passed the second examination of the College of Music, one with first class honors; another plays extremely well; three fairly well; the last was very weak with a hard touch. Of the three pupils in Class C, one passed the second year College of Music examination with second class honors; another does fair work; the third plays quite well.

In grade IV. are five pupils, two of whom were ill and could not be heard. Of the other three, one passed the third examination of the College of Music with first class honors; another passed the second examination with second class honors; the third does fair work.

Miss Mary Williams, who is the single pupil in the fifth or highest grade, has this year obtained the Artists' Diploma of the Toronto College of Music. She is an accomplished pianist, and a first-rate example to those students who are striving for graduation honors.

The six pupils in the organ class do only fair work. They seem to regard the organ as a mere second study and do not give this instrument the attention it deserves. The organ playing generally was weak.

Miss Moore's pupils in Musical Theory are divided into two classes, A (senior), and B (junior). Papers in Harmony, Counterpoint, and Musical History were set for the senior class, and in Harmony and History for the junior class. The pupils in Class A obtained an average of 75 per cent. of

the marks in Harmony and Counterpoint, and 89 per cent. in History; and the pupils in Class B obtained an average of 72 and 65 per cent. on the two subjects. Also, in the Toronto College of Music examinations for the year, one of the senior pupils passed the second examination in Theory, and one of the junior pupils the first examination. This is a very satisfactory showing. The percentages ranged from 41 to 92, and individual pupils did remarkably well.

The Choral Class, of some forty voices under Mr. Humphries' direction, sang Nevin's setting of Eugene Field's "Wynken, Blynken and Nod." The rendering was spirited and gave evidence of much painstaking care in its preparation. This class is, no doubt, of great help in the singing at the morning devotional exercise, when the hymns used are sung with life and spirit.

The class in Piano Tuning, which is now under Mr. Usher, maintains the high standard of previous years. The tunings examined were perfectly satisfactory.

A comparison of this year's examination of the Musical Instruction given at the O. I. B. with that of previous years shows that there is no deterioration in the character of the work done. Speaking generally, the results obtained compare favorably with those of other teaching institutions where the pupils have all their faculties; and Mr. E. A. Humphries and Misses Moore and Harrington deserve much credit for what they accomplish.

I have the honor to be,
Sir,
Your obedient servant,
W. E. FAIRCLOUGH.

Toronto, August 12th, 1905.

ONTARIO INSTITUTION FOR THE BLIND.

STATISTICS FOR THE YEAR ENDING 30TH SEPTEMBER, 1905.

I. Attendance.

	Male.	Female.	Total.
Attendance for portion of year ending 30th September, 1872..	20	14	34
" for year ending 30th September, 1873.....	44	24	68
" " " 1874.....	66	46	112
" " " 1875.....	89	50	139
" " " 1876.....	84	64	148
" " " 1877.....	76	72	148
" " " 1878.....	91	84	175
" " " 1879.....	100	100	200
" " " 1880.....	105	93	198
" " " 1881.....	103	98	201
" " " 1882.....	94	73	167
" " " 1883.....	88	72	160
" " " 1884.....	71	69	140
" " " 1885.....	86	74	160
" " " 1886.....	93	71	164
" " " 1887.....	93	62	155
" " " 1888.....	94	62	156
" " " 1889.....	99	58	167
" " " 1890.....	95	69	164
" " " 1891.....	91	67	158
" " " 1892.....	85	70	155
" " " 1893.....	90	64	154
" " " 1894.....	84	66	150
" " " 1895.....	82	68	150
" " " 1896.....	72	69	141
" " " 1897.....	76	73	149
" " " 1898.....	74	73	147
" " " 1899.....	77	71	148
" " " 1900.....	77	67	144
" " " 1901.....	72	66	138
" " " 1902.....	68	70	138
" " " 1903.....	67	64	131
" " " 1904.....	68	66	134
" " " 1905.....	67	74	141

II. Age of pupils.

	No.		No.
Six years.....	2	Seventeen years.....	10
Seven "	2	Eighteen "	8
Eight "	5	Nineteen "	5
Nine "	7	Twenty "	7
Ten "	8	Twenty-one "	4
Eleven "	4	Twenty-two "	8
Twelve "	8	Twenty-three "	4
Thirteen "	9	Twenty-four "	3
Fourteen "	13	Twenty-five "	0
Fifteen "	10	Over twenty-five years.....	20
Sixteen "	4	Total.....	141

III.—Nationality of parents.

——	No.	——	No.
American	2	German	7
Canadian	72	Scotch	16
English	24	Unknown	1
Irish	18		
Italian	1	Total	141

IV.—Denomination of parents.

——	No.	——	No.
Congregational	2	Presbyterian	30
Baptist	8	Roman Catholic	25
Disciples	1	Salvationist	3
Episcopalian	38		
Methodist	33	Total	141
Evangelical Association	1		

V.—Occupation of parents.

——	No.	——	No.
Agents	2	Laborers	31
Bricklayers	3	Lawyer	1
Blacksmiths	2	Manufacturer	1
Butcher	1	Machinists	3
Carpenters	6	Merchants	7
Clerk	1	Millwright	1
Civil engineer	1	Painters	5
Contractor	1	Printer	1
Cooper	1	Plumber	1
Cook	1	Policeman	1
Carriage-builder	1	Shipper	1
Conductor	1	Shoemakers	1
Cabinetmaker	1	Railway employees	1
Drover	1	Repairer	1
Electrician	1	Tanner	1
Farmers	38	Tailors	1
Firemen	2	Teacher	1
Foreman	1	Teamsters	1
Gardeners	2	Weaver	1
Government officers	2	Unknown	1
Gentleman	1		
Hostler	1	Total	141

VI.—Cities and counties from which pupils were received during the official year ending 30th September, 1905.

County or city.	Male.	Female.	Total.	County or city.	Male.	Female.	Total.
District of Algoma	2	3	5	District of Nipissing	3	1	4
City of Belleville	....	....	....	County of Norfolk	2	3	5
County of Brant	....	....	....	" Northumberland	3	2	5
City of Brantford	1	1	2	" Ontario	....	1	1
County of Bruce	1	2	3	City of Ottawa	2	2	4
" Carleton	....	....	....	County of Oxford	3	4	7
" Dufferin	1	....	1	" Peel	1	....	1
" Dundas	....	....	....	" Perth	3	2	5
" Durham	1	....	1	" Peterborough	1	2	3
" Elgin	2	1	3	" Prince Edward	1	....	1
" Essex	2	4	6	" Prescott	1	....	1
" Frontenac	....	....	....	" Renfrew	....	3	3
" Glengarry	1	1	2	" Russell	1	....	1
" Grenville	....	1	1	City of St. Catharines	....	....	....
" Grey	1	2	3	" St. Thomas	....	....	....
City of Guelph	1	1	2	" Stratford	1	....	1
County of Haldimand	....	....	....	County of Simcoe	1	1	2
" Haliburton	....	....	....	" Stormont	....	....	....
" Halton	....	....	....	City of Toronto	10	15	25
City of Hamilton	....	3	3	County of Victoria	2	....	2
County of Hastings	....	1	1	" Waterloo	1	....	1
" Huron	3	1	4	" Welland	....	1	1
City of Kingston	1	....	1	" Wellington	1	....	1
County of Kent	3	2	5	" Wentworth	....	3	3
" Lambton	5	1	6	" York	1	1	2
" Leeds	1	....	1	*Quebec	1	....	1
" Lanark	....	2	2	*North-west Territory	3	....	3
" Lennox	....	....	....	Manitoba	....	....	....
" Lincoln	....	....	....	British Columbia	1	....	1
City of London	....	....	....	District of Parry Sound	1	....	1
County of Middlesex	....	4	4				
District of Muskoka	....	....	....	Total	67	73	141

* On Payments.

VII.—Cities and counties from which pupils were received from the opening of the Institution till 30th September, 1904.

County or city.	Male.	Female.	Total.	County or city.	Male.	Female.	Total.
District of Algoma	5	4	9	County of Haldimand	4	5	9
City of Belleville	3	1	4	" Halton	6	3	9
County of Brant	7	7	14	City of Hamilton	13	19	32
City of Brantford	16	10	26	County of Hastings	5	5	10
County of Bruce	9	11	20	" Huron	12	10	22
" Carleton	2	1	3	City of Kingston	7	4	11
" Dufferin	2	1	3	County of Kent	10	6	16
" Dundas	3	3	6	" Lambton	18	5	23
" Durham	4	4	8	" Leeds	13	4	17
" Elgin	7	6	13	" Lanark	2	4	6
" Essex	11	20	31	" Lennox	4	1	5
" Frontenac	5	2	7	" Lincoln	3	3	6
" Glengarry	8	1	9	City of London	10	9	19
" Grenville	2	2	4	District of Nipissing	5	3	8
" Grey	9	12	21	County of Middlesex	9	12	21
City of Guelph	4	3	7	District of Muskoka	3	....	3

VII.—Cities and counties from which pupils were received from the opening of the Institution till 30th September, 1905.—*Continued.*

County or city.	Male.	Female.	Total.	County or city.	Male.	Female.	Total.
County of Norfolk	10	9	19	County of Stormont	5	....	5
" Northumberland	5	9	14	City of Toronto	57	41	98
" Ontario	7	9	16	County of Victoria	8	2	10
City of Ottawa	17	2	19	" Waterloo	10	4	14
County of Oxford	7	11	18	" Welland	6	4	10
" Peel	2	1	3	" Wellington	10	8	18
" Perth	5	9	14	" Wentworth	8	9	17
" Peterborough	12	5	17	" York	18	16	34
" Prince Edward	6	2	8	*Province of Quebec	4	1	5
" Prescott	4	....	4	*North-West Territory	1	4	5
" Renfrew	8	6	14	*United States	1	....	1
" Russell	3	1	4	*British Columbia	1	....	1
City of St. Catharines	2	1	3	*Manitoba	1	....	1
" St. Thomas	3	2	5	District of Parry Sound	1	....	1
" Stratford	3	1	4				
County of Simcoe	11	10	21	Total	459	349	808

* On payment.

VIII.—Cities and counties from which pupils were received who were in residence on 30th September, 1905.

County or city.	Male.	Female.	Total.	County or city.	Male.	Female.	Total.
District of Algoma	2	1	3	County of Norfolk	....	4	4
City of Belleville	....	....	....	" Northumberland	2	....	2
County of Brant	1	....	1	" Ontario	1	....	1
City of Brantford	2	2	4	City of Ottawa	2	2	4
County of Bruce	1	2	3	County of Oxford	....	1	1
" Carleton	....	....	....	" Peel	1	....	1
" Dufferin	....	....	....	" Perth	1	..	1
" Dundas	....	....	....	" Peterborough	1	1	2
" Durham	1	....	1	" Prince Edward	....	....	....
" Elgin	2	....	2	" Prescott	2	....	2
" Essex	2	3	5	" Renfrew	....	....	....
" Frontenac	....	....	....	" Russell	....	....	....
" Glengarry	1	1	2	City of St. Catharines	....	....	....
" Grenville	....	1	1	" St. Thomas	....	....	....
" Grey	....	1	1	" Stratford	1	2	3
City of Guelph	1	1	2	County of Simcoe	2	....	2
County of Haldimand	....	....	....	" Stormont	....	....	....
" Haliburton	....	....	....	City of Toronto	7	12	19
" Halton	....	....	....	County of Victoria	1	....	1
City of Hamilton	....	3	3	" Waterloo	2	....	2
County of Hastings	....	....	....	" Welland	....	1	1
" Huron	2	1	3	" Wellington	....	....	....
City of Kingston	1	....	1	" Wentworth	....	2	2
County of Kent	2	2	4	" York	1	1	2
" Lambton	5	1	6	British Columbia	....	....	....
" Leeds	1	....	1	Quebec	....	....	....
" Lanark	....	....	....	Manitoba	....	....	....
" Lennox	....	....	....	District of Parry Sound	1	....	1
" Lincoln	....	....	....	" Rainy River	....	1	1
City of London	....	....	....	North-West Territories	....	3	3
City of Woodstock	1	2	3				
County of Middlesex	....	2	2				
District of Muskoka	....	....	....				
" Nipissing	2	2	4	Total	51	56	107

Ontario Institution for the Education of the Blind, Brantford, Ont., Canada. Maintenance Expenditures for the year ending 30th September, 1905; compared with preceding year.

Item.	Service.	30th September, 1904. Average attendance, 107.			30th September, 1905. Average attendance, 109.		
		Total Expenditure, 1904.	Yearly cost of average 107.	Weekly cost of average 107.	Total Expenditure, 1905.	Yearly cost of average 109.	Weekly cost of average 109.
		$ c.	$ c.	c.	c.	$ c.	c.
1	Medicines, Medical Comforts....	156 14	1 45	2.7	54 09	0 49	.9
2	Butcher's Meat, Fish and Fowls.	1,582 29	14 78	28.4	1,424 26	13 06	24.7
3	Flour, Bread and Biscuits.....	378 07	3 53	6.8	524 78	4 81	9.2
4	Butter and Lard.....	1,021 98	9 55	18.3	978 25	8 97	15.3
5	General Groceries.....	1,323 45	12 37	23.7	1,447 99	13 28	25.5
6	Fruit and Vegetables.....	157 44	1 47	2.8	120 79	1 17	2.1
7	Bedding, Clothing and Shoes....	410 69	3 84	7.3	416 61	3 82	7.3
8	Fuel—Wood, Coal and Gas.....	3,964 86	37 5	71.2	3,626 09	33 26	63.9
9	Light—Electric and Gas.....	760 07	7 10	13.6	752 48	6 81	12.7
10	Laundry Soap and Cleaning.....	301 57	2 82	5.3	232 37	2 13	4.5
11	Furniture and Furnishings.....	571 80	5 34	10.2	642 06	5 89	11.3
12	Farm and Garden — Feed and Fodder, &c.....	890 20	8 32	16.	636 49	5 83	11.2
13	Repairs and Alterations.....	992 06	9 27	17.8	852 01	7 88	15.1
14	Advertising, Printing, Stationery, &c.....	563 19	5 26	10.1	754 43	6 91	13.3
15	Books, Apparatus and Appliances	600 05	5 61	10.8	644 30	5 91	11.3
16	Miscellaneous, unenumerated....	873 17	8 16	15.7	804 75	7 37	14.1
17	Pupils' Sittings at Church.....	200 00	1 87	3.5	100 00	91	1.7
18	Rent of Hydrants.....	160 00	1 49	2.8	160 00	1 46	2.1
19	Water Supply.....	246 73	2 31	4.4	309 45	2 83	5.5
20	Salaries and Wages.....	17,820 16	166 55	320.2	17,674 72	162 15	311.8
		32,973 92	308 17	592.6	32,155 92	295 01	567.3

30th September, 1905. Certified, W. N. HOSSIE, Bursar.

APPENDIX L.—REPORT OF THE SUPERINTENDENT AND PRINCIPAL OF THE ONTARIO INSTITUTION FOR THE DEAF AND DUMB.

BELLEVILLE, 30th September, 1905.

HON. R. A. PYNE, M.D.,
Minister of Education, Toronto Ont.

SIR,—I have the honor to present the thirty-fifth annual report of this Institution for the year ending the 30th of September, 1905.

UNDER THE EDUCATION DEPARTMENT.

The placing of the Institution under the Education Department has occasioned a great deal of gratification to the educated deaf throughout the Province, as well as to the parents and friends of deaf children. Since its establishment thirty-five years ago, until the latter part of 1904, the Institution has been for greater or lesser intervals in charge of nearly every governmental department—except the proper one—but for many years past it has been administered by the Hon. the Provincial Secretary, in conjunction with the asylums, prisons and charitable institutions. That the deaf and their friends were dissatisfied with that arrangement and classification does not imply any lack of efficiency in the administration nor in the character of the work accomplished. On the contrary, the Institution has always been accorded the most generous recognition and support by the Minister-in-charge, for the time being, and by the Government and Legislature as a whole, and the progress made and the work accomplished probably could not have been any greater or better even had it been from the first, as was I understand intended by the late Dr. Ryerson, under the Education Department. The cause of complaint was entirely a sentimental one, but none the less real and justifiable on that account. It was unjust to the deaf, and detrimental to their interests, that they should be officially classed, and therefore always associated in the public mind, with the criminal incorrigible and mentally defective classes. The reports of the Institution, although issued separately in the first instance, were incorporated with those of the asylums and prisons, and when the Inspector came to inspect the Institution he left here to make his official visit to the jail usually the same day. This was not only humiliating to the deaf, but it also tended to prejudice them in the opinion of the public, and still further handicapped them in their efforts to obtain a livelihood in competition with hearing people. The injustice of this classification became still more marked in view of the easily demonstrated fact that the deaf, instead of possessing any exceptional affinity for the criminal and mentally defective classes, are, on the contrary, above the average of hearing people in probity of character and amenability to good influences. In no public school in the Province can there be found a brighter or better conducted lot of boys and girls than those who have filled our halls in the past or who are here now. Our graduates, with very few exceptions, are honest, industrious citizens. It will be easily understood, therefore, how anxious the educated deaf have always been to have removed from them the stigma of inferiority necessarily resulting from their former classification with idiots and criminals. Frequent requests by the deaf for a change were unheeded and recommendations made in my

former reports passed by. Dr. Jessop, M. P. P., first broached the matter in the Legislature and it will readily be believed therefore that the transfer of the Institution to the Education Department by the then Provincial Secretary, the Hon. J. R. Stratton, a year or two afterwards, was hailed with delight by the deaf and their relatives and friends all over Ontario. Under the old regime we all tried to do our duty and it was generally admitted that our Institution has done, and is doing an excellent work for the deaf. We know, however, how far short we come of realizing our ideals and attaining to the highest possible efficiency. We trust that we shall be spurred on to more earnest efforts in the future and aspire to greater success, under the added stimulus and inspiration of the fact that the Institution now forms a recognized, and by no means unimportant part, of the Educational System of Ontario.

Teachers' Examination Questions.

The written examination that was held at the close of the last session will always stand out prominently in the history of this Institution as the first one held after its transference to the Education Department. In order to appropriately mark this auspicious change, and to establish a record at the beginning of the new era to which in after years we may refer, and that will serve as a standard by which we may be able to guage our progress in the years to come, I have deemed it advisable to include in this report for 1905 a copy of the examination questions given last June to the pupils in the classes in the various grades in the Institution. These will also be helpful in enabling you and the officers of your Department to become conversant in some degree with the character and scope of our work and in enabling all who are interested in the education of the deaf to compare and contrast our work at the Institution with that done in the Public Schools. The word "contrast" is used advisedly, and with a specific purpose; for, while it is true that we endeavor in our curriculum to cover nearly the same ground as is included in the public school course, it is also true that our method of instruction, and the main pedagogic principles which underlie our work, of necessity differ very radically from those of hearing schools. I wish to strongly emphasize this difference, for, unless it is kept in view, it will be impossible for any one to either understand or appreciate the work of educating the deaf. The main work of the public school teachers is to convey instruction to the pupils, and to develop their intellects by these means; and the chief purpose of their examination questions is to test the extent to which the pupils have remembered and digested the facts and information imparted. In contrast with this, the most important feature of the work of educating the deaf is the necessary prominence given to the teaching of the elementary forms and principles of language. The reason for this is obvious. When a hearing pupil enters school he already has at his command a copious vocabulary and sufficient acquaintance with the ordinary forms of expression to enable him to give clear and correct utterance to his thoughts, and to understand whatever is said to him. All the teacher has to do is to build upon this large and substantial foundation; and such language work as is taken up in the way of elaboration and refinement. The deaf child, on the contrary, when he enters school, does not know a solitary word of the English language, and the great task that confronts his teacher is to aid him in gaining a sufficient knowledge of and facility in the use of language to enable him to express himself with reasonable correctness and comprehend what is said to him in written or printed

form. It is quite impossible for any one not engaged in this work to form any adequate conception of how difficult, and sometimes seemingly hopeless, a task this is. There is no other way to acquire facility in the understanding and correct use of language except by constant practice. This every hearing child unconsciously gets from its infancy up, and this the deaf child never gets to an even approximately equal degree. The one is absorbing language every day of its life; the other, till the day he enters school, dwells apart in a wordless region, and what language he obtains after he begins his school life is acquired by slow, painful, laborious effort, and at the best is as a foreign tongue to him. We all know how difficult it is even for a well-educated foreigner to become sufficiently familiar with the idioms of the English language to be able to express himself correctly, although he is aided by a knowledge of his own cognate tongue, and is acquainted with the general principles of language construction and oracular expression. All of these same difficulties confront the deaf child in his efforts to master the intricacies of language, to which must also be added immaturity of intellect, initial ignorance of any form of linguistic expression, and the limited amount of practice that it is possible for him to obtain by the means at his disposal. If after four or five years' hard work at school, a deaf child has as extensive a vocabulary as a hearing child has at six years of age, and can express himself with equal facility and correctness, he has done remarkably well indeed. These considerations will give some faint idea of the great difficulty that besets the teaching of the deaf. When the hearing child begins his school course he already possesses an extensive medium for the acquisition of knowledge, as well as the sense of hearing, through which both language and knowledge are chiefly obtained. The deaf child has neither the language nor the sense of hearing; and this double lack is what presents the chief difficulty in our work, and demonstrates the justness of our contention that a deaf child should remain at school for several years longer than a hearing child if he is to be expected to reach the same educational status. And these same considerations will suffice to explain the radical difference between the character and intent of the subjoined examination papers, and those such as are usually given to pupils in the public schools of the Province.

TEACHERS' EXAMINATION QUESTIONS.

First Grade Pupils.—Juniors.

Manual Alphabet for the Deaf.

Questions.

What is your name?
How old are you?
Where do you live?
How long have you been here?
Who is your teacher?
Do you like school?
How are you?
What color are your eyes?
How many robins did you see?
What day is this?
Do you love Miss Ross?
Are you happy here?
How many eggs can you eat?
Do you like mice?
Is Mr. Mathison kind?
Will you be glad to go home?
Can you skip?
Do you love your mother?
What do you want?
How old is Mr. Madden?
Is Miss Dempsey industrious?
Where do I live?
Can you write?
Do you like to smell the flowers?
Is Mr. Campbell thin?
What color are my eyes?
Are you lazy?
Do you like oranges?
Can you jump off the cabinet?
Can you swim?

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Verbs and Prepositions taught.

Ran to .....
from .....
out of .....
into .....
around .....
Walked to .....
from .....
out of .....
into .....
around .....
Hopped to .....
from .....
out of .....
into .....
around .....
Took ..... off .....
..... out of .....
..... from .....
off .....
Put ..... on .....
..... into .....
..... under .....
on .....
Sat on .....
under .....
Stood on .....
under .....
Jumped on .....
off .....
over .....
Threw ..... to .....
..... out of .....
..... into .....
..... under .....
..... on .....
Pulled down .....
up .....
..... off .....
Sharpened ..... with .....
Shook ..... with .....
Wiped ..... with .....
Combed ..... with .....
Wrote on ..... with .....
in ..... with .....
Bowed to .....
Gave ..... to .....
Ate .....
Broke .....
Drank .....
Folded .....
Kissed .....
Opened .....
Read .....
Shook .....
Shut .....
Tore .....
Touched .....
Unfolded .....

Actions.

I kissed Muriel.
Druscilla shook hands with Ellen.
Eva read a book.
I put my watch into my pocket.
Ada drank the water.
Muriel gave her letter to me.
Isabella shut a door.
I threw a crayon out of a window.
Marie ran to Mamie.
Dorothy pulled Marie off a window-sill.
Alma sat on the floor.
Evelyn combed her hair with a comb.
Janet folded the newspaper.
Florence opened my watch.
Annie tore her dress.
Ellen wrote on her slate with a slate-pencil.
Mamie bowed to Annie.
I sharpened a lead-pencil with a knife.
Druscilla jumped on the mat.
Eva ate two biscuits.
Ada sat under the large desk.
Muriel took her ball out of her pocket.
Mamie took off her boots.
Isabella jumped off a chair.
Janet shut her eyes.
Florence wiped her face with her apron
Mamie unfolded the duster.
I took the books out of the cabinet.
Alma touched a picture.
Annie opened her mouth.
Evelyn threw the knife into the basin.
Ellen shut the windows.
Dorothy smelled the flowers.
Annie stood on the stool.
Florence wrote in her book with a lead-pencil.
Druscilla folded her arms.
I put the boxes under a small desk.
Mamie ran into the room.
Isabella threw the keys under the cabinet.
I ate an orange.
Janet put a crayon into my mouth.
Ada broke the pointer.
Dorothy pulled up a blind.
I put Muriel on a window-sill.
Eva broke her slate.
I put Ellen under the large desk.
Ellen bowed to Evelyn.
Evelyn sharpened a slate-pencil.
Muriel kissed her doll.
I wrote on a large slate with a crayon.
Annie kissed Eva.
Eva jumped over the pail.
I took my watch out of my pocket.
Druscilla tore a newspaper.
Mamie walked from Janet.
Ellen walked around an arm-chair.
Isabella touched her nose.
I wiped my nose with my handkerchief.
Alma shook Florence.
Janet hopped out of the room.
I threw a ball to Dorothy.
Muriel combed my hair.
I gave an orange to Muriel.
Florence took the pens out of the box.
Marie read her letter.
Evelyn wiped the small desks with the duster.
I threw the erasers out of the door.
Dorothy put the basin on my head.

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Supply Adjectives.

..... man.
..... ball.
..... cow.
..... watch.
..... pig.
..... girls.
..... window.
..... flower.
..... horse.
..... book.
..... lady.
..... potato.
..... milk.
..... baby.
..... dress.
..... bed.
..... doll.
..... hat.
..... chair.
..... boy.

Supply Nouns.

A clean .....
The hot .....
A rude .....
A kind .....
A sly .....
A warm .....
The cross .....
A pretty .....
A selfish .....
The industrious .....
A beautiful .....
A small .....
The happy .....
A good .....
A white .....
A sorry .....
A fat .....
The green .....
A proud .....
The lazy .....

Directions.

East.
North.
South.
West.

Numeration.

12 .....
44 .....
16 .....
100 .....
50 .....
91 .....
28 .....
17 .....
32 .....
85 .....
10 .....
13 .....
55 .....
90 .....
21 .....
46 .....
78 .....
5 .....
69 .....
80 .....
15 .....
99 .....
11 .....
52 .....
34 .....
14 .....
92 .....
22 .....
87 .....
25 .....

Notation.

Nineteen .....
Forty .....
Sixty-six .....
Tewnty-one .....
Seven .....
Fifty-three .....
Eighteen .....
Thirtv-five .....
Forty-two .....
Nine .....
Fifty-six .....
Seventy-seven .....
Sixty .....
Twenty-eight .....
Thirty-nine .....
Six .....
Forty-two .....
Ten .....
Ninety-three .....
Four .....
Eighty-nine .....
Fifteen .....
Twenty-nine .....
Sixty-five .....
Two .....
Fifty-four .....
Thirty .....
Eighty-six .....

Articles of Food: Potato, cheese, bread onion, butter, honey, apple, meat, cabbage, sausage, biscuit, chicken, pudding, orange, tomato, cake, duck, pie fish, corn, gravy, egg, turkey, beet bun, syrup, sugar, water, milk, tea coffee, soup.

Natural Phenomena: Rain, lightning wind, snow, sky, sun, cloud, moon thunder, hail, rainbow, frost, star, ice

Divisions of Time: Afternoon, day, evening, forenoon, hour, month, morning night, noon, week, year.

Officers: Dr. Pyne, Mr. Mathison, Dr Goldsmith, Miss Ross, Mr. Cochrane Miss Chisholm, Miss Dempsey, Mr Keith, Mr. Nurse, Miss Bates.

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Teachers: Mr. Coleman, Mr. Denys, Mr. Balis, Miss Templeton, Mr. Stewart, Mr. Campbell, Miss Linn, Mrs. Terrill, Miss Bull, Mr. Forrester, Mrs. Balis, Miss James, Mr. Ingram, Mr. Madden. Miss Gibson, Miss Cross, Miss Gowsell.

Days of the Week: Friday, Monday, Saturday, Thursday, Sunday, Wednesday, Tuesday.

Adjectives: New, beautiful, good, red, obedient, rude, well, cold, black, disobedient, kind, square, dry, cross, strong, bad, stubborn, pink, sick, selfish, bold, weak, old, grey, small, hot, polite, yellow, sly, large, clean, fat, white, sweet, thin, tall, lazy, dark, wise, blue, warm, fast, light, proud, wild, silly, green, short, pretty, clever, dirty, wet, sorry, slow, vain, sour, industrious, round, happy, brown, purple, big, long, saucy, nice.

Parts of the Body: An arm, a tooth, a forehead, a nose, an ear, a hand, a knuckle, a foot, a cheek, a side, an elbow, a leg, a thumb, a face, a neck, a finger, a mouth, a back, a wrist, a chin, the hair, a lip, a head, an eye, a knee, a tongue, a toe, an ankle, a chest, a shoulder.

Animals: A cat, a sheep, a monkey, a colt, a puppy, a cow, a lamb, an elephant, a mouse, a giraffe, an ass, a kangaroo, a fox, a squirrel, a rat, a buffalo, a seal, a rabbit, a frog, a goat, a zebra, a calf, a dog, a lion, a pig, a bear, a tiger, a hog, a kitten, a horse.

Objects: A doll, a chair, a newspaper, a ball, a blind, a cup, a handkerchief, a hat, a broom, a bed, an umbrella, a fan, a mat, a picture, a wheel-barrow, a ring, a duster, a door, a trumpet, a pen, a gun, a window, a rocking-horse, a box, a pin, a cradle, a desk, a book, a pointed, a slate, a lead-pencil, a drum, a cabinet, dolls, chairs, a shelf, a key, an eraser, a comb, a clock, a ladder, a girl, a coat, a letter, a boy, a flower, a man, a light-house, a top, a watch, a hoe, a trunk, a bag, a crayon, a baby, an apron, a basin, a lady, an arm-chair, a pipe, a nest, an axe, a plate, a slate-pencil, a house, a spoon, a boat, a dress, shelves, keys, a knife, a car, a table, a towel, a kite, a bell, a pail, a pump.

Counting.

X X X X X X X X X X X—11.

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0—23.

1 1 1 1 1 1 1—7.

X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X—31.

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0—44.

X X X X X X X X X X X X X X X X—16.

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0—35.

X X X X X X X X X—9.

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0—19.

Birds: A bat, a canary, a robin, a goose, a sparrow, an ostrich, a peacock, an owl, a parrot, a chicken, a turkey, a hen, a duckling, a duck, a gosling.

FIRST GRADE PUPILS.—JUNIORS.

Manual Alphabet for the Deaf.

Questions.

1. What is your name?
2. How old are you?
3. Where do you live?
4. Where do I live?
5. What is my name?
6. Who is your teacher?
7. Who is the Superintendent?
8. Who is the Matron?
9. Are you happy.
10. Are you hungry?
11. Are you tired?
12. How are you?
13. How long have you been at school?
14. When will you go home?
15. What day is this?
16. What day was yesterday?
17. What will to-morrow be?
18. What month is this?
19. What was last month?
20. What will next month be?
21. What year is this?
22. What was last year?
23. What will next year be?
24. What season is this?

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Verbs: Ran, sat, lay, stood, walked, hopped, jumped, knelt, gave, struck, kicked, shook, opened, shut, locked, unlocked, folded, unfolded, wrote, read, broke, tore, drank, ate, laughed, cried, touched, pushed, pulled, showed, looked, took, put, brushed, wiped, cut, washed, butoned, unbuttoned, threw, combed, swept.

Prepositions: In, on, to, into, out of, off, at, over, with, from, behind, under, around.

Actions.

Charles Earl washed his hands in a basin, and wiped them with a duster.
Robert Eric Shaw swept the floor with a broom.
Earl A. Smith brushed his boots with a bootbrush.
Farley Fountain jumped over a pointer.
Arthur Gelineau took off his coat, and put it on Farley Fountain.
Mr. Ingram took off his cuffs, and put them on Charles Dorschner.
Percy Smith took three slate-pencils, three lead-pencils, and three inkwells out of the large desk, and put them into the cabinet.
Charles Dorschner took two crutches off the cabinet, and carried them around the room.
Charles Roy McCallum unbuttoned his coat, and took it off.
Charles Roy McCallum put on his coat and buttoned it.
Mary Lorentz took off her apron, she folded it, and put it under an armchair.
Beatrice Parker wrote on a large slate with a crayon.
Winnifred Barnett took a rag out of a box, she tore it, and threw it on the floor.
Martha Granger opened the door, and walked out of the room.
Eddie Fishbein stood behind a large slate.
Mr. Campbell took his watch out of his pocket, he looked at it, and showed it to Mr. Ingram.
Miss Templeton wiped the desks with a duster.
Earl A. Smith and Charles Dorschner hopped around the room.
Charles Earl read a newspaper.
Mr. Ingram combed his hair.

ADJECTIVES.

Supply Nouns.

A good .....
A bad .....
A hot .....
A cold .....
A new .....
An old .....
A fat .....
A thin .....
A wet .....
A dry .....
A nice .....
A nasty .....
A pretty .....
An ugly .....
A sweet .....
A hard .....
A sour .....
A soft .....
A round .....
A sick .....
A deep .....
A cross .....
A kind .....
A large .....
A small .....
A long .....
A short .....
A strong .....
A weak .....
A lazy .....
A sly .....
A clean .....
A brave .....
A dirty .....
A timid .....
A wide .....
A narrow .....
A high .....
A low .....
A tidy .....
An untidy .....
A fast .....
A slow .....

Supply Adjectives.

A ..... horse.
A ..... bear.
A ..... potato.
A ..... pie.
A ..... book.
An ..... slate.
A ..... man.
A ..... woman.
A ..... day.
A ..... towel.
A ..... cake.
..... medicine.
A ..... peacock.
An ..... frog.
A ..... candy.
A ..... plum.
A ..... stone.
A ..... muff.
A ..... ball.
A ..... calf.
A ..... hole.
A ..... dog.

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Supply Adjectives.—Con.

A ..... father.
A ..... elephant.
A ..... fly.
A ..... ladder.
A ..... screw.
A ..... lion.
A ..... lamb.
A ..... girl.
A ..... mouse.
A ..... collar.
A ..... boy.
A ..... floor.
A ..... girl.
A ..... sheet.
A ..... ruler.
A ..... church.
A ..... bench.
A ..... room.
An ..... woman.
A ..... squirrel.
A ..... cow.

COLOR.

Supply Nouns.

A white .....
A black .....
A brown .....
A blue .....
A pink .....
A green .....
A grey .....
A yellow .....
A red .....

Supply Adjectives.

..... snow.
..... ink.
A ..... ass.
The ..... sky.
A ..... ribbon.
..... grass.
A ..... jacket.
..... butter.
A ..... tongue.

Arithmetic.

Write in words: 111, 300, 1.000, 100, 10, 1, 0, 89, 515, 736, 909, 18, 666, 720, 33.

Write in figures: Nine hundred and eighty-seven, eight hundred and seventy, seven hundred and nine, six hundred and seventeen, five hundred, four hundred and three, thirty-eight, twelve, one hundred and ten, none.

7-2=	8+1=	3+6=	2+4=
5-4=	6+6=	0+0=	1+5=
10-10=	9+9=	4+5=	2+8=
3-4=	5+2=	6+2=	7+7=
5-5=	1+9=	9+0=	2+1=

Parts of the Body: Head, face, forehead, nose, chin, mouth, beard, tongue, chest, back, stomach, neck, throat, ankles, feet, heels, toes, legs, knees, thighs, shoulders, elbows, arms, wrists, hands, thumbs, lips, fingers, eyes, ears, cheeks, sides, hair, veins, blood, bones, heart, chin.

Articles of Furniture: A bed, a chair, a rocking chair, a cabinet, a cot, a lamp, an armchair, a cupboard, a sofa, a picture, a curtain, a clock, a stove, a mirror, a bookcase, a screw, a blind, a bureau, a washstand, a piano, a bath, a table, a sideboard, a bench, a shelf, a cradle, a desk.

Persons: A man, a woman, a girl, a boy, a baby, a lady, a father, a mother, a sister, a brother.

Articles of Clothing: Cap, hat, bib, boot, cuff, tie, muff, veil, coat, vest, pants, shirt, collar, braces, glove, button, dress apron, ribbon, jacket, garter, belt, scarf, blouse, handkerchief, stocking, pinafore, overcoat, sock, bootlace, rubber, pocket.

Articles of Hardware: Knife, fork, spoon, hinge, hasp, kettle, bell, key, file, plow, saw, awl, stove, basin, iron, rake, axe, scissors, screw, wrench, saucepan, horseshoe, scales, dustpan, corkscrew, oilcan, lantern, hammer, anvil, spade, hoe.

Objects in the Class-room: Floor, door, map, pen, pin, book, knife, brush, broom, slate-pencil, lead-pencil, newspaper, abacus, duster, crayon, crutch, letter, picture, desk, slate, ruler, rag, wall, box, glass, large desk, large slate, cabinet, basin, crayon, pointer, ceiling, eraser inkwell.

Animals: Cat, dog, rat, bat, pig, cow, ram, ass, fish, horse, foal, calf, camel, goat, kid, sheep, lamb, frog, lion, tiger, bear, fox, deer, zebra, mouse, kitten, seal, elephant, weasel, rabbit, squirrel, monkey, kangaroo, crocodile, puppy, fly.

Birds: Hen, cock, duck, owl, wren, chicken, peacock, sparrow, robin, bird, eagle, parrot, swan, hawk, vulture, goose, pigeon, turkey, ostrich.

Plurals of: Man, woman, baby, lady, calf, puppy, kitten, sheep, ox, ass, fox, box, potato, tomato, cabbage, peach, cherry, knife, bench, watch, leaf, loaf, orange, dress.

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Articles of Food: Pudding, porridge, vinegar, mustard, pepper, salt, biscuit, meat, fish, ham, hash, grapes, pie, tea, coffee milk, water, soup, lemonade, wine, peach, lemon, orange, cherry, nut, plum, bread, butter, cheese, syrup, toast, jam, currant, potato, carrot, onion, beet, currant, beans, blackberry, strawberry, gooseberry, raspberry, banana, pineapple, cabbage, melon, corn, apple, pear, cake, peas.

Natural Phenomena: Rain, snow, ice, wind, hail, frost, cold, cloud, thunder, lightning, rainbow, air, the sun, the moon, the sky, a star.

Divisions of Time: Morning, minute, month, noon, hour, year, afternoon, day, night, week.

Directions: North, south, east, west.

The Seasons: Spring, summer, autumn, winter.

The Days of the Week: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday.

The Months of the Year: January, February, March, April, May, June, July, August, September, October, November, December.

Words: Rockingchair, lighthouse, grindstone, steampipe, electric light, wheelbarrow, whistle, whisk, pump, pail, pipe, towel, match, urn, anchor, anvil, album, bottle beads, basket, thimble, trumpet, oar, net, hammer, fence, nest, umbrella, gate, globe, grjdiron, inkwell, whip, workbox, violin, vase, valise, rope, fishing-rod, rose, razor, harp.

FIRST GRADE PUPILS.—SENIORS.

Questions.

1. What day is this?
2. What month is it?
3. Do you like summer?
4. Was it very cold last winter?
5. Who made the snow?
6. Is it warm now?
7. Are you glad you will soon go home?
8. When will you come back to school?
9. Do you like school?
10. What is your teacher's name?
11. Where is your home?
12. Have you a brother?
13. Can you add and subtract?
14. How long have you been in school?
15. Has a bear a tail?
16. What make honey?
17. Whose uncle gave her a bag of candy?
18. Are there many flowers here?
19. Did you go to Belleville last Saturday?
20. Shall I give a new pen to you?
21. How old are you?
22. May I see your book?
23. Who was very sick last winter?
24. Which girl do you like the best?
25. What color is the grass?
26. Am I tall?
27. Can you climb a tree?
28. Have you seen birds' nests in the trees?
29. Will it rain to-day?
30. Is this a beautiful place?

Language Exercises.

Daily News Items.
Action Writing.

Incorporation.

1. After.
2. Before.
3. Often.
4. Sometimes.
5. Perhaps.
6. Always.
7. Remember.
8. Every day.
9. Ran away.
10. Last night.
11. This afternoon.
12. Sweet.
13. A bunch of grapes.
14. Looked.

Questions. See above.
The Lord's Prayer.
The Child's Prayer.
A Letter.

Parts of the Body.

1. I have .....
15.

Parts of Animals and Fowls.

1. A ..... has long horns.
2. A ..... has ugly humps.
3. A ..... has a strong trunk.
4. A ..... has sharp teeth.
5. A ..... has a small bill.
6. A ..... has large antlers.
7. A ..... has a long neck.
8. A ..... has bright eyes.
9. A ..... has long ears.
10. A ..... has a curly tail.

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Parts of Animals and Fowls.—Con.

11. A ..... has a bushy tail.
12. A ..... has no tail.
13. A ..... has fins.
14. A ..... has an ugly snout.
15. A ..... has a long mane.
16. A ..... has an udder.
17. A ..... has large paws.
18. A ..... has sharp claws.
19. A ..... has small wings.
20. A ..... has long legs.
21. A ..... has heavy hoofs.
22. A ..... has a long beard.
23. A ..... has two strong hands.
24. A ..... is covered with scales.
25. A ..... is covered with feathers.
26. A ..... is covered with fur.
27. A ..... is covered with wool.
28. A ..... is covered with hair.

Questions by Pupils.

1. Am
2. Are
3. Can
4. Did
5. Do
6. Have
7. How
8. Is
9. What
10. Who
11. When
12. Where
13. Whose
14. Will
15. May

Parts of Objects.

1. Jane broke the ..... of her comb.
2. John sat on ..... of the table and swung his feet.
3. Charles held the ..... of a pin between his teeth.
4. Annie pulled thread thru the ..... of a needle.
5. An angry boy kicked the ..... of a chair.
6. Mary looked at the ..... of the clock.
7. Maggie broke the ..... of a tea-pot.
8. Some horses pulled a wagon by its .....
9. Harry poured ink from the ..... of a bottle.
10. A baby stood at the ..... of its cradle.

Adjectives.

1. The sun is ..... to-day.
2. The trees are ..... now.
3. Bessie picked many ..... flowers last summer.
4. Yesterday Cora ironed her ..... apron.
5. This afternoon Jane will sew her ..... dress.
6. Albert got a ..... suit of clothes in his box last Christmas.
7. Some ..... birds made a ..... nest in a tree.
8. Lila gave a ..... piece of..... candy to Violet.
9. Miss Dempsey made a .... dress for Mary last month.
10. My home is a ..... place.

Colors.

1. The flag is ....., ... and .....
2. Now the grass is .....
3. Last winter the snow was ..... and cold.
4. The ..... roses are prettiest.
5. My hair is ..... and my eyes are .....
6. George's sister sent him some ..... oranges.
7. ..... ink is in one bottle and .....ink is in the other.
8. Florence wrote on her slate with a ..... crayon.
9. The grass is ....., the sky is ....., and the clouds are .....to-day.
10. I like ..... best.

Pronouns.

1. Edmund pulled ..... boots off ..... feet.
2. Clara took ..... hat off ..... head.
3. Harry was bad and ..... mother whipped .....
4. John pushed Charles and ..... fell down and hurt ..... knee, ... cried.
5. A cow kicked Albert and ..... kicked .....
6. Herbert took some raspberries from a box and ate .....
7. Bessie's uncle gave ..... some candy, ... gave some to ..... and I thanked .....
8. Cora cut ..... fingernails with .....penknife.
9. Mr. Keith took ..... handkerchief out of ..... pocket and wiped ..... nose with .....
10. Jane threw some cold water on Maggie and ..... chased ..... and slapped .....

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Numbers.

Notation.

4386
295
926
7030
65

Numeration.

Twelve.
Two thousand.
Four thousand and two hundred and eighty-one.
Seventy-two.
Four hundred and sixty.

Cardinal and Ordinal.

38th.
Thirteenth.
1st.
Twenty-fourth.
10th.
Sixty-second.
83rd.
Twelfth.
40th.
Seventieth.

Currency. $ c.

Seven dollars and twenty-four cents.
Sixty-three cents.
Nineteen dollars and seventy-five cents.
Forty dollars.
Four cents.
.01c.
$6.00.
.15c.
$28.70.
$11.25.

Addition.

4,236	78	9	7,420	526	4+8=
1,045	20	2	328	931	6+1=
2,331	34	3	422	104	9+7=
1,401	14	6	6,104	211	11+5=
		1		733	3+8=
					6+4=

Simple Problems.

1. Mary picked 243 strawberries, Maggie picked 330, Annie picked 125 and Lila picked 84; how many did they pick altogether?
2. Harry put 64 apples into one barrel, John put 85 into another, Edmund put 70 into another, and George put 92 into another; how many apples did they put into them?
3. Jane gave 8 nuts to Cora, 9 to Bessie, 5 to Florence, and 3 to Clara; how many nuts did she give to them?
4. Herbert found 12 hen's eggs in a nest, Albert found 7 in a barrel, Charles found 5 in the barn, and George found 4 in an old box; how many eggs did they find?
5. Florence washed 24 plates at noon, Maggie washed 32 in the evening, and Jane washed 40 after breakfast; how many plates altogether did they wash?

Subtraction.

2483	752	94	374	40	10	20	14
1460	611	80	261	5	7	3	4
5260	397	248	75	364	80		
5210	161	124	5	204	2		

Simple Problems.

1. John had 5 apples, he ate 2; how many remained?
2. Bessie saw 7 birds on the ground, 4 flew away; how many stayed?
3. Lila bought 12 oranges, she gave 6 to her sister; how many did she keep?
4. Cora had .25c., she gave .10c. to Miss Ross; how much did she keep?
5. Harry's father picked 2684 cherries, he gave away 1452; how many cherries were left?

Miscellaneous.

Names of the Days.
Names of the Months.
The Seasons.
Divisions of Time.
Natural Phenomena.
Form, Quantities, etc.

1. A team of .....
2. A dozen .....
3. A couple of .....
4. An ear of .....
5. A bunch of .....
6. A barrel of .....
7. A slice of .....
8. A pail of .....
9. A piece of .....
10. A pair of .....
11. A bucket of .....
12. A glass of .....
13. A box of .....
14. A pitcher of .....
15. A pan of .....
16. A loaf of .....

Plurals.

1. A man.
2. A child.
3. A baby.
4. A woman.
5. A knife.
6. A calf.
7. A foot.
8. A leaf.
9. A mouse.
10. A deer.
11. An ox.
12. A cherry.
13. A puppy.
14. A tooth.
15. A watch.
16. A dress.

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

SECOND GRADE PUPILS.—JUNIORS.

Arithmetic.

Write in words: 346, 1392, 504, 3670, 55, 13th, 90th, 100th, 1000th, 62nd.
Write in figures: Two hundred and sixteen, five thousand six hundred and ninety-one, thirty-two, two thousand and five, six hundred and seventy, first, seventy-third, eightieth, one hundred and fortieth, sixty-seventh.

Add 1394	3627	4360
426	853	236
7365	1236	8754
538	745	267
From 367209		785415
Take 182673		37093

Arithmetic.

Problems.

1. In an orchard there are 13 peach-trees, 75 apple-trees, 24 pear-trees, 86 cherry-trees, and 5 plum-trees. How many trees are there altogether?
2. Rachel has 65 cents, Ida 26, Alice 77, Mary 50 and Diana 6. How many cents have all?
3. A lady had 97 cents. She bought a book for 86 cents. She found 15 cents. How many cents had she then?
4. A farmer had 84 sheep. He sold 26. He bought 35. How many sheep had he then?
5. William had 64 cents. He earned 80 cents. He spent 25 cents. How many cents had he then?

Actions.

1. You are waving your handkerchief.
2. You waved your handkerchief.
3. Wesley is washing his face.
4. He washed it.
5. Winnie walked to the window.
6. You are wiping your eyes.
7. A man is whipping a horse.
8. The man whipped it.
9. Mr. Burns is working in the printing office.
10. Mr. Nurse worked in the store.
11. A fox is watching the birds.
12. The fox watched the birds.
13. You unwound the string.
14. William untied his tie.
15. Gerald tried to lift the cabinet.
16. You are teaching us.
17. You taught us yesterday.
18. You threw a ball to Walter.
19. You turned round the blackboard.
20. Violet is standing on the chair.
21. She stood on it.
22. A duck is swimming in the water.
23. A duck and a dog are swimming in the water.
24. A duck, a dog and a deer are swimming in the water.
25. They swam in the water.
26. A man is shooting some birds.
27. The man shot some birds.
28. Dorina is sitting on the chair.
29. She sat on the chair.
30. You are sharpening your pencil.
31. You sharpened it.
32. You are squeezing a sponge.
33. You squeezed it.
34. Miss Dempsey is sewing a dress.
35. You sewed Tom's coat.
36. You shook hands with Carrie.
37. You are reading a book.
38. You read it.
39. A boy is riding on a pony.
40. A man is rowing a boat.
41. He rowed it.
42. You peeled an orange.
43. You are rubbing your hands.
44. You rubbed them.
45. Tom is brushing his coat.
46. Mary is carrying a book round the room.
47. She carried it round the room.
48. A horse is drinking some water.
49. The horse drank some water.
50. A rabbit is eating a leaf.
51. The rabbits are eating the leaves.
52. The rabbits ate the leaves.
53. A man is emptying a wagon.
54. Miss Ross filled a glass with water.
55. A bird is flying.
56. You unfolded your handkerchief and wiped your eyes.
57. You took your keys out of your pocket and unlocked the desk.
58. You gave a knife to Olive and she thanked you for it.
59. You sealed a letter and put it into your pocket.
60. You took a picture out of the desk and showed it to us.
61. Alice rolled a cent on the floor and Ida picked it up.
62. Otto made a box and gave it to you.
63. Rachel lost a cent, looked for it and found it.
64. William led a horse to the barn and fed it.
65. Diana got a letter from home and read it.

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Questions.

1. What is a horse?
2. Is it a strong animal?
3. Can it draw a heavy load?
4. How many hoofs has it?
5. Are they hard or soft?
6. What has it on its hoofs?
7. What are they made of?
8. What is its skin made into?
9. What are its hoofs made into?
10. Is the horse a useful animal?
11. How many horns has a cow?
12. Has it a long or a short tail?
13. With what is its body covered?
14. What does it eat?
15. What does the cow give us?
16. What is milk made into?
17. What color is it?
18. What is the cow's flesh called?
19. What are its horns made into?
20. Has your father any cows?
21. What does the sheep give us?
22. Is it a large or a small animal?
23. Into what is the wool made?
24. What is the sheep's flesh called?
25. Is mutton good for us?
26. What is a young sheep called?
27. Has your father any sheep?
28. Would you like to have a pet lamb?
29. What are your stockings made of?
30. What does a shepherd do?
31. What is a herring?
32. Name some other kinds.
33. Is the herring a large fish?
34. What are its gills for?
35. What are its fins for?
36. Where does a fish live?
37. Could you live in the water?
38. Who catch herrings?
39. Have you seen a robin?
40. Which bird do you like best?
41. Is the robin a nice bird?
42. What color is its breast?
43. How many wings has it?
44. What are its wings for?
45. Are its claws sharp?
46. What is its nest made of?
47. Where does it build its nest?
48. Does the robin stay here in winter?
49. What is that?
50. What kind of knife is it?
51. What is a knife for?
52. How many blades has my knife?
53. What are they made of?
54. What is the handle made of?
55. How much did the knife cost?
56. Can you sharpen a knife?
57. How?
58. Do you like that picture?
59. What do you see in it?
60. What is the boy doing?
61. Where is he going?
62. How does he look?
63. Why?
64. To whom will he give the rabbits?
65. Will she be glad to get them?
66. Where are they?
67. How many are there?
68. Are they living or dead?
69. When is your birthday?
70. How long have you been at school?
71. What kind of day is this?
72. Is your father living?
73. What does he work at?
74. When will you go home?
75. Will you be glad to see your friends again?

Miscellaneous Language.

Write the Months and the Seasons.
Write 10 Articles of Furniture.
Write plurals of: scissors, woman, mouse, water, knife, daisy, box, ox, deer, lily.

Supply Nouns.

A box of .....
A piece of .....
A pair of .....
A cup of .....
A ball of .....
A bottle of .....
A jar of .....
A bag of .....
A sack of .....

Elliptical.

I put ..... clothes into ..... trunk.
You read ..... letter.
A boy cut ..... finger with a knife.
Mary sewed ..... dress.
A rabbit ran into ..... hole.
We shall meet ..... friends in summer.
Mr. Campbell and you rode on ..... bicycles.
Mr. Ingram and Mr. Nurse read ..... newspapers.
The boys and girls enjoyed .....dinner.
Some birds are building ..... nests.

Description of Picture.

The Lord's Prayer.

SECOND GRADE PUPILS.—SENIORS.

Mental Arithmetic.

1. 7+6+8+9+5+4+9+6+3.
2. 35—8—9—4.
3. 26—8+9—7—6+8+3.
4. A man had 7 twenty-five cent pieces. How much money had he?
5. How many more days are there in this month?
6. How many months are there in 1 years.
7. How many days are there in 8 weeks
8. A man had 6 fifty cent pieces. How much money had he?

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Mental Arithmetic.—Con.

9. 74 - 38.
10. A man had $1 and he bought a handkerchief for .17. How much money had he then?
11. If 1 cow cost $25, how much will 5 cows cost?
12. How many fingers have 9 boys?
13. A boy bought a slate for .08, 6 slate-pencils for .03, a book for .09, 3 oranges for .06, a copy-book for .10, and 3 lead-pencils for .04. How much did he spend?
14. How many articles did he buy?
15. 63—27.
16. If a man paid .50 for 1 book, how much would he pay for 5 books?
17. A boy had .50. He bought a tie for .10 and a handkerchief for .09. How much money had he then?
18. How much did he spend?
19. If 1 pig cost $12, how much would 8 pigs cost?
20. 7+4+8+9+6+7+10+8+4+3.

Written Arithmetic.

1. 7469+863+9374+98+6437+9514+6874+3768+4174+95.
2. 69087761940003714 −13796786470967869
3. 9468+7714+3898+97+2163+4978.
4. $5168+$19.84+$168+$216.95+$3.17+.94.
5. A farmer had 378 sheep, another had 642 sheep, another had 76 sheep, another had 879 sheep, another had 316 sheep, another had 272 sheep, another had 538 sheep, another had 674 sheep, and another had 97 sheep. How many sheep had they?
6. How many farmers were there?
7. How many sheep had the third, fifth and eighth farmers?
8. How many days are there in January, April, June, August and October?
9. How many days are there in 12 years.
10. A man had 416 chickens. He killed 84, sold 129, gave 12 to his son, bought 286, and a fox stole 37. How many chickens had he then?
11. A man bought a carpet for $58.46, a table for $17, a stove for $35.26, a picture for .36, 19 chairs for $86.42, a bed for $8.96, a bureau for $17, and a washstand for $9.16. How much did he spend?
12. How many articles did he buy?
13. How much did the table and chairs cost?
14. 74685249061784x9.
15. A man had $300. He bought 15 sheep for $135.49, and earned $73. How much money had he then?
16. If 1 horse cost $86.47, how much would 8 horses cost?
17. Write in words: 1,760, 384, 5,000, 2,006. 8,600, 709, 2,608 and 2,584. Also $96.84, $700.29, $3,000, $6.01, .82, $7,604.56.

Language.

1. Write compound or complex sentences containing the following: Afraid, raised, cellar, about, behind, in front, under, over, against, before, after, between, counting, this, that, these, those, lent, funeral, cemetery, to rain, to bleed, bleeding, got up, a long time, each other, home, planted, woods and piece of .....
2. Write questions beginning with do, does, did, will, is, am, are, was, were, what, who, where, why and how, and answer them.
3. Write about the picture of the children on the sea shore.
4. Write the Lord's Prayer.
5. Write news.

Questions.

1. What church do you go to?
2. Who is your minister?
3. What do you do after you get up?
4. What do you do after supper?
5. How many children has your father?
6. How many sons has he?
7. How many daughters has he?
8. Who are his sons?
9. Who are his daughters?
10. Who is his wife?
11. Who is your teacher?
12. Who was your teacher last year?
13. Who do you think will be your teacher next year?
14. How many meals do you eat every day?
15. Name them.
16. Did you have your breakfast?
17. What did you have for breakfast?
18. Where did you eat it?
19. When is Easter?
20. When is vacation?
21. Where do you go in vacation?
22. How many months are there in summer?
23. Name them.
24. What month do you like best?
25. Why?
26. What are the fourth and tenth months?
27. Name the autumn months.
28. What was the month before last?
29. What will the month after next be?
30. What was the day before yesterday?
31. What will the day after to-morrow be?
32. What was the year before last?

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Questions.—Con.

33. What will the year after next be?
34. How old is King Edward?
35. Where does he live?
36. When did you have a holiday?
37. When is King Edward's birthday?
38. When is Dominion Day?
39. Where is the engine-room?
40. Where do you sleep?
41. What is your bed covered with?
42. What is the parlor wall covered with?
43. What is it made of?
44. What is the lawn covered with?
45. Where is the lawn?
46. Where is Mr. Cunningham?
47. How is he?
48. What is he?
49. What does he make?
50. Who is between Spray and Ethel?
51. Who is in front of Maggie?
52. Who is behind Gregory?
53. Where do the girls iron the clothes?
54. Where is Mr. Peppin?
55. What is he?
56. How are you?
57. When do you get up?
58. When do you go to bed?
59. When is Hallowe'en?
60. What is your porridge made of?

Questions on a Story.

1. Where does Mrs. Mills live?
2. What does she do?
3. Is China near here?
4. How long is she in a ship?
5. Are there many deaf children in China?
6. How many schools for the deaf are there?
7. What did she show us?
8. What did she tell us?
9. What kind of writing is the Chinese?
10. Are Chinese beds like ours?
11. What do they have for a pillow?
12. Do they make slates in China?
13. Where does Mrs. Mills get her boys' slates?
14. Is the United States near here?
15. What do they make in China?
16. Do the people like girls?
17. What do they sometimes do with deaf girl babies?
18. What are Chinese windows made of?
19. What do they put on the paper?
20. Can they see through the paper?
21. Can the light come through it?
22. What grows in China?
23. Would you like to live in China?
24. What country do you like best?

Questions on Bible Stories.

1. Were the people always good after the flood?
2. What kind of man was Abraham?
3. What did God tell Abraham to do?
4. Where did Abraham go?
5. Who was Abraham's wife?
6. How many sons had he?
7. What was his son's name?
8. How many sons had Isaac?
9. What were Isaac's sons' names?
10. How many sons had Jacob?
11. Which did Jacob love best?
12. What did he give Joseph?
13. How did Joseph's brothers feel?
14. What did they want to do?
15. What were Joseph's brothers doing
16. Where were they?
17. How did Jacob feel?
18. What did Jacob do?
19. Were Joseph's brothers glad to s
    him?
20. What did they do?
21. Whom did they see?
22. What did they do?
23. Who bought Joseph?
24. Where did the merchants take J
    seph?
25. What did he become?
26. Why did Joseph's brothers go
    Egypt?
27. Did Joseph forgive his brothers?
28. Where did Jacob and his sons go
    live?

Miscellaneous.

1. Write the names of fifteen trades a
   professions.
2. Write the names of fifteen rooms.
3. Write the names of ten articles in
   parlor.
4. Write the names of ten articles in
   kitchen.
5. Write the names of ten articles in
   dining-room.
6. Write the names of ten articles in
   bed-room.
7. Write the names of fifteen kinds
   food.
8. Write the names of ten kinds
   meat.
9. Write the names of ten kinds
   fruit.
10. Write the names of ten kinds
    vegetables.
11. Supply quantities: A .....
    bread, a ..... of oxen, a .....
    of horses, a ..... of hay, a .....
    of eggs, a ..... of lem
    ade, a ..... of water, a .....
    tea, a ..... of pills, a .....
    medicine, and a ..... of pins
12. Supply adjectives:
    (1) A boy buried a ..... bird.
    ..... bird sat on the tree a
    looked at him.

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Miscellaneous.—Con.

(2) A lady left the Institution. Some girls liked her, and they were ..... she went away. Some other girls did not like her, and they were ..... she went away.

(3) It was raining. A ..... girl wore her rubbers. A ..... girl did not wear hers..

(4) A wagon cannot pass another wagon on a ..... road. It can pass it on a ..... road.

(5) A boy studied his lessons. He became a ..... man. Another boy did not study his lessons. He became a ..... man.

13. Write the past negative and possessive forms of the following verbs: Knelt, slapped, lay, caught, bought, thought, knew, pitied, shone, led, struck, taught, carried, lost, whipped, laid, blew, flew, bled, forgot, quarrelled, wound, left, fought, struck, had, lit, studied and swam.

THIRD GRADE PUPILS.—JUNIORS.

Geography.

1. What is the earth? What shape is it? How far is it through the earth, and how far is it around it?
2. Where does the earth get its light and heat? Is the sun as large as the earth? Is the moon as large as the earth?
3. Name the continents. Which is the largest continent and which is the smallest?
4. Define cape, gulf, isthmus.
5. What is a city? Name some cities in Ontario.
6. Which is the largest city in Ontario? In Canada? In the world?
7. What is an ocean? Name the oceans.
8. What ocean is south of Asia? What ocean is west of America? What continents are south of the Arctic ocean? What ocean is between Africa and America?
9. Who is Governor-General of Canada? Where does he live?
10. What is an island? Which is the largest island in the world?
11. In what continent is Japan? In what continents is Russia.
12. What is a lake? Name four large lakes between Canada and the United States.
13. In what hemisphere do you live? In what continent? In what country? In what province? In what county?
14. What is a river? What river flows through Belleville, and where does it empty?
15. In what county is this Institution? In what township is it?
16. What bay is south of the Institution? What county is on the other side of the bay?
17. Is Ottawa as large as Belleville? Is Ottawa as large as Toronto?
18. What is the capital of Ontario? Of Canada? Of the British Empire?
19. What country is south of Canada? What continent is east of Europe?
20. Who rules over the British Empire? Who is our Queen?

Artisans.

1. What does a shoemaker do? Name some materials which he uses.
2. Who make men's clothes? Who make women's clothes? Name some kinds of cloth.
3. What trades are taught here? What trade are you learning?
4. What does a farmer do? When does he sow wheat? When does he sow oats?
5. Who works with leather? With iron? With wood?
6. Who build brick houses, and who build frame houses?
7. What does a gardener do? Name some kinds of vegetables.
8. Name some kinds of fruit that grow in Canada. Name some kinds that do not grow in Canada.
9. Who uses an awl, a trowel, a plane?
10. What is bread made of? What is bread called before it is baked?
11. What are chimneys built of? Why are they not built of wood?
12. What is an auger, a razor and a hammer used for?
13. What are houses built of? What is this Institution built of? What kind of a house does your father live in?
14. What does a butcher do? Name some kinds of meat.
15. What does a dressmaker sew with? What does she wear on her finger when she sews?
16. What does a blacksmith do? Name some tools which he uses.
17. What does a dressmaker cut cloth with? What does a tailor cut cloth with? What does a shoemaker cut leather with?
18. What are the covers of books made of? What are the leaves made of? What is one side of a leaf called?
19. What are horse-shoes, dust-pans and chairs made of?
20. Who teaches printing, shoemaking, and dressmaking here?

TEACHERS' EXAMINATION QUESTIONS.—*Continued*.

Mental Arithmetic.

1. John has 24 apples, James has 37 and William has 46. How many apples have all three?
2. Sarah has 9 cents and Rosana has 6 more than Sarah. How many cents have both?
3. A boy had $1.25. He paid $0.30 for a book and $0.40 for a tie. How much money had he left?
4. A girl had $1. She bought 5 lbs. of candy at $0.12 a lb. How much money had she left?
5. A farmer had 15 geese. 6 died, he killed 4, he bought 9, he sold 7 and a fox caught 3. How many geese had he then?
6. In a class there were 19 boys and 17 girls. How many pupile were there in the class?
7. In a school there were 60 pupils. 35 of them were boys. How many girls were there?
8. How many days are there in 32 weeks, omitting Sundays?
9. How many meals do you eat in 3 weeks?
10. A room is 8 feet long and 7 feet wide. How far is it around the room?
11. George had 24 cents and Joseph had four times as many as George. How many cents had both?
12. How many weeks are there in 6 years?
13. How much are 6 lambs worth at $4.85 each?
14. A man bought a ring for $6.50 and sold it for $9.15. How much did he gain?
15. If a printer earns $2.60 a day, how much will he earn in a week, omitting Sunday?
16. If a boy earns $9 a week, and spends $5 a week. How much will he save in a year?
17. A merchant bought 24 watches at $14 each and sold them at $9 each. How much did he lose?
18. A girl got 67 marks in geography, 75 in mental arithmetic and 59 in incorporations. How many marks did she get altogether?
19. How many days are there in 4 weeks and 5 days?
20. A girl bought 6 oranges at 4 cents each and 5 bananas at 3 cents each. How much did she pay altogether?

Written Arithmetic.

1. Make out the following bill: 364 lbs. of tea at $0.45 a lb., 257 lbs. coffee at $0.34 a lb., 64 gallons of syrup at $1.25 a gallon, 56 dozen eggs at $0.27 a dozen, and 15 barrels of apples at $1.85 a barrel.
2. If a man earns $64.80 a month and spends $12.75 a week, how much will he save in 14 years?
3. A butcher had 149 sheep. He sold 36 of them at $7.40 each, 54 at $8.60 each, 14 died, and he sold the rest at $9.75 each. How much did he get altogether?
4. Annie had $7.80, Sophie had three times as much as Annie, Nettie had $4.30 more than Sophie, Rose had $19.75, Pearl had as much as Annie and Rose together less $3.40, Barbara had twice as much as Nettie plus $6.75, Clara had $3.20 less than Pearl, and Arlie had four times as much as Barbara and Rose together, less $3.60. How much had all eight?
5. A merchant bought 642 yards of carpet at $1.65 a yard, and sold it at $2.40 a yard. How much did he gain?
6. A man sold 246 bushels of wheat at $0.85 a bushel, 347 bushels of peas at $0.62 a bushel, and 437 bushels of barley at $0.54 a bushel. With the money he bought 34 tons of coal at $6.75 a ton, 47 gallons of coal-oil at $0.54 a gallon, and 3 colts at $97 each. How much money had he left?
7. If a teacher pays $3.75 a week for board, how much will he pay in 6 years?
8. A man earns $3.60 a day and gets $24 a month from his father. He pays $16.25 a month for rent, $7.40 a week for provisions, $12.60 a month for clothes, and $380 a year for other expenses? How much will he save in 5 years, omitting Sundays and 9 holidays each year?
9. A drover bought 32 sheep at $6.70 each, 24 sheep at $7.20 each, and 65 calves at $5.40 each. He sold the sheep at $7.60 each, 34 calves at $4.80 each, and the rest at $5.90 each. How much did he gain?
10. A farmer had $800. He bought 26 lambs at $3.60 each, 24 sheep at $6.70 each, and 35 pigs at $9.80 each. He sold 56 tons of hay at $8.60 a ton, 17 loads of straw at $3.40 a load, and 25 cords of wood at $6.80 a cord. How much money had he then?

Miscellaneous Questions.

1. What is this Institution? Why do you come here?
2. How is the Institution heated? How is it lighted?
3. What is the Institution built of? What is its roof covered with?

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Miscellaneous Questions.—Con.

4. Name the resident teachers of the Institution. Name the non-resident teachers.
5. What city is near the Institution? What town is a few miles west of here? What town is east of Belleville?
6. What river runs through Belleville? How many bridges are there across the river in Belleville? What are they called?
7. How do people generally cross the bay in the winter? How do they cross in the summer? What kind of a bridge is the bay bridge?
8. How is coal sold? Coal-oil? Wood? Cloth?
9. How far is it from Belleville to Toronto?
10. Name some domestic animals. Name some wild animals that live in Canada. Name some wild animals that do not live in Canada.
11. What is a word made of? What is a sentence made of? How many letters are there in the alphabet?
12. What teachers take study-duty on the boys' side? What teachers take study-duty on the girls' side? What teachers take chapel-duty?
13. Why can you not lift a piano? Why can you not touch that bell?
14. Name some metals. Which is the most useful metal?
15. In what months are the days longest and shortest? Which is the shortest month? In what month is Christmas?
16. Name some kinds of birds. Name some kinds of trees.
17. What is maple-sugar made from? How is it made?
18. Name some animals that eat grass. Name some animals that eat flesh.
19. How does sugar taste? How does a lemon taste? How does medicine generally taste?
20. Name some things we drink. Name some things we eat. Name some things we eat with.

Illustrative Questions.

I.

To illustrate the comparison of adjectives.

1. Is the Atlantic ocean as large as the Indian ocean?
2. Is the large desk as heavy as the table?
3. Who is the tallest boy in this class?
4. Is this Institution as comfortable as your home?
5. Who is the most industrious pupil in this class?
6. Are oranges as good as bananas?
7. Which is the warmest season?
8. Can a horse run as fast as a dog?
9. Which do you think is the most useful animal?
10. Is this building as high as the hospital?
11. Which do you think is the most pleasant season?
12. Is a rose as beautiful as a lily?
13. Is Belleville as large as Toronto?
14. Is Belleville as large as Trenton?
15. Do you think the Japs are as brave as the Russians?

II.

To illustrate the use of *either, neither, both.*

1. Did you have either bacon or eggs for breakfast?
2. Is either your father or your mother deaf?
3. Is Mr. Forrester either deaf or dumb?
4. Is either Mr. Denys or Mr. Madden married?
5. Did either Mr. Mathison or Mr. Keith come to this room yesterday?
6. Did it either rain or hail last night?
7. Can you either add or multiply?
8. Did either Annie or Sophie go to church last Sunday?
9. Would you like either your father or your mother to meet you at the station?
10. Do you know either The Lord's Prayer or "God save the King?"

III.

To illustrate the use of *any, no, some, none, etc.*

1. Have you any money?
2. Has Mr. Campbell any children?
3. Has Mr. Cunningham any children?
4. Did you have any cake for supper last evening?
5. Did you see any orioles this morning?
6. Did any of the boys play football yesterday?
7. Did you buy any candies on Saturday?
8. Did you get any letters yesterday?
9. Did any of the pupils go to the Catholic church last Sunday?
10. Did any of the pupils go to the Methodist church last Sunday?

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

IV.

To illustrate the use of *never, often, sometimes, always, generally, seldom, etc.*

1. Do you ever get letters from home?
2. Do you ever have mistakes on your slate?
3. Does Mr. Mathison ever come to this room?
4. Does Miss Ross ever come to this room?
5. Do you ever read the Bible?
6. Do you ever say your prayers before you go to bed?
7. Do you ever have meat for breakfast here?
8. Do you ever have meat for dinner here?
9. Do you ever have cake for supper?
10. Have you ever been in Mr. Mathison's house?
11. Does it ever rain in January?
12. Does it ever snow in July?
13. Do the boys ever play football here?
14. Do the girls ever play hide and seek?
15. Does Miss Ross ever let the girls go for a walk?

Elliptical Sentences.

1. Mary lost.....book,.....looked for ..... but ..... could ..... not find.....
2. John lost.....keys,.....looked for .....and.....found.....
3. We lost.....pens, ...looked for .....but.....could not find.....
4. I lost.....hat,.....looked for..... and.....found.....
5. Some boys lost.....caps,..... looked for.....but.....could not find.....
6. I ..... sitting on my chair now.
7. Thomas.....studying his lesson last evening.
8. We ..... writing our examination now.
9. The boys.....playing football yesterday.
10. George.....not talking now.
11. Some pupils.....going to church next Sunday.
12. We.....letters from our parents.
13. A girl.....a letter to her sister.
14. A boy got some money.....his father.
15. A girl sent a present.....her mother.
16. This room is.....the dining-room.
17. The study-room is.....the dormitory.
18. Clara sits.....Annie and Edgar.
19. The girls wash the dishes.....dinner.
20. Mr. Keith told a boy to .....
21. Miss Ross told a girl that.....
22. A boy told a girl about.....
23. A boy read in a newspaper about.....
24. We eat our supper.....six o'clock.
25. We stay in school in the forenoon .....twelve o'clock.
26. A boy had ten nuts and he gave..... of them to a girl.
27. Mary picked.....apples and she ate both of them.
28. A boy bought.....and gave some of it to his sister.
29. A girl bought.....and she ate all of them.
30. James bought.....figs and he ate six of them.

Incorporations.

Every day, last month, next year, were playing, was writing, will be going, a few days ago, in a few days, sometimes, never, often, perhaps, in front of, behind, above, did so, at noon, one of the, none of the, all of the, before breakfast, after supper, each, every, largest, taller, as long as, more industrious, most obedient, told..... to, told.....that, to stop, allowed, enjoyed, some of them, some of it, both of them, one.....the other, one-another ..... the other, two of them ... the others.

Write The Lord's Prayer.

Write the National Anthem.

Write some news.

Ask twenty questions.

Describe a picture.

Language Exercises.

I.

Prefix the proper forms of the verbs *see, feel* or *hear* to the following sentences.

1. A cow was eating the grass.
2. The wind was blowing hard a few days ago.
3. I am correcting the pupils' papers now.
4. A bad girl was pounding on her desk.
5. A man was cutting the grass in front of the hospital with a lawn-mower.
6. The pupils are writing their examination now.
7. Some boys played baseball last week.
8. An angry boy was stamping on the floor.
9. It was thundering a few days ago.
10. Some boys were planting potatoes two or three weeks ago.

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

II.

Write the following sentences, changing the latter clause into the negative form:

1. A lady visited the Institution and she came into this room.
2. A man fished in the bay and he caught some fish.
3. A boy saw a bird's nest and he stole the eggs out of it.
4. A girl went out of the room and shut the door.
5. A boy bought a lot of candies and he gave some of them to his sister.
6. A boy chased a squirrel and he killed it.
7. A girl cut her finger and she cried.
8. Miss James was sick and she went to bed.
9. A gentleman met a lady and shook hands with her.
10. A girl made some lemonade and she gave some of it to Miss Dempsey.

III.

Write the following sentences, changing *that* to *about*:

1. Mr. Coleman told a boy that he saw a large steamer on the bay.
2. Nettie told Rose that she got a letter from home last week.
3. Joseph told Pearl that he went to Belleville last Saturday.
4. Mr. Forrester told us that he shot a bear a few years ago.
5. Mr. Stewart told us that a girl killed a baby in Toronto.
6. Miss Bates told Miss Ross that a little girl was very sick.
7. Some girls told me that they went for a walk to the cemetery.
8. The nurse told Mr. Mathison that a boy fell down and broke his arm.
9. I heard that some boys stole a stove out of Mr. Wheeler's boat-house.
10. A boy told a girl that he found a bird's nest in the grass.

IV.

Write the opposite of: Came, shut, lost, drop, into, from, on, above, behind, yes, bought, sweet, large, slow, rich, dear, obedient, dull, sick, hard, intelligent, weak, young, new, dead.

V.

Write the past of: Stand, fly, go, is writing, see, saw, has, are playing, find, meet, think, wear, cut, buy, study, am talking, drive, have, lose, sell, teach, drink, forget, leave, carry.

VI.

Change the following verbs into the corresponding negative form: Gave, writes, sew, went, obeyed, was studying, walks, stand, to go, must come, can run, sees, rode, play, is talking, put, loves, bought, to work, am looking, curls, wash, teaches, drove, break.

VII.

Write 15 nouns, 15 verbs, 15 adjectives, 15 prepositions, 15 pronouns.

THIRD GRADE PUPILS.—SENIORS.

Mental Arithmetic.

1. Simplify $8\times8+8-2\times5+6$.
2. " $12\times12+6\times3+8$.
3. " $6\times9+4-8\times6+7-5$.
4. " $7\times3+4\times6+8-4$.
5. " $\$2\times3-75c.$
6. A woman had 17 hens. She killed 10 of them. How much are the rest worth at 25c. each?
7. James had $16 and he bought 3 books at $3 each. How much money had he left?
8. Henry earned $1.10 a day and spent 50c. a day. How much did he save in 7 days?
9. I paid $3.50 for a pair of boots and $1.25 for a pair of gloves. How much more did I pay for the boots than for the gloves?
10. A merchant bought 9 hats at $2.50 each and sold them for $24.50. How much did he gain?
11. John bought 4 oranges at 5c. each, and some candies for 45c. How much more did he pay for the candies than for the oranges?
12. A boy bought 3 lead-pencils at 4c. each, and 2 other lead-pencils at 5c. each. He sold all of them at 5c. each. How much did he gain?
13. James bought 3 scribbling books at 2c. each and 4 other scribbling books at 3c. each. He sold all of them for 25c. How much did he gain?
14. How many more wheels have 3 buggies than 4 bicycles?
15. Mary had 8 stamps. Jane had 4 times as many as Mary less 3 stamps. How many stamps had Jane?

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Written Arithmetic.

1. Find the omitted addend:

743586
209753
.....
522903
584762
723998
357862
473954
682073
5196495

2. Add the following numbers and prove your work by subtracting each addend from the sum:

74968
32705
68403
72569
38275
40732
89685

3. Multiply 782906 by 8742 and prove your work.
4. An agent bought 145 books at $3 each and sold them for $362.50. How much did he lose?
5. A grain merchant bought 5070 bushels of oats at 39c. a bushel. He paid $1879.64 in cash. How much has he yet to pay?
6. A woman bought 16 yards of cloth at 28c. a yard and 19 pounds of butter at 21c. a pound. (a) How much more did she pay for the cloth than for the butter? (b) How much did she pay for both?
7. A drover bought 25 cows at $27.50 each and sold them at $35 each. How much did he gain?
8. Mr. Smith bought 12 pigs at $15.20 each; 18 pigs at $14.75 each, and 16 pigs at $15.72 each. He sold all of them at $16 each. How much did he gain?
9. A man's farm was 1425 yards long and 742 yards wide. He built a board fence 6 boards high around it. How many yards of boards did he use?
10. A farmer sold 14 cows at $37.50 each. With the money he bought 6 horses at $75 each. How much money had he left?
11. A grocer bought 50 pounds of tea at 30c. a pound; 60 pounds at 35c. a pound, and 75 pounds at 32c. a pound. He sold 145 pounds of it at 36c. a pound and the rest of it at 34c. a pound. How much did he gain?
12. Mr. Jones bought 54 acres of lan at $75 an acre. Mr. Smith bough 47 acres of land at $85.50 an acre
    (a) How many acres did both buy?
    (b) How many more acres did Mr. Jone buy than Mr. Smith?
    (c) How much more did Mr. Smith pa an acre than Mr. Jones?
    (d) How much did both together pa for their land?
    (e) How much more did Mr. Jones pa for his land than Mr. Smith?

Incorporation.

Incorporate the following words in sentences:

1. Some of it.
2. Some of them.
3. Often.
4. Never.
5. Every day.
6. No.
7. Sleepy.
8. More untidy.
9. Each.
10. Every.
11. Either.
12. Neither.
13. Both.
14. Sometimes.
15. Not any.
16. A pair of.
17. Her gloves.
18. Are not writing.
19. Uglier.
20. Much.
21. A lot of.
22. Her.
23. Its.
24. Him.
25. Me.
26. A few.
27. Have.
28. Permitted.
29. To-day.
30. In a few weeks.
31. Saw.
32. Youngest.
33. Perhaps.
34. Swept.
35. Broke.
36. Went.
37. Came.
38. Rained.
39. Cannot climb.
40. Will not go.

Miscellaneous Questions.

1. When will your next birthday How old will you be then?
2. How did you come to the Institut last fall? Why did you come he
3. Where is your home? Is it east west of here? What kind of ho do you live in at home?

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Miscellaneous Questions.—Con.

4. Is your dormitory a large room? How many beds are there in it?
5. In which room do you eat your meals? Is it as large as your dormitory? Did you ever eat your dinner in this class-room?
6. How many windows are there in this Institution? What is a window for?
7. How many teachers are there in this Institution? How many teachers are there in this class-room?
8. Did you ever write a letter to your friends at home? How much does a postage stamp for a letter to your home cost?
9. Did you ever lose any money? Have you any money in your pocket now?
10. How many electric lamps have we in this class-room? How can we light them? When do we light them?
11. Whose birthday was Victoria Day? When is our King's birthday? In what month does your birthday always come?
12. Do you sleep well at night? Who sleeps near you?
13. How many seasons are there in a year? How many months are there in each season? In which season do we have much snow?
14. When will you go home? Who do you think will meet you when you get home?
15. In which month does New Year's Day always come? When is New Year's Day?
16. What church do your parents attend? Is it far from your home to the church? Did you go to church when you were at home last summer?
17. How many horns has a cow? Did you ever see a sheep that had horns?
18. Is there a clock in this class-room? What is a clock for? What do I carry in my pocket to tell the time with?
19. What are trees good for?
20. Tell me the names of some wild animals.

Elliptical Sentences.

1. A little girl's father ..... here to see her. He gave ..... orange to her and she .....him for it.
2. There are ..... slate-pencils in a box in the large desk.
3. I think.....pupil in the Institution will be glad to go home on the..... of June.
4. ..... of the boys in this class-room have hats on their heads now.
5. The boys wore ..... caps .....overcoats when they were shovelling snow last winter.
6. I do not know who is the ..... man in the world.
7. I saw a cat watching a bird. It tried to catch ..... but it flew away.
8. Three men and a lady were in a store. ..... men was selling some things to ..... and the other men were talking to each other.
9. I met a poor man a few days ago. He had not ..... money. I was sorry for him and I ..... him ten cents.
10. A book is not as ..... as a piece of paper.
11. Henry got a ..... photograph from his sister. He was very glad to get it. He will thank her for ..... when he writes a letter ..... her.
12. A little girl told me that she expects ..... her father ..... mother to meet her when she goes home.
13. A boy found a hen's nest in a haymow in the barn. There ..... five eggs in it. He put ..... in his hat and carried them into the house.
14. There.....two electric-lights in this class-room. They ..... burning now.

Artisans.

1. Who teaches shoemaking, carpentering and barbering here?
2. Who makes bread? What is it made of? What is it called before it is baked?
3. What does a blacksmith do? What is the room in which he works called? What does he work with?
4. Who make clothes for men and boys? Who make clothes for women and girls? What are clothes made of?
5. What is a farm? What does a farmer do?
6. Who takes care of a garden? Name some tools which he uses. Name some kinds of flowers.
7. With what does a farmer generally reap his grain? What does he clean it with? Name some kinds of grain.
8. What are couches, sofas, and bedsteads used for? Who make them?
9. What is food? How is it cooked? What is the room in which food is cooked called? Name some kinds of food.
10. Who uses saws, planes, augers and hammers. What are they used for?
11. What does a butcher do? What is the room in which he sells meat called?

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Artisans.—Con.

12. Who build stables and barns? What are they used for?
13. Name some tools which a cabinet-maker uses.
14. Name some kinds of cloth for men's and boys' clothes.
15. What are chairs, dressers, and tables made of? What are they used for?
16. Who uses flour? What is it made from?
17. What are newspapers printed on? Where are they printed? What does a printer use?

Geography.

1. What is geography?
2. Of what does the surface of the earth consist? Name some of the land divisions of the earth. Name some of the water divisions.
3. On which continent do we live? In which country do we live? In which province do we live?
4. Who is Earl Grey? Where does he live?
5. Where is Canada? Where is the United States? Name four large lakes between Canada and the United States. Which of them is near here? What is a lake?
6. What is a sea? Is a sea as large as a lake?
7. What is a bay? What bay is near here? What lake is it a part of?
8. Name the continents in the Eastern Hemisphere.
9. What is an ocean? Which of the oceans is not in the Western Hemisphere? What ocean is west of this continent?
10. What are the people who live in Canada called?
11. What is a canal? What canal is near here? About how far is it from here? What does it connect?
12. What is a harbor? Name four harbors near here.
13. What is a pond? Is a lake as large as a pond?
14. What is the capital of Canada? What is the capital of Ontario? Name some of the cities in Ontario. What is a city?
15. Who is our king? What empire does he rule over?
16. Who is the Premier of Canada? Who is the Premier of Ontario?
17. What is a town? What town is about ten mines from here?
18. Which is the largest city in the world? Which is the largest city in Canada?
19. What is an island? Which is the largest island in the world? To whom does it belong? In which hemisphere is it?
20. Define a cape, a strait, a stream, a hill, a swamp, a valley, a coast, a continent.

Language Exercise.

Mary saw a dog on the road when she was going to the city last Saturday. She was afraid of it.

Re-write the above making the following changes:

(1) Change "Mary" to "John."
(2) Change "Mary" to "Mary and John."
(3) Change "a" to "two."
(4) Change "last Saturday" to "next Saturday."
(5) Change "Mary" to "Mary and I."

Asking Questions.

1. Ask ten general questions.
2. Write ten requests.
3. Ask five questions about "A Dog."

Miscellaneous.

1. Write some news.
2. Write our National Anthen.
3. Write The Lord's Prayer.
4. Describe the picture about "The Blacksmiths."

FOURTH GRADE PUPILS.

Mental Arithmetic.

1. How many months in 9 years and a half?
2. There are 63 sheep and pigs in a field. 29 of them are sheep. How many more pigs than sheep?
3. How many pigs?
4. A boy sold 4 pairs of chickens at 85c. per pair. He received a four-dollar bill in payment. How many chickens did he sell?
5. How much did he get for them?
6. How much change did he give?
7. A boy pays 9c. for each meal and 40c. for his bed for a week. How much does his bed cost in a month
8. How much does his meals cost in two days?
9. How much do they cost in a week?
10. How much does he spend in a week
11. How many more meals will you eat until you go home?
12. How many meals have you eaten this month?

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Mental Arithmetic.—Con.

13. A boy bought 3 dozen and a half bananas for half a dollar and sold them at 2c. apiece. How many bananas did he buy?
14. How much did he get for five?
15. How much did all cost?
16. How much did he get for all?
17. Find his gain or loss.
18. A girl paid 90c. for a straw hat and veil. The hat cost 65c. How much less did the veil cost than the hat?
19. How much did the veil cost?
20. How many minutes in four hours and three quarters?
21. A woman had 9 fowls and she raised six times as many plus 5. How many had she then?
22. How many did she raise?
23. How many had she at first?
24. A boy paid 43c. for a cap and 16c. less for a pair of braces. He gave the clerk 45c. How much change did he get?
25. How much did the braces cost?
26. How much did he spend?
27. James is 18 years old. When was he born?
28. A boy has a dime, a quarter and four cents. How much must he earn to have half a dollar?
29. How many more minutes in an hour than hours in a day?
30. How many more fingers than thumbs have nine boys?

Slate Arithmetic.

1. A man gets a salary of $69.00 per month. He pays $9.00 per month for rent, $14.00 monthly for clothes, $4.65 weekly for groceries, $6.90 monthly for fuel, $2.40 weekly for meat, and $7.25 monthly for other things.
   (a) How much can he save yearly?
   (b) How much does he earn yearly?
   (c) How much does he spend yearly?
   (d) How much does he pay for rent in half a year?
2. A drover bought 13 sheep and a yoke of oxen for $296.00. He paid $10.95 each for the sheep. How much did the oxen cost?
   (b) How much did all the sheep cost?
   (c) How many oxen did he buy?
   (d) How many animals did he buy?
   (e) How much did four sheep cost?
3. A dry-goods merchant bought 9 webs of cloth, each measuring 38 yards at $15.00 per web, and sold at 46c. per yard.
   (a) Find his gain or loss.
   (b) How many yards did he buy?
   (c) How much did he get for all?
   (d) How much did all cost?
   (e) How much did one web measure?
   (f) How much did one web cost?
   (g) How much did he get for one web?
   (h) How much did he gain or lose on one web?
   (i) Why did he gain or lose?
4. What will it cost for bread from Feb. 9th to Nov. 14th, taking 8 loaves a day at 12c. per loaf?
   (b) How many days?
   (c) How many loaves?
   (d) How much will it cost in Feb.?
   (e) How many loaves will it take in Nov.?
5. A drover bought 14 head of cattle at $17.00 per head, 16 others at $18.00 per head, and 14 others for $265.00. He sold the whole lot at $19.00 per head.
   (a) Find his gain or loss.
   (b) How many cattle did he buy?
   (c) How much did all cost?
   (d) How much did he get for all?
   (e) How much did he get for five?
6. How many seconds in April?
7. A farmer's wife sold 7 pairs of ducks at 98c. per pair, 9 rolls of butter each weighing 5 lbs. at 18c. per lb., 8 cakes of lard, each weighing 6 lbs. at 11c. per lb.; and a turkey for a dollar and a quarter. She received in payment a hat for two dollars and a half, a parasol for 78c. less than the hat, a jacket for as much as the hat and the parasol together, three pairs of gloves at 35c. per pair, and the balance in cash.
   (a) How much money did she get?
   (b) How much did she get altogether?
   (c) How much did she get in trade?
   (d) How many fowls did she sell?
   (e) How many lbs. of lard did she sell?
   (f) How much did she get for one roll of butter?
8. Express in Roman numerals: 986, 640 and 1905.
   Express in figures: XCIX, CMLV and CDLX.
9. A man has nine thousand and forty dollars. He gives three hundred and five dollars and six cents to each of his seven children and to his wife as much as three children.
   (a) How much has he left?
   (b) How much do all the children get?
   (c) How much does his wife get?
   (d) How much does he give away altogether?
   (e) How much has he at first?
10. A and B started to walk toward each other, the former going 28 miles a day, and the latter 23 miles a day. After walking 6 days they met.
   (a) How far apart were they?
   (b) How far did they go in one day?
   (c) How far did each go?

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Geography.

1. Give four divisions of land and three of water.
2. What is land nearly and entirely surrounded by water?
3. Define an ocean, and name the largest.
4. What oceans are west and east of Africa?
5. What continent is this and what oceans are west, east and north of it?
6. What is low, wet land called?
7. Define a river and name one.
8. Give the continents in the Eastern Hemisphere.
9. Name the countries in North America.
10. What country is this and what is its capital?
11. How many provinces in Canada and name them?
12. How is Canada bounded on the south and west?
13. How many cities in Ontario, and name those east of here?
14. Name the most western province.
15. Where is Niagara river?
16. How are Lake Michigan and Lake Huron connected?
17. Give the county town of each of the following: Simcoe, Dufferin, Algoma, Leeds, Durham, Frontenac, Haldimand, Essex, Nipissing, and Bruce.
18. In what county is each of the following: London, Orangeville, Owen Sound, L'Orignal, Milton, Hamilton, Goderich, Picton, Lindsay, and Ottawa?
19. Give the peninsulas in Ontario.
20. Name the counties on Lake Erie.

Miscellaneous Questions.

1. By whom are you taught?
2. Why do you come to school?
3. What are you learning?
4. How many marks did you get in the last paper?
5. What is the name of the paper published here?
6. How often is it published?
7. What is the price of it?
8. Name the two chief newspapers of Ontario.
9. How often are they published?
10. Give the two chief railways of Canada.
11. How many senses are there, and name them?
12. How many kinds of words are there, and name them?
13. Give three adverbs and four pronouns.
14. What are the people living in England, Scotland, Ireland, France and Italy called?
15. What are many bees, dogs, birds, horses, and people together called?
16. What is animal food?
17. What is vegetable food?
18. How are meat, milk, bread, potatoes, wood and coal sold?
19. What is the price of eggs now?
20. How much does butter cost?
21. What is the price of milk?
22. How are paper and envelopes sold?
23. How many pounds in a ton?
24. Why is the horse called a beast of burden?
25. What is a beast of prey, and name one?

Language.

1. Ask and answer twelve questions.
2. Twelve items of news.

Incorporation.

Words.

1. Namely.
2. Steadily.
3. Heartily.
4. Except.
5. Until.
6. Since.
7. Do so.
8. Postponed.
9. Has invited.
10. None.

Phrases.

1. By and by.
2. Not sure.
3. Lots of.
4. Her own fault.
5. Pay attention.
6. At a distance.
7. At hand.
8. Take pains.
9. In memory of.
10. A sign of.

Composition.

Write a letter to a friend.
Give an account of Saturday, Sunday or Monday.
Describe a picture.

Grammatical Exercises.

Change to the Passive Voice.

1. We must write our lessons thoughtfully.
2. A boy sprained his ankle a few days ago.
3. The birds have built their nests on the trees.
4. Niagara River connects Lake Erie and Lake Ontario.
5. He has caught a string of fish.
6. People do not shoot deer now.
7. Perhaps we will have an excursion after the examinations.
8. She can make a dress for herself.

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Change to the Present, Perfect and Future.

1. The wind blew the trees last week.
2. A cat caught a mouse, teased, killed and ate it.
3. Mr. Balis said grace at dinner.
4. A farmer shot two weasels in his barn a few days ago.
5. Somebody stole a stove out of Mr. Wheeler's boat-house.
6. I saw the waves and white-caps on the bay lately.
7. A lady made ham sandwiches for a picnic last summer.
8. Dr. Goldsmith gave some medicine to a sick girl a week ago.

Change to Plural.

1. He has eaten his breakfast and will eat his dinner soon.
2. A small stream is called a creek, brook, rill or rivulet.
3. I saw a girl's book on the floor.
4. A little child falls downstairs but does not hurt itself.
5. A boy plays ball with another one.
6. She lends a book to another girl.
7. An isthmus connects land but a strait connects water.
8. A child goes an errand for its mother.

Give the opposite of: Wide, deep, dear, always, freezing, give, scold, forget, in front of, and above.

Give the Past-Participle of: Am, have, give, take, throw, steal, invite, seek, tear and kneel.

Give the corresponding adverbs for: Easy, pretty, awkward, clumsy, heavy, late, beautiful, hearty, careful and careless.

Elliptical Sentences.

1. A girl lost her book ....., looked for it ..... but could not find it.....
2. We go to school every day.....Saturday and Sunday.
3. There are four seasons..... spring, summer, autumn and winter.
4. A girl broke a cup and Miss Ross told her to..... .....
5. We must .... in school.
6. The girls .... to the city lately and perhaps they..... .... again before they go home.

Time Lesson.

1. What is the face of a clock called?
2. What is the short hand called?
3. What is meant by A.M. and P.M.?
4. What are noon and midnight?
5. How many minutes in three-quarters of an hour?
6. How many hours in half a day?
7. Name the longest and shortest days.
8. Where and when does the sun rise and set?

Six questions describing the time.

FIFTH GRADE PUPILS.

Mental Arithmetic.

1. A carpenter earns 12 dollars a week. How long will it take him to earn 72 dollars?
2. A box contains 3 bushels. How many boxes will hold 36 bushels?
3. When flour is 7 dollars a barrel, how many barrels can I get for 63 dollars?
4. If 4 sheep cost $16, what will 9 sheep cost?
5. If 4 men earn 12 dollars a day, what will 7 men earn?
6. A house was bought for $1,200, and sold for $1,500. The gain was shared by 6 persons. How much did each one get?
7. At 15 cents a yard how much calico could I buy for 300 cents?
8. I paid 32 dollars for 8 cords of wood. How much was that a cord?
9. One man can dig a ditch in 66 days. How long would it take 6 men to dig it?
10. If four horses eat 12 tons of hay in 8 months, how many tons will 5 horses eat in the same time?

Practical Arithmetic.

1. Willie bought 8 chickens at 14 cents each, and sold them to gain 24 cents on all. How much did he get for each?
2. How many pairs of stockings at 9 cents a pair should be given for 3 geese at 63c. each?
3. A man bought 4368 eggs at 15 cents a dozen. What did they cost him?
4. If 15 men earned $116.10 a week, how much did each man earn per day?
5. How many cows worth $28 apiece should be given for 17 horses at $112 each?
6. A man sold 7 cows at $57 each, and 23 pigs at $7 each. With the money received he bought 28 sheep. What was the price of each sheep?
7. Find the value of 1800 pounds of wheat at 86 cents a bushel, 850 pounds of oats at 34 cents a bushel, and 480 pounds of barley at 67 cents a bushel.
8. A miller put 125 barrels of flour into some 25-pound bags. How many bags did he use?

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Practical Arithmetic.—Con

9. When barley is worth 75 cents a bushel, a man exchanges 25 bushels for 5 pigs. How much less than $5.00 was each pig worth?
10. If 24 cows cost 552 dollars, how much would 17 cows cost?

Grammatical Exercises.

(a) Incorporation.

Very tired, handsomest, very smart, not very well, wise, sorry, proud, tough, a long time ago, swiftly, get ready, soundly.

(b) Change to Passive Voice:—

1. Men dig salt out of salt-mines.
2. Men also get salt from sea-water and salt-wells.
3. We use salt to season and preserve food.
4. Chemists make medicine from salt.
5. I put salt on snow to melt it.

(c) Change to Active Voice.

1. Sugar is made by men from sugar-cane, sugar-beets, and maple sap,
2. Rubber is obtained by Indians from the sap of rubber trees.
3. Much ivory is got from the trunks of elephants by hunters.
4. Ink is made by chemists from iron, acids and nut-galls.
5. Medicine is made by chemists from the stomachs of swine.

(d) Ask three questions each with "Why," "When," "Who."

(e) Write ten lines of news.

Miscellaneous Questions.

1. Name some common metals.
2. Which is the most useful and plentiful metal?
3. What is cast-iron? Names.
4. What is wrought-iron? Names.
5. What is steel? Names.
6. What is farming?
7. What do farmers work with?
8. What is an orchard? A forest?
9. Name some Canadian forest trees.
10. How large is a cord of wood?
11. From what plants is cloth made?
12. Name some things made of linen.
13. What is clothing made of?
14. What is money made of?
15. Name the Canadian money?
16. How much is a hundred-weight, a ton, a barrel of flour, a barrel of pork?
17. What does a bushel of wheat, oats, barley or corn weigh?
18. What grains grow in Canada?
19. Where does most wheat grow?
20. What is a calm, cyclone, rain, snow, ice?
21. Where does tea grow? Coffee.
22. Where does flax and wool come from?
23. Where do we get salt?
24. Where do we get cork?
25. Where do we get indiarubber?
26. What animals give us furs?
27. What does liquor do to men?
28. Is it healthy to drink much liquor?
29. What will May 24th be?
30. What will you do on June 21st? How'll you feel?

Geography.

1. What and where is Canada?
2. Bound Canada?
3. What is the population of Canada?
4. What is the capital of Canada?
5. What mountains in Canada, and where are they?
6. Name 6 cities in Canada outside of Ontario.
7. Name 4 large lakes in Canada.
8. Name 4 large rivers in Canada.
9. What lakes and rivers separate Canada from the United States?
10. Name the Maritime Provinces, and why are they so called?
11. Name the provinces and their capitals.
12. What is the commercial metropolis of Canada?
13. Who is the Premier of Canada? Governor-General?
14. What is said about Ontario?
15. What is the population of Ontario?
16. What separates Ontario from Quebec?
17. What does Ontario produce?
18. Name some fruits of Ontario.
19. What large towns in Ontario?
20. Name the cities in Ontario.
21. Name some mineral products of Ontario.
22. Name 6 large rivers in Ontario.
23. Where are (1) The Sault Ste. Marie, (2) The Welland, (3) The Murray, and (4) The Rideau Canals?
24. Name the chief bays around Ontario.
25. What is the capital of Ontario?
26. What is a Parliament?
27. Who are Premier, Provincial Secretary, and Minister of Education of Ontario?

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Natural History.

1. What is Natural History? What is "Nature?"
2. How is Natural History divided? Names.
3. What belong to the three kingdoms?
4. What kingdom do we belong to?
5. How do we differ from other animals?
6. What are domestic animals?
7. What are carnivorous, graminivorous, and ruminant animals?
8. What are beasts and birds of prey?
9. What are cattle? What are cattle usually called?
10. Which is the best beef?
11. What are mutton and tallow?
12. What are butter and cheese made of?
13. Who take care of sheep? Where are sheep kept?
14. What is swine's flesh called?
15. What are male, female, and young swine called?
16. What is the lion called and why?
17. What are rodents? Name a few rodents.
18. What are aquatic birds? Name some.
19. What do we call male and young ducks?
20. What do we call male and young geese?
21. What two kinds of fish are there?
22. Name some fresh and salt-water fish.
23. What are reptiles? Name some.
24. Which are the largest and strongest reptiles?
25. Name 6 classes of animals.
26. Name some winged insects?
27. Name some wingless insects.
28. What are insects?
29. Which is the largest quadruped?
30. Which is the largest animal?

Composition on Selected Subject.

SIXTH GRADE PUPILS.

Geography.

1. When and by what Act was Confederation formed?
2. Name the Provinces first federated.
3. When was Manitoba admitted into the Dominion? British Columbia? Prince Edward Island?
4. What two new Provinces are soon to be created?
5. What is understood by the "Banner" Province? What was its former name? What and where is its capital?
6. For what is Ontario noted?
7. What is meant by Lower Canada?
8. For what is Montreal noted?
9. Name the Maritime Provinces, stating how the inhabitants are chiefly employed.
10. Name two large rivers of Canada, two islands, two canals, two railways.
11. What and where are the following: Bruce, Chaleur, Dawson, Pelee, Saguenay, Bras d'Or?
12. What day do we keep in honor of Confederation?
13. What is the population of Canada? The area?
14. What about the soil, scenery and climate?

Canadian History.

1. What is Canada? Where is it? Who discovered it?
2. What country occupies the other half of North America? When was this continent discovered? What countryman was Columbus?
3. Since when has Canada been a British colony? By what treaty was it permanently ceded?
4. When was the Battle of the Plains fought? Who were the contending generals? Who won?
5. When was the Constitutional Act passed? What was it for?
6. When did the First Parliament of Upper Canada meet? What was one of its first acts?
7. When and by whom was Quebec founded? Montreal? Kingston? London?
8. Who was Donnacona? Kirke? Brock? Laura Secord?
9. When had we war with the United States? What caused it? Name two battlefields of that war. How long did it last? By what treaty was it concluded?
10. When was the Canadian Rebellion? What did the people want? By what Bill was Responsible Government granted? What city became the capital after the union?
11. When was Queen Victoria born? How long did she rule? When did she die?
12. When was King Edward in Canada? Why did he come here? Over how many people does he rule? What is he often called?
13. Are you proud to be a Canadian? Say why.

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Natural History.

1. Name the three kingdoms in nature.
2. What do you call bodies which have life? No life?
3. Which is the noblest work of God? How so?
4. How many senses has man generally? Name them.
5. How many species of known animals are there? Of birds? Of insects?
6. Name the king of beasts, of birds, the largest land animal, water.
7. What animal lows? Bleats? Howls? Roars? Trumpets?
8. Name a flower, a fruit, a mineral, a tree, an insect, a fish.
9. What bird hoots? Cooes? Screeches? Caws? Crows? Gobbles? Chucks?
10. Name an amphibious animal, a beast of prey, a ruminant quadruped, a talking bird?
11. What has the Creator shown in all His works?
12. How can man prove his gratitude for God's special benefits to him?

Mental Arithmetic.

1. If 4 lbs. of meat cost 48c., what will 9 lbs. cost?
2. A gallon of maple syrup is worth 80c. What is that a pint?
3. Two boys caught 30 fish. One caught 6 less than the other. Each?
4. Mary spoke twice in 15 minutes. How often in one hour?
5. I gave two boys 50c. Each time one got 2c. the other received 3c. How much had each?
6. What will half a barrel of flour be worth at 3c. the pound?
7. How many steps of 2 ft. each in 100 yards?
8. Two men earned $60. One earned 4 times as much as the other. Each?
9. A sheep cost $10, a cow twice that and a horse five times as much as the cow. All?
10. John has 3 brothers and 5 sisters. How many children in his family?
11. How many quires in 72 sheets of paper?
12. After spending half of his money, Willie had $1.50 left. How much had he at first?

Written Arithmetic.

1. $19.50 bought 3 tons of coal. How much is that for 36 tons 1,000 lbs.?
2. A man's salary is $1,180 a year. He spends $16 a week. How much does he save in two years?
3. A man sold 288 sheep for $2,520, by which price he gained $2 on each. What did one sheep cost?
4. How many telegraph poles are there in 70 miles of line, the poles being 4 rods apart?
5. A grocer paid $49.50 for two barrels of molasses and found that the cost was 8c. a pint. How many gallons were in each barrel?
6. A case containing 36 doz. oranges was bought for $7.20, and sold at the rate of 8 oranges for 22c. How much was gained on it?

Temperance.

1. What is temperance in all things called?
2. If a man drinks what will be the result?
3. Name a strong drink, a malted liquor, a natural beverage.
4. Why do we teach temperance to you?
5. What is the effect of alcohol on the system?
6. What does Solomon say of drink?
7. Have we Prohibition in Canada? What is Prohibition?
8. If you had a friend who drank, what would you say to him?
9. What is said of the Ancient Romans?
10. Where, when and on what occasions was wine used at first?
11. Do you think you will ever acquire the habit of drinking?
12. Whom will God assist?

Incorporation.

Carefully, particularly, anywhere, nowhere, for it, to them, however, nevertheless, of whom, of which, too much, too little.

General Conversation.

1. How has your health been this term?
2. How do you think you have done?
3. What were your subjects of study?
4. Why did you not go to a Public School?
5. When was this Institution founded? How is it supported? Who is the Minister in charge?
6. How many Institutions for the deaf are there in Canada? Where are they located?
7. How do you express your thoughts?
8. What alphabet do we use here? Who invented the Manual alphabet?
9. When one uses correct language, what do we say?
10. How many languages are there in the world?
11. By how many people is English spoken?
12. How long does it take a deaf mute to acquire an education?
13. If you met with uneducated mutes of school age, what would you say to them?

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

General Conversation.—Con.

14. How do you expect to put in your summer?
15. Do you think you will earn money? What should one do with his money?
16. What do you call a man who spends everything? One who will not spend anything?
17. How do you purpose to make your living?
18. Do you like Canada? Give reason. Where did your forefathers come from?
19. Over how many people does King Edward rule? Who represents him in Canada?
20. What is the emblem of our country? Of England? of Ireland? Of Scotland? of France?
21. What country lies to the south of us? Who is their President? What is their population? Their capital?
22. What two countries are still at war? What is the war about?
23. Name the Czar of Russia, the Mikado, a Japanese General, a Russian General.
24. Do you like to see war? Say why.
25. When had we our last trouble in Canada?
26. Was that a civil or a foreign war?
27. When will a country prosper?
28. Name the six great military powers of the world.
29. Which has the largest navy? The second largest?
30. If you had not come to school, could you have answered these questions?
31. Who generally get on in life?
32. If a man drank, would he likely succeed?
33. Where do you intend to live after you are through here?
34. If you answer all this correctly, what will it show?
35. What will you do with your papers?
36. If you pass a good examination, how will your friends feel?
37. To whom must we look for health, and success in all our endeavors?

SEVENTH GRADE PUPILS.

Mental Arithmetic.

1. A lot 2800 feet around is 600 feet wide. How long is it?
2. A lot is 150 feet wide and twice as long. How many feet around it?
3. What part of the year is past at the end of October?
4. What part of a bushel of wheat is 45 lbs?
5. How many days from May 5th to Dominion Day?
6. If 3 eggs cost 4c., what will 3½ dozen cost?
7. What will 9¼ lbs. of cheese cost at 12c. a pound?
8. What will 12 lbs. of beef cost at 12½c. a pound?
9. If 3½ lbs. of butter cost 60c., how much is it a pound?
10. If 3 men can cut 48 cords of wood in 8 days, how many cords can 5 men cut in 12 days?
11. A man arrived at home the day before Christmas after an absence of 87 days. When did he leave home?
12. How much can a man earn in the months of May, June and July at $1.25 a day, deducting 12 Sundays?
13. A boy spent 4-7 of his money and had 9c. left. How much had he at first?
14. How many yards of carpet, 3 feet wide, will be required for a room 30 feet long and 18 feet wide?
15. A man spent ¼ of his money in May, 1-6 of it in June, and ⅛ of it in July, and had 55c. left. How much had he at first?
16. How many pickets 3 inches wide and set 3 inches apart will be required for a fence around a lot 170 feet long and 130 feet wide?
17. What will 6 lbs. 12 oz. of butter cost at 24c. a pound?
18. Find the value of 3 piles of lumber each containing 1200 boards 10 feet long and 6 inches wide at $40 a 1000 feet.
19. What will it cost to plaster a ceiling 30 feet long and 18 feet wide at 5c. a square yard?
20. How many revolutions will a wheel 8 feet in circumference make in running 3½ miles and back?
21. What will it cost to dig a cellar 27 feet long, 15 feet wide and 6 feet deep, at 30c. a cubic yard?
22. How many cords of wood in a pile 80 feet long, 8 feet hight and 4 feet wide?
23. A woman had 6 pounds of butter. She sold 4 lbs. at 27½c. a pound, and the balance at 24½c. a pound. How much did she get for all?
24. Draw a line 11¾ inches long, and divide it into two equal lengths, marking the length of each.
25. Draw a line 10½ inches long and divide it into four equal lengths, marking the length of each.

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Mental Arithmetic.—Con.

26. Draw a 6⅛ inch square.
27. Draw a parallelogram 7¼ inches long and one-half as wide.

Slate Arithmetic.

1. What will the lumber cost for a sidewalk 2½ miles long and 5 feet wide at $30 a thousand feet?
2. A railway section is 6 miles long and 99 feet wide. How many acres does it contain?
3. How much would the lumber cost at $40 a 1000 feet for a 4-board fence along both sides of the above railway section, if the boards are 10 feet long and 6 inches wide?
4. A boy spent 2-5 of his money in May, 4-9 of the remainder in June, 7-10 of the remainder in July, and had 30c. left. How much had he at first?
5. Write and analyze a question to prove the one next above.
6. A bin is 16 feet long, 6 feet wide, and 4 feet deep. How many bushels will it contain?
7. It takes 1236 steps 2½ feet long to walk around a lot 650 feet wide. How long is it?
8. A man bought 8¾ lbs. of tea at 60c. a pound, 9 lbs. of coffee at 33⅓c. a pound, and sugar at 3¾c. a pound, paying $9.15 for all. How many pounds of sugar did he buy?
9. Henry Smith in Belleville, on May 15, 1905, sold a farm to John Brown for $4800, receiving ¾ of the money down, and taking a note for the balance at 90 days.

   Write: (1) A receipt, and (2) the note.
10. What will it cost for gravel at 15c. a cubic yard to gravel a road 9 feet wide for a distance of 2½ miles if the gravel is put on 6 inches deep?
11. If 6 lbs. 10 oz. of butter cost $1.59, what will 9 lbs. 4 oz. cost?
12. A cellar 32 feet long and 16 feet wide has 3 inches of water in it. How many gallons of water are in the cellar?
13. Find the total cost of the following: 6 bushels 35 lbs. of wheat at 84c. a bushel; 8 bushels, 17 lbs. of oats at 48c. per bushel; 9 bushels 18 lbs. of barley at 64c. a bushel; 12 bushels 24 lbs. of rye at 49c. a bushel.
14. A room is 45 feet long, 27 feet wide and 12 feet high. What will it cost to plaster the walls and ceiling at 5c. a square yard?
15. Tom alone can do a work in 6 days; Dick alone in 9 days; and Harry alone in 18 days. In what time can they do it if they work together?
16. What will it cost to paper the walls of a room 42 feet long and 27 feet wide, if it is 12 feet high, with paper 18 inches wide at 20c. a roll of 12 yards, deducting 8 strips for doors and windows?
17. Find the value of a crop of wheat cut off a field 847 feet long and 640 feet wide, if the yield is 36 bushels per acre, and the price is 85c. a bushel?
18. What is the rate of speed per hour of a train that passes a telegraph pole every 3 seconds, if the poles are 198 feet apart?

Language Exercises.

Incorporations, Ellipses, Etc.

1. ..... proposed to ..... to ....., and ..... agreed.
2. ..... proposed to ..... to ....., but ..... declined on account of .....
3. ..... asked ..... how long it took to ....., and said .....
4. ..... broke up .....
5. ..... broke down .....
6. ..... broke into .....
7. ..... broke out of .....
8. ..... a letter ..... asking how ..... was geting along .....
9. ..... and ..... said that ..... would go if ..... had money enough.
10. ..... and ..... said that ..... would have gone if ..... had had .....
11. ..... asked .....how long it would be till .....
12. ..... asked ..... how long it had been since .....
13. ....if nothing happened to prevent it.
14. A man punished ..... for ..... by ....
15. .... and ..... said "not yet."
16. As soon as ....
17. .... but ..... refused to do it.
18. .... but ..... was disappointed.
19. .... told .... not to .... or ..... might ....
20. .... but ..... said that..... didn't do it.
21. .... would have been .... if .... had not ....
22. .... would not have been .... if ..... had ....
23. .... but ..... was mistaken.
24. If there were no ....

Teachers' Examination Questions.—*Continued.*

Language Exercises.—Con.

25. .... and never returned.
26. .... and never returned it.
27. ....to prevent..... ....
28. ....to protect..... from ....
29. A woman ..... her baby upon the bed, and she ..... down beside it.
30. Some boys were ..... down upon the grass watching the masons..... brick.
31. A river ..... and overflowed its banks.
32. A boy ..... early in the morning and ..... the flag.
33. A balloon ..... in the air. (Future).
34. A balloon ..... in the air. (Past).
35. A balloon ..... in the air. (Habitual).
36. .... in a few days.
37. .... for a few days.
38. .... asked .....when, and ..... said..... (Past).
39. .... asked ..... when ....., and ..... said ..... (Future).
40. .... asked .... when ..... and ..... said..... (Habitual).
41. .... and the result was that ....
42. .... and the cause was that ....
43. .... and ..... said that ..... didn't have any.
44. .... and ..... said that ..... didn't have it.
45. ..... said that ..... trade was..... and ..... learned it in .....
46. ..... said no, but .....would have gone if ....
47. ..... said yes, ... would go if ....
48. ..... asked ..... which ..... would rather do; ..... or .....

I would rather { be —— / go —— / eat —— / see —— / read —— / have —— / live —— } than ——

56. ..... asked ..... why..... ..... and ..... said because ....
57. .....asked.....what .... for, ... and .....said ....
58. ..... says that when ...., he .... (Future).
59. ..... says that when she..... ....., she .... (Past).
60. ..... says that when he..... ..... , he ....(Habitual).
61. ..... used to .... but..... doesn't do it now.
62. ..... didn't use to .... but ..... does it now.
63. .....said: "So am I."
64. .... said: "So will I."
65. .... said: "So do I."
66. .... said: "Neither am I."
67. .... said: "Neither do I."
68. .... said: "Neither will I."
69. .... a new one.
70. .... new ones.
71. .... to keep it.
72. .... to take care of it.
73. .... to stop talking.
74. .... stopped to talk.
75. Before ...., he ....
76. After .... she ....
77. .... before he ....
78. .... after she ....

Language Exercises.

Changing from Narrative to Colloquial Form

1. A man told his son not to walk on the track or he might be killed.
2. A boy went into a photographer's rooms and told the photographer that he wanted him to take his photograph. The photographer asked him what size he wanted, and he said that he wanted cabinet size.
3. A man told his wife that he was going to Montreal the next day, and asked her if she wanted him to bring her anything, and she said no, she didn't need anything. She asked him when he thought he would return, and he said he thought that he would return the next night.

Write the following Letter.

4. On the 10th of May, 1905, John Smith in Belleville wrote a letter to his father in Toronto acknowledging the receipt of his letter containing money, which he sent him the day before, and thanked him for it. He said that his health was good and he hoped that his was the same, and that they were all well at home. He said that he was busy preparing for the examination, and he hoped that he would pass well. He said that the time was passing rapidly, and he would soon see them all again. He asked how his little sister was getting along at school. He said that he had no more to add, and he would bring his letter to a close. He told him to give his love to all at home.

TEACHERS' EXAMINATION QUESTIONS.—*Continued.*

Changing to Narrative Form.

1. *A boy*: "I sold my old bicycle and I bought a new one."
   His mother: "How much did you get for your old one, and how much did you pay for the new one?"
   The boy: "I got $5 for the old one, and I paid $20 for the new one."
   His mother: "How do you like your new one?"
   The boy: "I like it very much. It is a better one than the old one was."
2. *Jones*: "How are you; I am glad to see you. When did you come to town?"
   Smith: "I am well, thank you. I came last night."
   Jones: "Did you leave your family well?"
   Smith: "Yes, they are all well except my youngest son who has a bad cold."
   Jones: "How long will you be here?"
   Smith: "I think I will be here till to-morrow."
   Jones: "I will be glad to have you call and see us before you leave."
   Smith: "Thank you; I will if I can."
3. Belleville, Ont.,
   May 12th, 1905.

   Dear Mother:

   I am pleased to write a letter to you to-day. I am glad to inform you that I am well, and I hope that this letter may find you the same. It will not be long till school closes, and I will soon see you all again. I suppose that my father and brothers are busy on the farm now. Did my little sister receive the present I sent her? How is she getting along in school? I hope that you are well of the bad cold you had when you wrote to me last. I have nothing more to add. Give my love to all at home, and keep a large share for yourself.

   Your loving son,
   JOHN BROWN.

Change from Active to Passive.

1. John struck James.
2. A man told his son to go to school.
3. A man took his son to school and told him to be a good boy.
4. A boy asked a policeman what the Judge did to a thief, and he said that he sent him to jail for six months.
5. Some burglars entered a house and stole many valuable articles.
6. If a man had not jerked a boy off the track the train would have run over and killed him.
7. A brass band frightened a horse and it ran away, upset the buggy, threw out a boy and broke his arm.

Change from Passive to Active.

1. A cat was chased.
2. A boy's boots were repaired.
3. A girl had her photograph taken.
4. A boy was thrown and his leg was broken.
5. A boy was struck by a base ball and he was badly hurt.
6. A boy was struck by a runaway horse and badly injured. He was carried home by a policeman, and the doctor was sent for.
7. The pupils were asked what should be done to a room if the air in it was foul, and they said that the windows should be raised and the room ventilated.

Subjects to Write About.

1. Vacation.
2. History of "Myself."
3. Our Institution.
4. Our country.
5. Our daily work in the Institution.
6. Food.
7. Christmas.
8. A railway trip.
9. King Edward VII.
10. Thanksgiving Day.
11. Good Friday and Easter.

Miscellaneous Compositions.

1. An offer.
2. A proposal.
3. A promise.
4. A warning.
5. A threat.
6. A command.
7. A request.
8. An apology.
9. An excuse.
10. A complaint.
11. A rumor.
12. A reprimand.
13. A preference.
14. A punishment.
15. An exclamation of joy.
16. An exclamation of sorrow.
17. A charge and a denial.
18. A cause and a result.

Letter Writing.

1. A note to the doctor.
2. A note of invitation.
3. A note accepting an invitation.
4. A note declining an invitation.
5. A note asking information.
6. A note asking advice.

TEACHERS' EXAMINATION QUESTIONS.—*Concluded.*

Letter Writing.—Con.

7. A notice of a meeting.
8. A letter of introduction.
9. A note asking to be met.
10. A letter subscribing for a newspaper.
11. A notice of change of address.
12. A letter of congratulation.
13. A letter of condolence.
14. A letter applying for a situation.
15. A letter of acknowledgment.
16. A letter asking for a certificate of character.

Canadian History.

1. What distinguished member of the Royal Family visited Canada in 1860, and what is his rank now?
2. Tell the difference between a civil war and a foreign war, and give an example of each.
3. Give the cause of the war of 1812.
4. Write a note on General Sir Isaac Brock.
5. Write a note on the Duke of Richmond, and tell what progress Canada made during his rule.
6. When and for what purpose was the Earl of Durham sent to Canada?
7. Write a note on Lord Sydenham.
8. What was the cause of the rebellion in 1836-1837?
9. Tell what you know of the Elgin Riots.
10. Write a note on the Fenians.
11. Tell what you know of the Riel Rebellion.
12. What was Ottawa formerly called, and when did it become the capital?
13. What is the form of Government in Canada, and of what does it consist?
14. Where were Canadian soldiers sent to fight three years ago, and what was the result?
15. Mention the names of some prominent men in England and in Canada

Geography.

1. Of what does Great Britain consist?
2. Through what waters would a vessel pass in sailing around Great Britain from London and back?
3. Of what does the British Isles consist?
4. Of what does the British Empire consist?
5. What is the difference between a colony and a dependency?
6. Name the principal British colonies and dependencies throughout the world, and tell where they are.
7. What exports do we send to Great Britain, and what imports do we get in return?
8. Name some chief cities in England, and tell for what they are noted.
9. Name the capital and the chief commercial city in Scotland.
10. How are England and Scotland separated?
11. Name the provinces in Ireland and the chief city in each.
12. How could you go from Belleville to Vancouver, B. C., by an all land route, and how by an all water route?
13. Name the chief American cities that lie on the great lakes.
14. What and where is the capital of the United States?
15. Where are the West Indies, and what are the chief products?
16. Through what waters would a vessel pass in sailing around the world from Montreal and back by way of Gibraltar?
17. What are the chief occupations of the people in South America?
18. From what countries do we get the following: Sugar, tea, rice, molasses, cheese, tobacco, coal, iron, silver, gold, diamonds, dye-woods, spices, cutlery, silk, linen, ivory, and tropical fruits?
19. What two nations are now engaged in war; where are they, and what is the capital of each?
20. What and where are the following: Cuba, the Amazon, Liverpool, the Horn, the Andes, the Thames, the Solway, Yukon, the Golden Gate, Ulster, the Wash, Erie, Chicago, the Mississippi, Belle Isle, Paris, Brazil, the Ottawa?

Temperance.

1. What is a drunkard, a moderate drinker, a total abstainer?
2. Which of the above three is it always safest and best to be, and why?
3. What is it in spirituous liquors that makes them injurious?
4. What is alcohol?
5. Name the liquors that contain alcohol.
6. How do spirituous liquors injure the human system?
7. What is it always best and safest to do when invited to take a drink of spirituous liquors?

The Combined System—Pure Oralism.

In previous reports the characteristics and relative merits of the Pure Oral and Combined Systems of instruction have been fully discussed, and it is needless to traverse the same ground again. The facts are that not twenty per cent. of the deaf can ever learn to articulate with reasonable distinctness by the pure oral or any other method, not ten per cent. ever become successful lip-readers even under the most favorable conditions, and not one in a hundred is able to follow a speaker when addressing a number of people from a platform a short distance away. We regret that this is so, and wish most heartily that it were possible to accomplish what the oralists claim; but there is no use shutting our eyes to demonstrated facts or striving to accomplish impossible feats. No stronger proof of the failure of pure oralism to "restore the deaf to society" is to be found than the testimony of the educated deaf themselves; and it is no exaggeration to say that at least ninety-five per cent. of them, even those educated under the pure oral system, are strongly in favor of the Combined Method—which simply means a method which rejects all faddisms and dreamy idealisms, and which uses all available means with the one practical object in view, of giving to the pupils such intellectual equipment and training as will best fit them to attain the highest degree of prosperity and happiness in life. The attitude of a large majority of the teachers of the deaf on this continent relative to the Combined System is well known and their position has been time and again endorsed with practical unanimity by the educated deaf themselves throughout Canada and the United States. To this testimony I desire to add that of the deaf in Great Britain, as expressed at the Ninth Biennial Congress of the Deaf and Dumb Association, which was held last July. In his opening address the President of the Congress dealt largely with the question of methods of instructing the deaf. He held that the Combined System was the best, and said he would like to see an inquiry by the Board of Education into the practical results of the Oral Method. He did not hesitate to say that in the majority of cases to try to educate all the deaf and dumb by means of the Oral Method was a cruel waste of time; the progress was too mechanical, and such instruction did little to expand the intellect. The public needed to be told that the pupils educated in pure oral schools were by no means "restored to society," but were too often doomed to a greater social isolation than those trained according to the Combined System, which used all methods and rejected none. Subsequently the following series of resolutions were unanimously adopted by the Congress:—

We, the members of the British Deaf and Dumb Association in Congress assembled at Windermere, in the County of Westmoreland, England, this fourth day of July, 1905, while recognizing and appreciating to the full extent all methods of educating the deaf, deplore and condemn the narrow and short-sighted policy pursued by those teachers who seek to educate all deaf children by the Pure Oral Method alone. We are firmly and unalterably in favor of the Combined System, which adapts the method to the pupil, and not the pupil to the method.

We resolve therefore:

"I. That the educated deaf feel it their duty and privilege to discuss and pass judgment upon all questions affecting the education of deaf children, inasmuch as interests vital to their happiness and success in life are involved, and as the adult deaf, by reason of their daily personal experience are the best judges of the success or failure of the method by which they were educated, they feel that they are justly entitled to claim for their well-considered opinion the full weight of authority."

"II. That to those deaf who have never acquired speech through the medium of the ear, speech as represented by the motions of the lips and mouth is a sign language, and that those oral teachers who decry the conventional language of signs and manual alphabet are guilty of an inconsistency."

"III. That the Oral Method, which withholds or discourages the use of the manual alphabet and the language of signs, robs the deaf of their birthright."

"IV. That those champions of the Oral Method who have been carrying on a warfare, whether openly or secretly, against the use of the language of signs by the deaf are no true friends of the deaf."

"V. That in our unanimous opinion that it is the duty of every teacher of the deaf, no matter what method he or she uses, to have a working command of the manual alphabet and the sign language."

"VI. That it is the opinion of this Congress that the highest educational interests of the deaf require an increased ratio of deaf teachers possessing the requisite intellectual and moral qualifications."

"VII. That the practice of those oral teachers who through deliberate misrepresentation influence the parents of pupils to deprive their children of the benefits of association with their fellows, calls for the severest condemnation, as it is opposed to the true happiness and well being of the deaf."

"VIII. That in view of the persistent policy of ultra-oralists by entertainments and 'living exhibits' to mislead and prejudice the uninitiated public against all other methods, we recommend to the deaf the advisability of holding public entertainments and of circulating such literature as may tend to remove the wrong impressions the public may have formed and which will make manifest the advantages of the combined system over the pure oral method."

"IX. That this Congress extends its greetings and encouragement to our brethern in America and on the Continent who are struggling for a more rational and humane system of education and hopes their noble efforts will be crowned with success and finally

"X. That the spirit which establishes and cultivates fraternal and beneficial organizations of the deaf be encouraged and commended."

Convention of Instructors of the Deaf.

The seventeenth meeting of the Convention of American Instructors of the Deaf (including Canada) was held at Morganton, N.C., on July 7th to 15th, 1905, and it was a most enjoyable and helpful gathering. I had the pleasure of representing this Institution. This Convention meets every third year, and its purpose is to give those able to attend an opportunity of discussing matters relating to the work of educating the deaf, and endeavor, by an interchange of views and a comparison of experiences, to eliminate or lessen as many as possible of the difficulties peculiar to deaf-mute instruction, and to try to devise, if possible, yet more perfect methods. Among the subjects discussed were the following:—"English from the Beginning," "Foundation Work in Arithmetic," "Technical Training for the Deaf," "Some Fruits of a Long and Rich Experience in the Class-room," "Gardening for the Deaf," "What the Domestic Training of our Girls Should be." "Industrial Training," and many others. It will be seen that the subjects are all of a very practical character, and as the discussions were participated in by many of the most experienced and successful instructors of the deaf on the continent, they cannot fail to prove of very great helpfulness to all who were privileged to hear them; and, as a verbatim report is published, every teacher, whether present or not, will be able to have the benefit of the views advanced and the conclusions arrived at. It would be difficult to overestimate the value and importance of these periodical gatherings of so many teachers of the deaf in elevating their ideals, renewing their zeal, perfecting their methods, giving them a truer estimate of both their opportunities and responsibilities, imbuing them with greater incentives to excel, and infusing in them new inspiration and enthusiasm for the noble work in which they are engaged. High and Public school teachers have frequent opportunity

of exchanging views and discussing methods with teachers from other schools, and no one doubts that they thus gain a broader outlook and a deeper insight into their work, and that increased efficiency must result. This privilege is denied to most teachers of the deaf except on rare occasions, hence special necessity and utility of these triennial conventions. As always happens at these gatherings, the value and necessity of signs was one of the subjects most warmly discussed, and there seemed to be an increased tendency to recognize that they are essential to best improvement and highest welfare of the deaf, a majority of even the pure-oralists admitting that on some occasions and for some purposes signs are helpful and even necessary. The superiority of the Combined or Eclectic System of Education, also, seems to have been so amply demonstrated and to have become so firmly established that it is now scarcely ever questioned, even by those who still adhere to the Pure-Oral System; and on this occasion no effort was made to formally challenge its supremacy as has been done at former conventions.

Attendance at the Institution.

It will be noticed elsewhere in this report that the attendance at this Institution during the current session is somewhat less than that of previous terms. For this there are several reasons. In the first place, there were a number of pupils of low mental capacity that had been allowed to remain here much longer than the regular term, in the hope that their dormant faculties might awaken to greater activity, but in most cases this hope has not been realized. All of these, and a few others who were not capable of benefiting by a longer stay at the Institution, were not allowed to return. In the second place, a larger number of pupils than usual had completed their course in class-rooms and shops, and have now gone out to take their place in the activities of life. We have done for them all that our facilities and opportunities will permit, and we trust that abundant happiness and prosperity will crown all their days. In addition to these, there were, I regret to say, an unusually large number of pupils whom we expected to return, and who should have done so, but who have been kept at home to help their parents. In one or two cases this may have been necessary because of family troubles or afflictions, but in most instances it is quite without justification, and cannot but result in life-long injury to the children. Doubtless the scarcity of laborers and the current high wages have been controlling factors in producing this regrettable result. To these three classes must be added eight pupils whose parents have moved to other provinces, and who, therefore, could not be allowed to return. The losses, forty-eight pupils who were with us last year not being with us this session, due to this unusual combination of circumstances, have been to some extent made good by thirty-six new pupils, but these were not sufficient to bring the attendance up to that of last year. It might be added that for many years the attendance at the Institution was abnormal, because each year, in addition to the natural number of young children who entered school, there was a considerable number of older boys and girls—some of them, in fact, young men and women—who should have come many years before, but for various reasons had not done so. That period in our history is now pretty well past, and from this time on, with some isolated exceptions, the number of new pupils each year may be expected to remain at the normal level. This, for a few years, may result in a smaller average attendance than that of the last decade, but in course of time the rapid growth and development of New Ontario, and the consequent great increase in the population of the Province, will doubtless again bring the attendance up to the utmost limits of the capacity and resources of the Institution.

Industrial Departments.

Our boys and girls who were engaged in the Industrial Departments last session, did very well indeed. In nearly every case, anxiety to improve and make the most of the time in the Departments was quite noticeable, and the progress made, satisfactory.

Manual Training.—During the session twelve boys received instruction in this department, all of whom have made good use of their time and profited by the training here afforded. As in previous years it has been the aim of the instruction to secure neat, accurate, well-finished work, and to develop in a very practical way the hand and eye. No pretence is made of teaching carpentry, though teaching the names of tools and their operations, as well as their care and how to use them, forms part of the scheme. Their use is taught in the making of a prepared list of useful articles such as dovetailed boxes, mallets, axe-handles, etc. The class is comprised of first, second, third and fourth year pupils. No matter what occupation the boys are likely to follow hereafter, their experience in the Manual Training Room will help them materially.

Domestic Science Classes.—The work generally was satisfactory, keen interest being manifested by the pupils during every lesson. Their conduct was excellent. During the class-work pupils were led to think and decide for themselves. All new work was copied in books to be used for future reference.

The teacher reports as follows:—Class 1. A class of six girls completed the third year's work. During the year the practice work consisted of bread-making, cooking of meats and fowls, making of soups, cooking of vegetables in various ways, and the review of marmalade. Instructions were given in canning of vegetables and fruit, jelly making, cooking of fish, making of hot and cold desserts, ices, pudding sauces, meat and fish sauces, cooking and planning of meals for the sick as well as other useful knowledge in home nursing was taught. These pupils also had practice in laundry work. Class 2. A class of nine girls completed the second year's course, but had fewer practice lessons than formerly. Bread-making, study of meat and cooking of the same, making of cream soups, planning and serving of a dinner, care of kitchen and dining-room were taught. Class 3. A class of eight girls received instructions in the cooking of fresh and dried fruits, cereals, vegetables, cooking of eggs in various ways, combining of milk and eggs as in custards, the cooking of bacon, care of the dining-room, planning and cooking of a breakfast as well as serving it completed their year's work. Class 4. These girls have very little language and have to depend upon their memories. This makes the work very slow for them. During the session two boys from the bake-shop received instruction once a week in cake-making, pastry, fancy rolls, and some simple cooking.

Sewing Class—Boys.—Class 1 received instruction once a week, the various stitch forms being received as well as practical work done. These boys kept their coats and vests in repair. The interest manifested was encouraging, while the work done by them was neat. Class 2, a class of small boys, had one lesson a week. In this class the teaching was not uniform, owing to the difference in ability. Those who were ready to advance were allowed to do so. Habits of cleanliness, order and personal neatness were encouraged.

The boys in the printing office, shoeshop, bakery, carpenter shop and barber shop all did well, and some of those who were in these departments last session, who did not return, are filling good positions outside. Three or four who ought to have come back for further instruction, were kept at home, very much to our regret.

Our Publicity Effort.

Our Publicity Effort of March last, in connection with the Institution for the Blind, gave us an idea of the number of deaf children of school age in the Province whose parents had not made application for their admission here. Ten thousand special circulars and return postal cards were sent to teachers of common, separate and high schools, newspaper editors and others. From them we learned the names and parents' addresses of twenty-six deaf children under seven years of age, eighty-eight from seven to nineteen, over nineteen and no age mentioned, eighteen,—in all one hundred and thirty-two. Application papers and other printed matter concerning the Institution and its advantages were mailed to the parents and a number of the children admitted as pupils this session, nineteen are to come next year and in time others will be sent. We are indebted to all who were appealed to for prompt and kindly responses to our request for information.

Farm and Garden.

Our farming operations this year are not quite as satisfactory as we could desire. The potato crop on which we rely to a great extent for our needs, was an utter failure and instead of having 800-900 bushels of potatoes as we usually have each year, some forty bags or sixty bushels rewarded our efforts. All through this section on clay land there was a potato rot and we did not escape. Our hay crop was a bountiful one and the oats yielded an unlimited quantity of straw but only a half crop of oats. The root crop such as mangolds, carrots, turnips, etc., gave us good returns. Our general garden truck was less than in former years. Mr. John Moore who was gardener and farmer for nearly ten years, resigned on account of ill health; he was a faithful, industrious and capable man in every respect. Mr. J. Hess filled the place until a few days ago when Mr. Wm. Forge assumed the duties of the position.

Changes in the Staff.

There have been a few changes in our staff during the year. Miss Caroline Gibson, a valued teacher of Articulation and Lip-reading for nine years resigned to be married and the position was filled by the appointment of Miss Agnes A. Gibson, who graduated from the Northampton Institution Normal Department in June last, and who comes to us most highly recommended. Mr. M. J. Madden, owing to the reduction of the number of classes, resigned to go into business in Tennessee, U. S. Mr. G. G. Keith, Supervisor of Boys for a number of years, retired to enjoy a well-earned rest; Mr. W. S. Minns takes his place. Miss M. L. Stratton, hospital nurse, left us for a more lucrative and responsible position in the Butterworth Hospital, Grand Rapids, Michigan, for which she is eminently fitted; she is succeeded by Miss F. E. Bates, who was one of our efficient and stalwart helpers during the trying and serious epidemic here in 1903. Miss A. G. Chisholm is now stenographer and clerk in my office and a most capable assistant she is, in succession to Miss J. Austin who resigned to get married with the best wishes of all with whom she was associated.

Miscellaneous.

The general health all through the session was very good considering the large number of children in residence. The physician's report refers more particularly to this matter.

The Ontario Deaf-Mute Association, composed principally of graduates of this Institution, will hold its tenth meeting here in June, 1906, in re-

sponse to an invitation extended to the members by the Hon. the Provincial Secretary, then Minister-in-charge, last year.

The clergymen of the city visit the pupils belonging to the various denominations regularly and their ministrations have been very helpful to all concerned. Those on our permanent visiting list are: Rev. Canon Burke; Right Rev. Monseignor Farrelly, V.G.; G. W. Beamish (English Church); Rev. A. H. Drumm; Rev. R. S. Laidlaw, B.A. (Presbyterian Church); Rev. J. P. Wilson; Rev. R. H. Leitch, Rev. Geo. Brown (Methodist); Rev. Father Twomey; Rev. C. H. Emerson (Baptist).

Sir William Mulock, of the Dominion Government, has very kindly opened the Post Office service to capable deaf mute young men and four are now engaged on trial. If they are successful others may secure places later on. The commencing pay is small and a number of our graduates who would have succeeded without a doubt whatever, declined to make application as they were earning from $10 to $18 a week in their present avocations.

During the session two deaths occurred, one a little boy about eight years of age named Percy Pierce, of Paris, from a severe attack of tonsilitis to which he was subject before coming to the Institution. The other was a large boy, twenty-two years of age, one of our best young men. He was bathing off the wharf early one morning just before school closed, and must have taken cramps and was drowned. In both these cases the parents were promptly notified and they have the sincere sympathy of all at the Institution in the great loss which they sustained.

Much needed improvements in the buildings were made during the summer, under the direction of the Department of Public Works. A thorough renovation of the chapel would add to its attractiveness. Metal ceilings and new hardwood floors in many places are desirable and necessary. A new and larger steam engine is wanted for the laundry machinery. The conservatory ought to be overhauled and partly rebuilt. A request for the foregoing and other requirements will be submitted to you in the near future.

We had 213 pupils in residence on the 30th of September. The Institution opened on Wednesday, September 20th, and all the children, some from as far west as Sault Ste. Marie, arrived at the Institution safely. Officers and teachers reported promptly and business commenced on the morning of the 21st. A number of parents with new pupils favored us by coming to the Institution with their children. We were extremely glad that they did so as they could see how their children were placed and judge how they are likely to be cared for. We would like the parents of every child in the Institution to visit us at some time or other.

Officers, teachers and employees are all deserving of commendation for duties faithfully performed.

I have the honor to be, Sir,
Your obedient servant,
R. MATHISON,
Sup't and Principal.

PHYSICIAN'S REPORT.

Hon. Dr. R. A. PYNE,
Minister of Education, Toronto, Ont.

SIR,—I have the honor to present to you, herewith, the Annual Medical Report of the Ontario Institution for the education of the Deaf and Dumb, Belleville, for the year ending 30th September, 1905.

The session just closed has been a favorable one. While there was considerable sickness every week, yet most of it was of a mild nature so that but little time has been lost from school.

Close watch is kept over every child for the first two or three weeks after school opens, fearing the outbreak of some contagious disease. However, when they get settled down to regular work, sleep, exercise and diet the general health much improves.

Early in many sessions septic sore throat becomes quite prevalent but is quite amenable to treatment and is of short duration. Anæmia, colds, minor accidents, discharging ears, dyspeptic affections and constipation are common diseases of every session.

Several cases of abscess and jaundice and one very severe case of erysipelas occurred during last school term. On the 7th of December, Miss McMillen, a domestic, had an attack of hemiplegia and was sent to our City Hospital but died in a few days. In April three cases of diphtheria occurred and one death, that of Percy Pierce—death came very early from heart failure. We also had four cases of ring worm and one of mumps, but thanks to our facilities for isolation, these diseases were readily cut short. Just as the school was closing a very regrettable and unfortunate accident took place. Contrary to the rules of the Institution, some of the larger boys went bathing very early in the morning and one of them was drowned.

I have the honor to be, Sir,
Your obedient servant,
P. D. GOLDSMITH, M.D., M.R.C.P.

EXAMINER'S REPORT—1905.

Hon. Dr. R. A. PYNE,
Minister of Education, Toronto, Ont.

SIR,—I have the honor to report as follows, regarding my examination of the Literary Classes of the Ontario Institution for the Deaf and Dumb, Belleville:—

General Scope and Course of Study.

The Curriculum, or Course of Study, is divided into seven grades. The first grade, or work of the first year embraces the study of the:—

Manual Alphabet.
Nouns. The objects in use in the class room; parts of the body, house furniture; most common animals; names of persons; divisions of time; as day night, morning, evening, noon; directions, as east, west, north, south; natural phenomena, as cloud, hail, snow, rain, etc.
Number. Singular and Plural of Nouns taught.
Adjectives. Common, as good, bad, old, etc. Color, etc.
Numerals, as one, two, three.
Conjunction. "And".
Pronouns. 1st, 2nd and 3rd persons, singular.
Verbs.—To express simple actions, using the words with which they are familiar.
Notation. Counting to 500 by objects.
Penmanship.

The *Second Grade* embraces:—

A thorough review of the work of the *First Grade*.

Substantives. Articles of furniture, and parts of the body of quadrupeds, birds, fish, etc. Names of articles of every day use.

Adjectives. Qualitative, as high, low, beautiful, etc. A, an, the same. Cardinal and Ordinal. Demonstrative, as this, that, etc. Possessive, as my, her, etc. Form and dimension, "a piece of."

Pronouns. Personal Pronouns, as taught.

Verbs. Actions relating to objects the names of which are known to the pupils. Present, progressive, past tense.

Grammar Exercises. Simple and compound actions described.

Arithmetic. Simple addition and subtraction—practical examples. Mental addition and subtraction. Express a number consisting of four figures.

The *Third Grade* embraces a study of:—

Substantives. The different classes of artisans, the articles made by each, their use, etc.

Arithmetic. (Simple). Addition and subtraction, multiplication, tables. Mental addition and subtraction. Miscellaneous Questions.

Grammatical Exercises and Composition. Description of Pictures, Questions and Answers by Pupils, Letter Writing. Simple Eliptical Sentences.

Geography. Divisions of land and water.

Adjectives. Verbs and *Conjunctions.* (Incorporation). Regular comparisons with "more" and "most". Distributives, each, every, either, neither. Present, Past, Past Progressive and Future Tenses "Or" and "Nor".

Penmanship.

The *Fourth Grade* embraces:—

Arithmetic. Addition, Subtraction and Multiplication with simple practical examples. Roman Numerals to 1,000. Time Lessons. Mental Addition. Subtraction and Multiplication.

Language. Temperance Notes.
Changing from Active to Passive Voice.
Common Verbs.
Object Lessons.
Talks and Stories.
Incorporation of different kinds of words.
Simple Eliptical Sentences.
Letter Writing; questions asked and answered by pupils.
Describing what was done on certain days.
Tenses, Present, Past, Future, Perfect, Present and Past Progressive.

Geography. Divisions of land and water, Counties, chief towns in each County. Cities of Ontario.

Penmanship.

The *Fifth Grade* embraces:—

Geography. Definitions—Divisions of Land and Water reviewed. Province of Ontario, Counties, Cities, County Towns. Chief Towns and Physical features. General Idea of the Dominion of Canada.

Arithmetic. Review work completed thoroughly, with Division.
Simple Analysis.
Reduction—Canadian Money.
Mental Arithmetic, Addition, Subtraction, Multiplication and Division.
Grammatical Exercises, Language Lessons.
And *Composition.* Pronouns, Adjectives, Adverbs and Common Conjunctions (Incorporation).
Changing from Active to Passive Voice.
Object Lessons.
Natural History.
Miscellaneous Questions.
Temperature and Hygiene.
Letter Writing.
Questions and Answers by pupils.
Penmanship.

The *Sixth Grade* embraces the study of:—

Arithmetic. Simple Rules, with Practical Examples.
Reduction, Canadian Money, Advoirdupois Weight, Long, Dry, Liquid and Time Measures, and Miscellaneous Table Mental Arithmetic. First four simple rules and analysis.
Gramatical Exercises and *Composition.* Incorporation of different words embracing different parts of speech.
Sweet's Lessons, No. 4.
Temperance Notes.
Letter Writing.
General Conversation.
Object Lessons.
Questions and answers by Pupils.
Dictation in Sign Language to be reproduced in writing.
Geography. Definitions.
Divisions of Land and Water.
Dominion of Canada; physical features; exports; where found, and where probably sent; imports, where from.
Canadian History. General Events.
Penmanship.

The *Seventh Grade* embraces:—

Arithmetic. Addition, Subtraction, Multiplication, Division and Analysis of Fractions, Simple Interest, Square and Cube Measure, Promissory Notes, and Accounts.
Language and *Composition,* Incorporation of words and phrases.
Changing from Narrative to Conversational form and vice-versa (using inverted commas).
Changing simple Sentences into Compound and Complex.
Writing Notes and Letters from sign dictation.
Temperance Notes.
Letter Writing.
Reproduction by Dictation and Sign Language.
Canadian History. From 1812 to the present time.
Geography. The United States, New Mexico, West Indies, Central America, South America and the British Isles.
Penmanship.

Teachers and Their Teaching.

The staff consists of seventeen teachers, nine ladies and eight gentlemen, all highly qualified, specially trained and thoroughly competent for their work. They invited thorough inspection and examination of their methods of teaching, and of the results of their efforts. I am thoroughly satisfied that their efforts to do their best, with the pupils under their charge, are sincere. Every teacher appeared most energetic and anxious concerning the pupils, and invited criticism of methods with the object of increasing efficiency. I could find no fault with any teacher.

Two teachers are engaged in the special work of teaching Articulation. Every child admitted, that is capable of instruction in this branch, becomes a member of the Articulation Class. I was surprised at the result. Many pupils, who, when they entered the Institution, could not utter one word, are now able to speak and recite intelligibly. Pupils answer questions in Geography in this way, and recite familiar pieces quite as well as some children of the public schools.

Pupils and Their Work.

The pupils number 225. 107 boys and 118 girls. These pursue their studies of the different Grades in 15 separate Class Rooms. I examined all the pupils of all the Grades and was impressed with the excellent order and discipline in every room. The pupils seem to have the sympathy of the teachers and show a desire to learn. All were neatly attired. Sickness, apparently, is entirely absent—not one pupil being absent for that cause. The pupils seemed delighted with my efforts to interrogate them and were most anxious to perform the tasks assigned to them. The work done by the pupils was well done. I found the Penmanship particularly good.

Rooms and Accommodations.

The rooms are clean and well kept, though many of them are rather small. Slate black-boards are used throughout, and the walls are decorated with various pictures and objects such as the teachers can make use of to convey language lessons to pupils. I observed the children in their study rooms and in all parts of the building and grounds at different times, and found them quite agreeable with one another and very careful not to injure the premises or annoy other occupants. The oversight and care of the pupils in and out of school hours seemed to me to be quite satisfactory.

Trades, Etc.

Printing. A regular Printing Office is part of the equipment of this Institution. It is presided over by a practical and competent printer. In this shop are ten pupils, one working all day and the others three hours a day. The character of the work of this Department ranks as excellent. The various forms for reports, etc., required in connection with the work of the Institution are printed here; also the neat semi-monthly paper.

Shoe-Shop. Four pupils work all day in this room, and ten for three hours under the instruction of a practical man.

Carpenter Shop. Six pupils work in this shop for three hours a day making furniture and doing repairs of a useful nature.

Barber-Shop. Six pupils devote attention to this shop.

Bakery and Meat Cooking. Three boys are engaged all day under a regular baker and meat cook.

Sewing Room. This important department is under the direction of Miss Dempsey. Eight pupils are engaged at work here all day and in the afternoon about thirty-five girls are taught general sewing. There is also a class in fancy work, taught by Miss Bull. Twenty-five girls spend two afternoons each week at this work.

Manual Training. This work is conducted by Mr. Forrester, who was specially trained in Sweden and Scotland. Twelve pupils take this course for six hours a week, and the work done will compare favorably with that of other Manual Training Departments in connection with other schools.

Domestic Science. There are three classes of nine girls each, and two classes of boys who take up sewing. In addition to the regular work of this class, the larger girls learn ironing in the Laundry, and are taught practically, domestic work in the Institution. In the Domestic Science Class the pupils are taught to cook vegetables, make various kinds of soups, how to lay the table, the care of linen etc.

Government and General Management.

Permit me to say that I approve the placing of this Institution under the Department of Education. It has been for years inspected and examined annually by Public School Inspectors, and the subjects taught are those of the Public School, plus the special language of the Deaf and Dumb. It is, therefore, a part of the School System of the Province and is properly governed through the Department of Education.

The various teachers and officials were civil, courteous and kind to me, and assisted me in every possible way with my work of inspection and examination.

No special mention is required, but I could not conclude this Report without particular mention of the efficient and kind Superintendent and Principal, Mr. R. Mathison, M.A. He was made for the office. He is at work night and day. This work is his life's work and he sacrifices much of his leisure and pleasure of life in order to add to the efficiency of the Institution. The pupils all regard him most affectionately and show him the greatest respect. He keeps in touch with every child here, and as long as possible after the child leaves, (See the published "Extracts from letters of Graduates and Ex-pupils").

He seems thoroughly to realize the importance and highly benevolent nature of his work—the reclaiming of these poor, unfortunate and in many respects, helpless children from their world of mental darkness where many of them would be lost, or become burdens on the Province, and possessing them with a language, denied them by nature, and thus enabling them to create and express their thoughts and become highly intelligent, and useful men and women, capable of earning honest livings for themselves and their dependents.

I send you herewith, a tabulated statement of all the pupils in the various classes and departments of the Institution showing the marks made during their examination.

I have the honor to be, Sir,
Your obedient servant,
(Sgd.) W. SPANKIE,
Public School Inspector.

Kingston, Ont., June 8, 1905.

Examiner's Report—1904.

T. F. Chamberlain, Esq., M.D.,
Inspector of Asylums, Toronto.

Dear Sir,—Acting upon your instructions, I went to Belleville and conducted the Literary Examination of the pupils in the Institute for the Deaf and Dumb, commencing work on the morning of June 2nd.

I began with the Articulation Class under the present charge of Miss Annie Mathison, in the absence of the regular teacher, Miss Caroline Gibson, through illness. The twenty-seven pupils at present enrolled in this class are divided into six sub-classes, No. 1 comprising first year pupils, while those in the remaining sub-classes range from two to eight years in attendance. The teacher gave them an examination in the work laid down for them in the Course of Study, consisting of drill in articulation; names of days, months, people; easy questions, numbers in hundreds; stories; and, in the senior classes, the cities and towns in Ontario; stories with questions about them; conversations between pupils and teacher; writing from dictation; oral reading. It is to be observed that the object aimed at is not, as in other classes, to convey knowledge, but to train the pupils in oral language expression, and as far as possible to lead them to talk. All new pupils arriving at the Institution are given a trial in the Articulation Classes, and if they show some facility, the instruction is continued, so that these classes are made up of pupils from all the other classes. Even when clear enunciation is not secured, the training is beneficial from physiological considerations. A teacher as a supply is always at more or less disadvantage, particularly with a class of this kind, but Miss Mathison is an experienced and skillful teacher of Articulation, possessing great tact, and a sympathy that secures the co-operation of the children, and teacher and children acquitted themselves most creditably. A number of these pupils read orally very nicely.

The other class in articulation is under the charge of Miss Florence Cross, and has an enrollment of twenty-eight pupils. These are also divided into six sub-classes. The Course of Study is much the same as in the other class, with the addition of commands, and the Lord's Prayer. The pupils showed facility in word building, using combinations of consonants or vowels as bases. I noticed both in this class and in Miss Mathison's a readiness, even an eagerness, to try to articulate, which was in marked contrast to the classes of eleven years ago when I visited before. At that time, the pupils seemed to dread trying to utter sounds, and the effort seemed to be painful to them. I notice also in both classes an absence of high shrill pitch of voice so common amongst deaf who talk—the tones are better modulated. This indicates not only kindness in treatment, but skill in the training. Miss Cross seems to be proficient in the knowledge of the subject she has to teach. It goes without saying that the examination in the Articulation Classes has necessarily to be done by the teachers themselves so as to show the methods, devices and results. The work of all the teachers in the Institution is arduous enough, but it is particularly so in these classes, and the nervous strain is great.

It may be premised in reference to the other classes, that the Primary —in fact almost the sole object, with the juniors, is not to give *instruction*, but to construct, practically to create, a medium of communication between the children and the outer world—to unlock the prison doors of their silent environment, and to furnish them with language, sign language, both natu-

ral and arbitrary, or where possible, spoken. The first steps are exceedingly slow and difficult, and the process differs from ordinary teaching in the following respect—the steps are isolated, very slightly related, and the knowledge acquired is not for a considerable time any help to gain further knowledge. It is only in the senior classes that the amount of language gained begins to be available for self help, self advancement. Therefore, the examination of these children must be strictly along the line they have been taught, and must not go beyond the vocabulary of the class. For these reasons, at the close of the session, each class is subjected to a rigorous examination by the teacher in charge, and the Course of Study, the examination papers, and the answer papers, together with an individual report upon each pupil, are submitted to the Superintendent, and by him laid before the Departmental Examiner, who then gives each class an examination upon the various subjects of the course. A comparison of these last results with the submitted papers enables me to say with confidence that the marking given by the respective teachers has been very close, that they have been careful to be "just before being generous," and that in no case was the standing awarded, as shown by the accompanying Institution Report, too high.

Mr. Madden's Class. Here are twelve pupils whose ages run from seven to ten years: this is the first year in the Institution and of course in the class for five of them; five others have been two years, and three others for three years in the class. Some of the pupils have made a very high standing, and two of the new ones a very low one. The standing, for a junior class, is good, being 63½ per cent. In addition to the subjects of a course, tests were given in writing numbers, in which the pupils showed considerable facility. Mr. Madden is a graduate of the Institution, and being himself a deaf mute, is all the better able to understand and overcome the disabilities under which his pupils labor.

Mr. Ingram's Class. The children in this class are of cheerful disposition, ready for work, and anxious to do their best. This is the first year in the Institution for five of the class, the most of the rest having been here and in the class for two years. Mr. Ingram is a thorough teacher, and has made a good year's record. Two of the first year pupils have made a superior standing, and with one exception, all have done well. The class average, and I think the marking moderate, is 73 per cent.

Miss James' Class. Here are the youngest and brightest "little tots" in the Institution. Of the thirteen in this class, five are only seven years of age; eleven of them have been in the class but one year, and seven but one year in the Institution. This class has suffered more severely from sickness than any other. Miss James is an excellent teacher of the deaf, and she has done exceedingly well under most discouraging circumstances. Some of the pupils stand very high; three are very low, but considering the unfavorable conditions, the average 60 per cent. is an excellent showing.

Mrs. Balis' Class. Twelve out of the seventeen in this class are girls. The individual standing of this class is very uniform, none high, and but one low, and the class average, 70 per cent., is excellent. No pupil has been in the class more than a year, and the average time in the Institution is but a little over two years. Good work has been done here. Mrs. Balis is a conscientious, hard working, successful teacher, always ready to help in everything of interest or to the advantage of anything connected with the Institution.

Mrs. Terrills' Class. This is a special class. Some are weak mentally; two are twenty-three years old; two are twenty-four; one is twenty-seven.

and all these were up in years before entering the Institution. Owing to these circumstances, the teaching has to be individual. It is probably the most trying class of all, requiring very great patience, persistence, tact, kindness and endurance. The standing obtained under these conditions, 70 per cent., is excellent indeed. These pupils do not take "signing" but "spelling" only.

Mr. Forrester's Class. Two features are distinctive here—fine blackboard work, and progressive descriptive language exercises based upon progressive picture stories, thus developing observation and language. The pupils have been in this class but one year. Nearly all the pupils in the class were absolutely correct in the working of the examples given in arithmetic. The individual standing is very uniform, the lowest being 53 per cent. the highest 77 per cent. and the class standing, closely marked, 70 per cent. Mr. Forrester is a capital draughtsman, and this greatly assists him in his work.

Miss Bull's Class. Here is less uniformity in individual standing, the lowest being 49 per cent. and the highest 95 per cent. The class standing, 73 per cent., is good. Here we begin to see a wider vocabulary, admitting of more varied classes of work, and training in use of plurals, and past and progressive forms of verbs is begun. Three pupils in this room show decided taste in drawing. It is a pity that means could not be devised to give them special training in this line with a view to their future means of livelihood. Several of the pupils of this class were absent from lessons for considerable periods during the session owing to sickness, otherwise, no doubt, a still better standing would have been secured.

Miss Linn's Class. These pupils have been in this class a year only. Both teacher and children are systematic and quick in work and movements. Miss Linn can write down figures, and good ones, on the blackboard, faster than any other teacher I ever saw. Most of her class can add up a column of figures more rapidly than most pupils in the fourth form of the public schools, and they are speedy and accurate in subtraction and multiplication. The literature of easy reading lessons is taken up here. The slate work is generally fine. There is some diversity in the individual standing of the pupils, but the class average is good—71 per cent.

Mr. Stewart's Class. This class, E. and class F., are about the same grade. The pupils are rather below average in ability. There has been more lost time during the session from sickness, in this class than in any other except Class L. One of the pupils was absent seventy days. All these pupils are first year pupils of the class. Notwithstanding the drawbacks, the class average, 70 per cent., shows the good result of a year's faithful intelligent training. In Mr. Stewart's detailed written report upon each member of the class, he sizes up accurately and succinctly their character and attainments, and shows that he has a clear idea of methods and aims.

Mr. Campbell's Class. (F). As has already been remarked, this and the preceding class may be considered sub-divisions of one grade pupils are promoted from both rooms to Class D., those that fail to make promotion from Class E. being transferred to Class F., so that although none of the pupils have been in this room more than a year, some of them have been two years in this grade. At first sight, this might seem an advantage to Class F., but then it must be remembered that the pupils who failed to be promoted were likely not the brightest ones, consequently it is probable that at the beginning of the year, there was little difference as to the capabilities of the two classes, and the class averages of the two do not

differ materially at the close of the year. Excellent work has been done here. Mr. Campbell is a strong teacher, and is apt in methods, and thorough in his training. The work of the pupils is particularly neat and accurate. The individual standing is uniform, and the class average is 72 per cent.

Miss Templeton's Class. Here are an enthusiastic, hard working teacher and a bright, well-trained class. Nearly every pupil does neat work and good work. Many of them have high marks and they deserve them, and the class average is 79 per cent., a high standing, but not higher I think than has been earned. The pupils have been in this class but a year, but have been in the Institution long enough to acquire a fair vocabulary, and so to admit of a wider range of study. A noticeable feature here is the cultivation of language, orally and then in writing, by a discussion of current local happenings under the heading of "News." Another feature is teaching the time of day by means of a clock face. It is a good class, and Miss Templeton has the trained skill and ability to make the most of it.

Mr. Balis' class. This has not been an easy class to make a record with. More than half the class is composed of pupils who have been transferred to this room from the Second Grade below, in order to maintain the balance of numbers and they were therefore ill-prepared to take up the work. Some of them are poor workers, and hard to manage, and thus Mr. Balis' task is a hard one. Part of the class is weak in arithmetic, but it is to be considered that the Course of Study is two Grades higher than in the room they left. The style and method of work are very fine, and they show that the teacher has paid great attention along these lines. In other subjects the pupils stand well. The class average, 69 per cent., is better than could have been expected.

Mr. Denys' Class. We now have reached a room in which the broader acquisition of language permits a wider range of subjects, and one where a longer time is required for examination. The Course of Study includes the Geography of the Dominion, Canadian History, easy lessons in Natural History; Mental and Slate Arithmetic, including practical questions in the four rules; ellipetical sentences; temperance, and general conversation in writing and by "spelling"; and letter writing. The features noticeable in this class are neatness of writing, and accuracy in answering. Very nearly 80 per cent. of all the answers in my examination of this class were absolutely correct, and among the tests was one requiring them to assign events to thirty-one different dates in Canadian History. The boys here are manly, and they pay uncommonly close attention to personal neatness and tidiness, the best, I think, in the Institution. The girls are lady-like, polite and intelligent. The class average is, as might be expected, very high, 82 per cent. This is the first year for all of them in this class. Mr. Denys has been so long in the Institution that no more need be said than that his whole soul is in his work, and the spirit that animates him may be gathered from the quotation that prefaces his Report to the Superintendent:—

"Serve thy generation,
Even though swiftly may fade thy name,
He who loves his kind
Performs a work too great for fame."

Professor Coleman's Class. This is the highest class in the Institution, and of course the graduating one. The pupils have the best command of language, the greatest range of subjects, and are given the most severe tests in their examination. In addition to the subjects of the preceding Grades, may be mentioned:—direct and indirect narration; difficult changes of con-

struction; formal composition; and bills and accounts. The answers to two of the questions that I gave necessitated the writing of a large number of geographical names. The pupils gave full answers to these, and difficult though they were, a misspelled word very rarely occurred. All the work was neatly done, and better writing than some of these pupils presented, I never saw in any school. Three members of this class obtained 100 per cent. at the final examination and from my tests, I feel assured that they were justly entitled to that standing. If the work of two exceptional cases be omitted, the class average would be 82 per cent., a very high standing indeed. The boys in this class are also manly and tasty in dress, being second only to those of Mr. Denys' class, and the girls are all that could be desired as to deportment and attention. Professor Coleman is most painstanking, careful and efficient, his great aim being to train the pupils to *think*, and that he has been successful in this, the results and the originality and correctness of the answers fully demonstrate. Perhaps no teacher in the Institution is more happy in the success of his pupils than is Professor Coleman.

In all the classes the greatest attention is paid to neatness and correct spelling, to accuracy in number work, and to good writing. Sickness was very prevalent during the session and seriously interfered with the progress of some classes.

The Industrial Departments.

Domestic Science Room. This is under the management of Miss Hattie H. Gowsell, a graduate of the Hamilton Normal College of Domestic Science. Here thirty girls are trained not only how to cook, but how to manage all the details of kitchen and dining-room. Plain and fancy cookery, pickling, canning, preserving, management of ranges and kitchen utensils; care of table ware and linen; care of groceries; how to make tea, coffee, and cocoa; how to save remnants, etc., engage the attention. They are taught to be exact and methodical; to maintain scrupulous neatness; the proper arrangement of the table; how to serve. The training here given these "daughters of silence" in household duties is second in importance to no other instruction given in the Institution. A visit to this department would be a revelation to many house-keepers. The advantage in the way of health and comfort in the future homes of these girls cannot be estimated. Miss Gowsell is not only mistress of this branch of science, but she knows how to teach it to her pupils, and at the same time to inculcate habits of observation, comparison, accuracy, neatness and economy, for nothing is allowed to go to waste. Miss Gowsell has also a class of sixteen boys whom she trains in sewing, patching, etc. These are small boys, and their dexterity, in hemming, back stitching, button-hole making and patching is surprising. The patching is turned to practical account in connection with pupils' clothing. The samples of their work showed that great attention is given to accuracy of fitting and matching of stripes and colors. Besides the immediate practical usefulness, care is taken to ascertain what pupils show enough natural skill to warrant their being taught tailoring.

Manual Training. This department is under the charge of Mr. T. C. Forrester, and as yet it comprises only working in wood. It is surprising the number of articles that the boys in this class manufacture. Industrial design forms part of the course of instruction and working plans, drawn to scale, are insisted upon before any article is begun. Accurate joining and perfection of finish are exacted. Nothing but the very best workman-

ship will be accepted by the teacher, and the pupil must try and try again until the character of the work meets these requirements. There are twelve boys in this class, and there are benches fully equipped for each. The care and management of tools are well taught. Some very delicate and skillful work may be seen here.

I venture to suggest that the whole time of a teacher might be devoted to this important feature of the training given in the Institution, and that a turning lathe, and scroll, might with advantage be added to the equipment, even if operated only by foot power. It would give a wider range of work, and more chance for the development by the boys of inventiveness and dexterity in ornamental art.

The Shoe-shop. Here the boys are taught to patch and to make boots and shoes, and instructed in the qualities and prices of materials. Good material, good workmanship, honest work is the rule. The needs of the pupils in the Institution call for considerable of the work of this class. Each boy after having completed his training, is furnished with an outfit and upon leaving the Institution, is in a position to earn a livelihood. Mr. Morrice is in charge of this department.

The Barber-shop, is in connection with the shoe-shop, for reason that the deaf can very conveniently and profitably carry on both these lines of business in combination.

The Printing Office. The *Mute,* the official organ of the Institution is printed here, and such jobbing as is required in connection with the school is done. The office is very far from being a sample of the ordinary printing office, for everything from machinery to floor, is scrupulously clean and in order, and one would suppose that one or two printers' "imps" would be required to keep things in such neatness. Mr. Burns, who is in charge is training ten boys in "the art preservative". It can easily be understood that practice here aids in the literary training of these boys.

The Bakery. The various forms of the "staff of life" required in the Institution are made here, under the charge of Mr. Cunningham, and advantage is taken of the extensive equipment to teach some of the boys the baking business. It is needless to say that as in every department of the Institution, the boys, while being taught to turn out an excellent quality of bread, buns, etc., are incidentally taught to be orderly, neat, systematic, and exact.

Dress-making and Millinery. Miss M. Dempsey, who is Girls' Supervisor, has charge of this department, one of the busiest and liveliest of all. Measuring, cutting, fitting, and making of apparel for girls, and to some extent for boys, are some of the operations carried out in this room. Nine girls work all day here, and sixty-one spend two hours each day, and most of them show great taste and skill in their work. Miss Dempsey's duties are varied and extensive, and make heavy demands upon her time and patience, but she is competent, cheerful, genial, a general favorite, and her room is a favorite calling place for other girls than the operatives.

Fancy Work Department. This is under the charge of Miss Mary Bull, and the number and variety of the articles made are astonishing and give one a high idea of the taste and inventiveness of the girls of the class, and of the ability and skill of the teacher.

In conclusion, I may say that some one must spend some time in the Institution in order to appreciate the uncommon administrative ability, tact, discretion, and wise discipline, exercised by the Superintendent. In such a large establishment, with such a diversity of interests, with such a large staff, with so many pupils peculiar in their dispositions, and mental

tainments, only special ability, and long experience could maintain efficient and harmonious working by all the different elements. Thoroughness, accuracy, and neatness are ruling principles throughout the Institution.

The necessity for increased accommodation is very evident. Some rooms are too small, and more rooms are needed. There is little doubt that there are many deaf mutes in the country that would be sought out and given the benefit of instruction, were there more room for them.

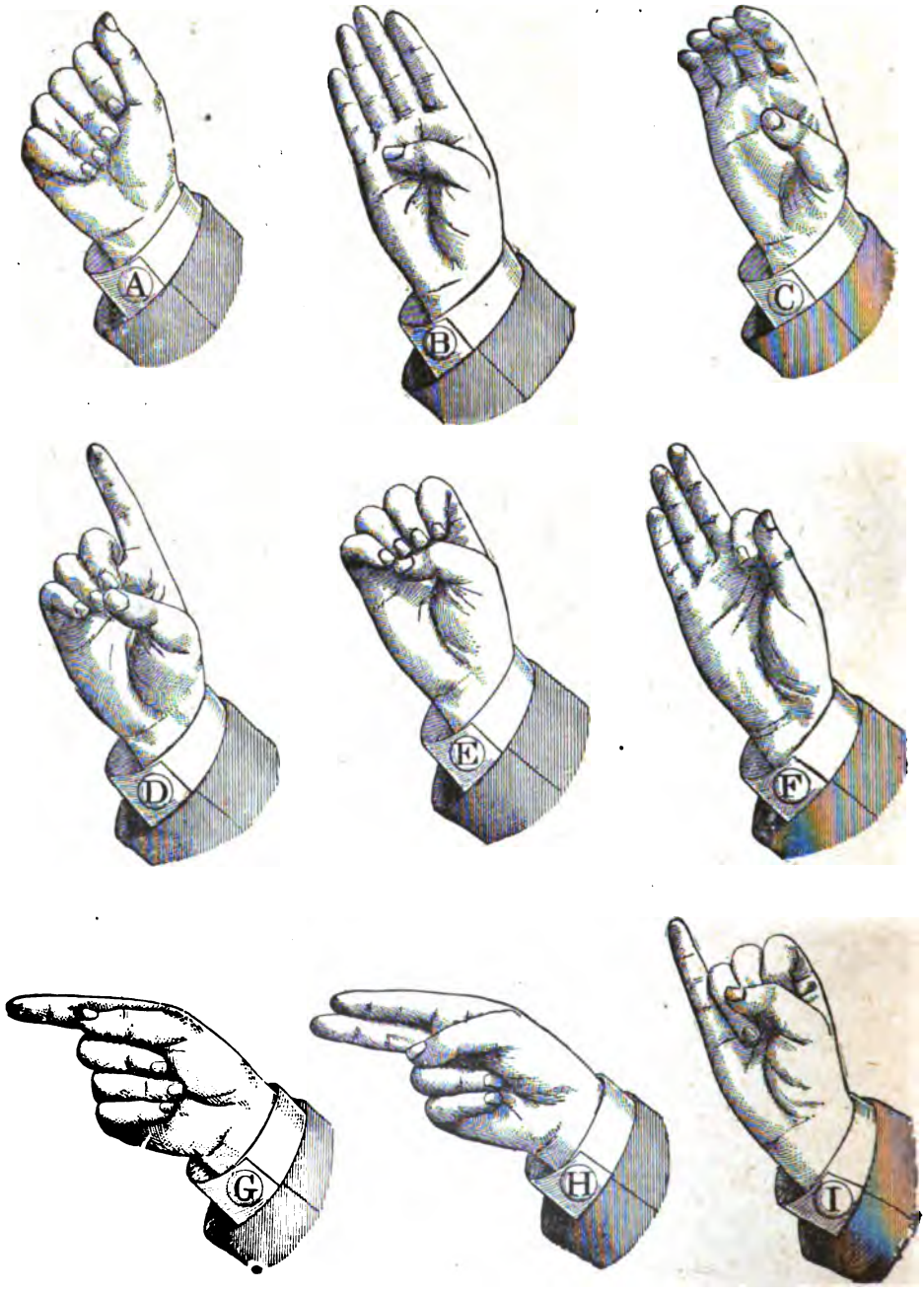
I have to thank Superintendent Mathison especially, and every officer and every member of the staff for assistance in making an examination thorough and impartial, and for personal kindness that made my stay with them most pleasant. "Although not within the scope of my instructions, I may be allowed to refer to the admirable way in which the Matron, Miss Ross, discharges the duties of her responsible position, and to express my appreciation of the care and attention given to my personal comfort while at the Institution". I must also thank Mr. Keith, the efficient Supervisor of Boys, for courtesies and information in connection with the Industrial Departments.

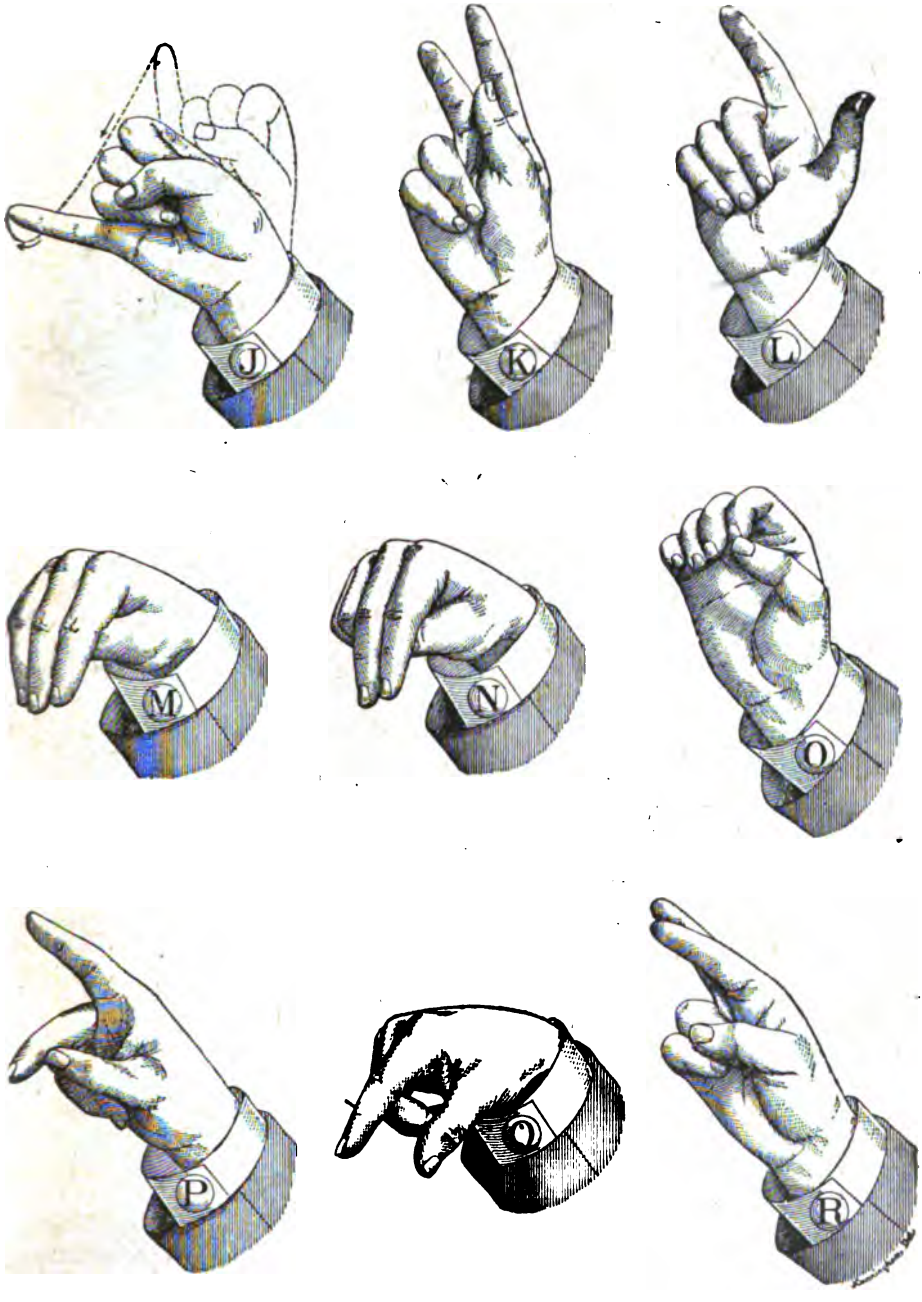
I have the honor to be,
Your obedient servant,

(Sgd.) ARTHUR BROWN,
Inspector of Public Schools.

risburgh, June 13, '04.

THE SINGLE HAND ALPHABET.

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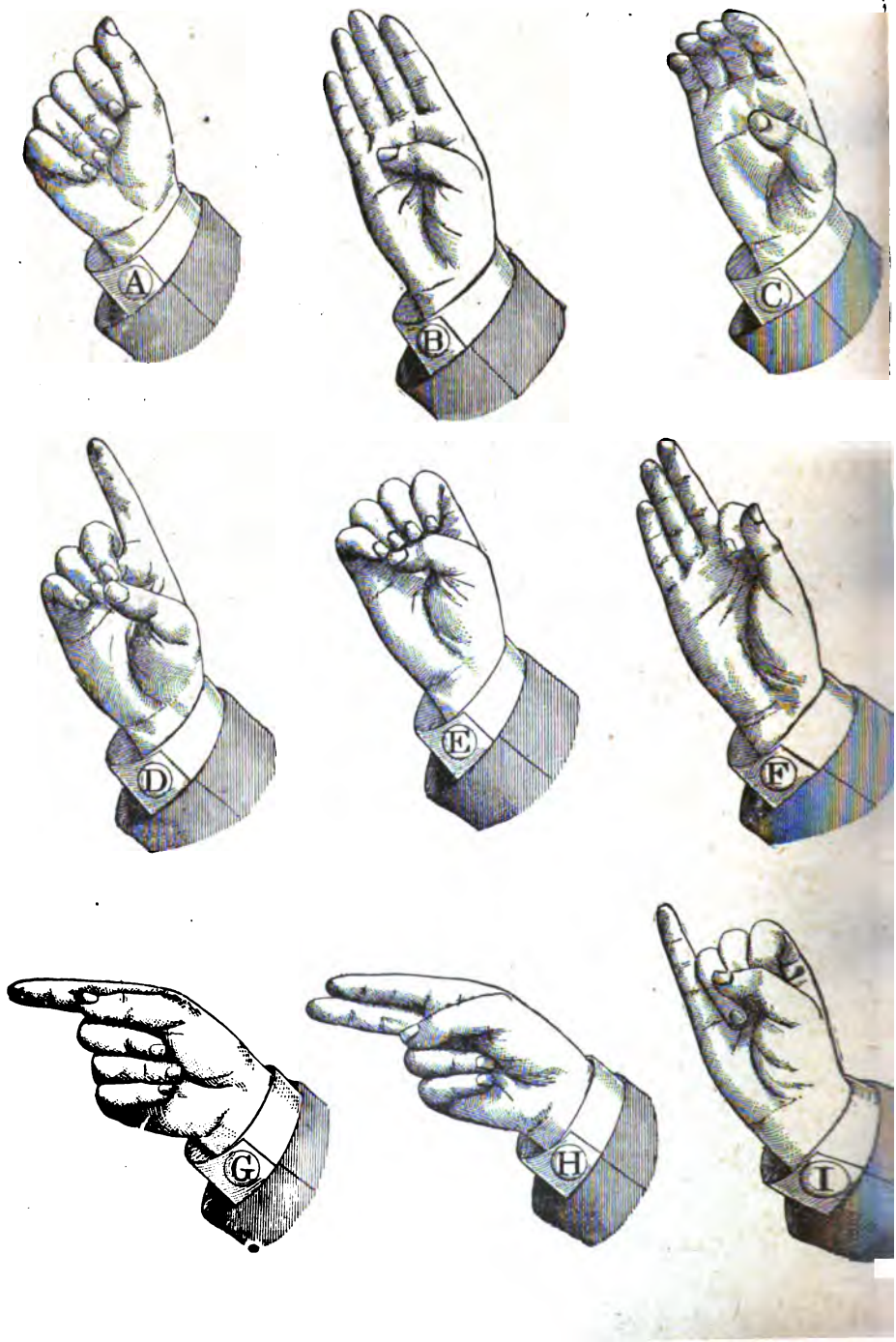

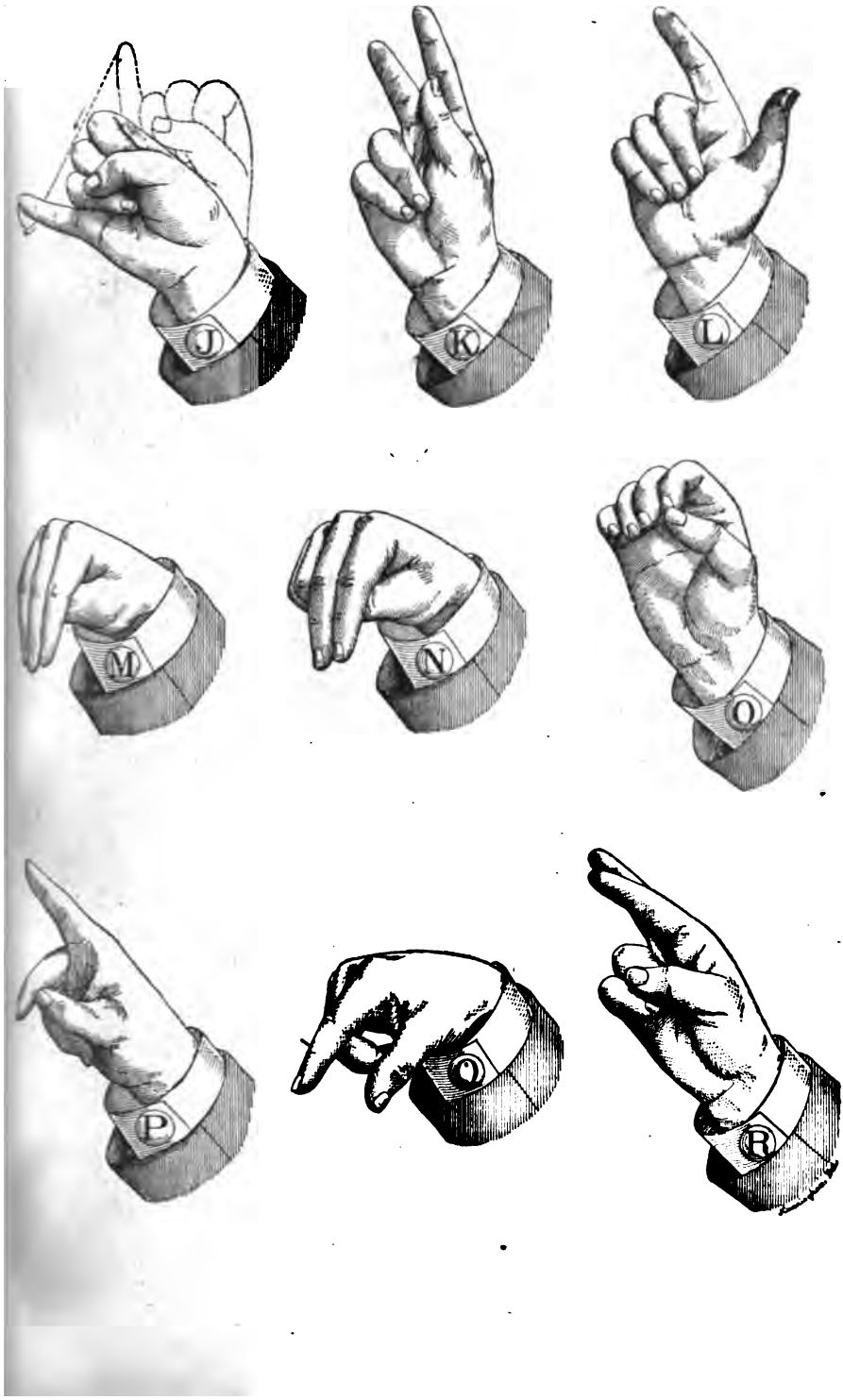
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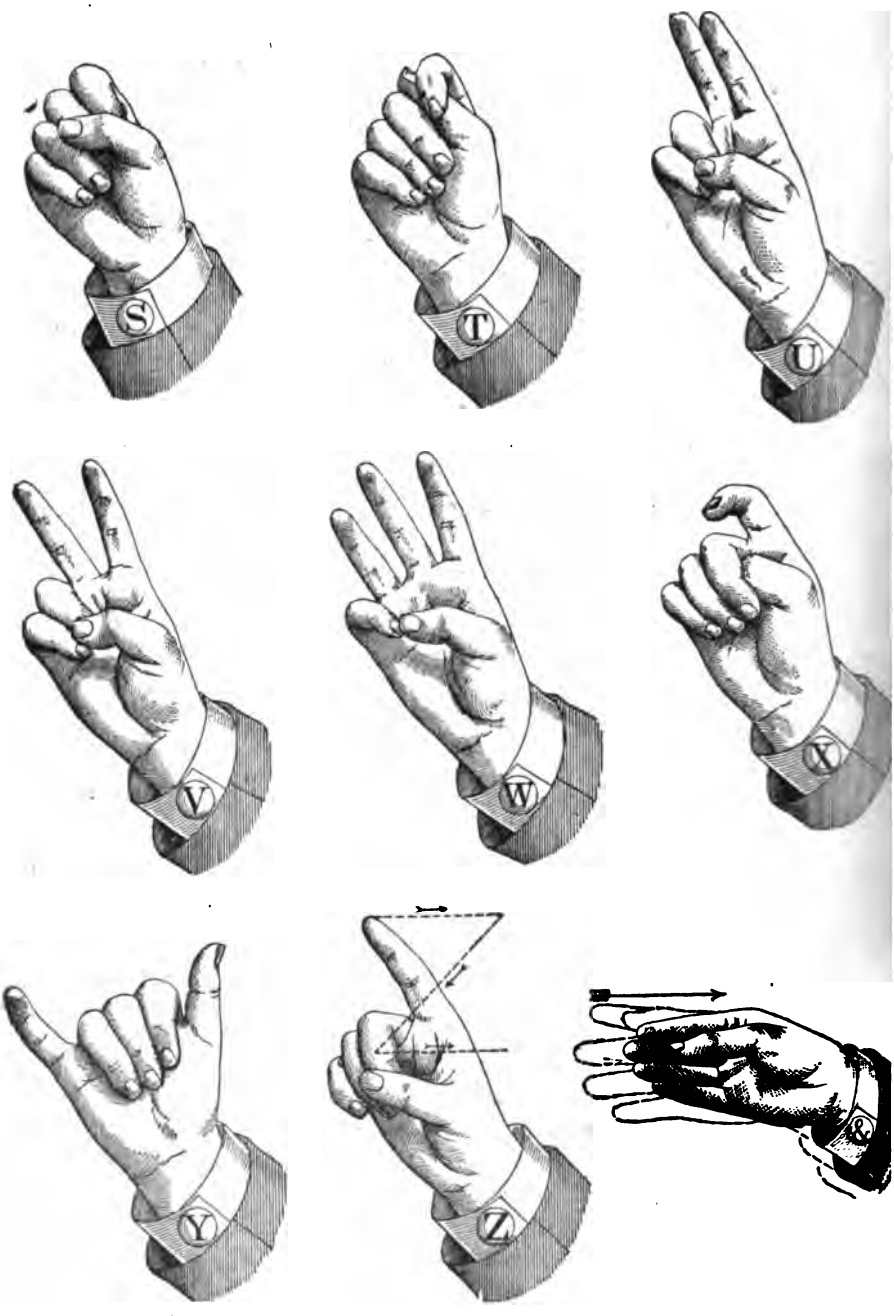
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STATISTICAL TABLES.

Total Number of Pupils in Attendance from October 1st, 1904, to September 30th, 1905.

Males	130
Females	138
Total	268

Counties from which the Pupils in Residence from October 1st, 1904, to September 30th, 1905, came:

Counties.	Male.	Female.	Total.	Counties.	Male.	Female.	Total.
Algoma	1	4	5	Northumberland	1	1	2
Brant	4	2	6	Norfolk	2	2	4
Bruce	4	7	11	Nipissing District	1	.....	1
Carleton	12	4	16	Ontario	1	.....	1
Durham	2	1	3	Oxford	1	4	5
Dufferin	.....	2	2	Peel	1	2	3
Elgin	2	2	4	Parry Sound District	.....	1	1
Essex	7	5	12	Perth	2	.....	2
Frontenac	2	1	3	Peterboro	3	5	8
Grey	5	4	9	Prescott and Russell	5	3	8
Glengarry	1	2	3	Renfrew	7	3	10
Hastings	5	6	11	Simcoe	4	5	9
Haliburton	2	3	5	Stormont and Dundas	4	2	6
Huron	3	6	9	Thunder Bay District	.....	1	1
Halton	.....	2	2	Victoria	3	4	7
Haldimand	2	1	3	Waterloo	4	2	6
Kent	2	6	8	Welland	1	.....	1
Lambton	2	1	3	Wellington	1	2	3
Lincoln	1	4	5	Wentworth	4	5	9
Lanark	1	2	3	York	17	22	39
Lennox and Addington	4	1	5				
Muskoka District	3	3	6	Total	130	138	.....
Middlesex	2	5	7				
Grenville	1	.....	1	Grand Total	.....	.....	268

Age of Pupils.

Age.	No.	Age.	No.
6	1	18	13
7	9	19	14
8	18	20	8
9	20	21	11
10	13	22	6
11	13	23	3
12	13	24	3
13	29	25	3
14	26	26	3
15	16	29	1
16	18		
17	27	Total	268

NUMBER OF PUPILS IN ATTENDANCE EACH OFFICIAL YEAR SINCE THE OPENING OF THE INSTITUTION.

	Male.	Female.	Total.
From October 27th, 1870, to September 30th, 1871	64	36	100
" " 1st, 1871, " 1872	97	52	149
" " 1872, " 1873	130	63	193
" " 1873, " 1874	145	76	221
" " 1874, " 1875	155	83	238
" " 1875, " 1876	160	96	256
" " 1876, " 1877	167	104	271
" " 1877, " 1878	166	111	277
" " 1878, " 1879	164	105	269
" " 1879, " 1880	162	119	281
" " 1880, " 1881	164	132	296
" " 1881, " 1882	165	138	303
" " 1882, " 1883	158	135	293
" " 1883, " 1884	156	130	286
" " 1884, " 1885	168	116	284
" " 1885, " 1886	161	112	273
" " 1886, " 1887	151	113	264
" " 1887, " 1888	156	109	265
" " 1888, " 1889	153	121	274
" " 1889, " 1890	159	132	291
" " 1890, " 1891	166	130	296
" " 1891, " 1892	158	127	285
" " 1892, " 1893	162	136	298
" " 1893, " 1894	158	137	295
" " 1894, " 1895	160	135	295
" " 1895, " 1896	173	137	310
" " 1896, " 1897	164	128	292
" " 1897, " 1898	167	138	305
" " 1898, " 1899	161	132	293
" " 1899, " 1900	152	130	282
" " 1900, " 1901	157	143	300
" " 1901, " 1902	147	141	288
" " 1902, " 1903	140	143	283
" " 1903, " 1904	137	134	271
" " 1904, " 1905	130	138	268

TOTAL NUMBER OF PUPILS SINCE THE OPENING OF THE INSTITUTION, OCTOBER 27TH, 1870, TO SEPTEMBER 30TH, 1905.

Number of boys admitted	761
Number of girls admitted	591
	1,352

COUNTIES FROM WHICH PUPILS WERE ORIGINALLY RECEIVED FROM OCTOBER 20TH, 1870, TO SEPTEMBER 30TH, 1905.

Counties.	Male.	Female.	Total.	Counties.	Male.	Female.	Total.
Algoma	5	6	11	Northumberland	13	12	25
Brant	22	10	32	Warwick, P.Q.	.....	1	1
Bruce	22	18	40	Monk, P.Q	.....	1	1
Carleton	42	22	64	Ontario	22	14	36
Durham	17	9	26	Oxford	17	16	33
Dufferin	3	3	6	Peel	7	8	15
Elgin	14	12	26	Parry Sound District	4	2	6
Essex	18	22	40	Perth	30	14	44
Frontenac	12	6	18	Peterboro	13	9	22
Grey	27	24	51	Prescott and Russell	22	10	32
Glengarry	7	2	9	Prince Edward	6	1	7
Hastings	34	29	63	Renfrew	17	17	34
Haliburton	5	2	7	Simcoe	29	24	53
Huron	32	30	62	Stormont, Dundas	18	10	28
Halton	5	11	16	Thunder Bay District	.....	1	1
Haldimand	7	4	11	Victoria	12	11	23
Kent	26	23	49	Waterloo	18	19	37
Lambton	21	18	39	Welland	6	4	10
Lanark	12	9	21	Wellington	20	16	36
Leeds and Grenville	22	6	28	Wentworth	26	17	43
Lincoln	3	9	12	York	57	56	113
Lennox and Addington	12	12	24	Westmoreland, N.B.	.....	1	1
Muskoka	9	7	16	Restigouche, P.Q.	1	.....	1
Middlesex	30	20	50				
Norfolk	13	11	24		761	591	1,352
Nipissing District	3	2	5				

CAUSE OF DEAFNESS.

Abscess	6	Gathering of the ears	10
Accident	12	Gathering of the head	9
Adenoids	1	Inflammation of the brain	15
Affection of the ears	21	Inflammation of the ears	6
Bronchitis	6	Inflammation of the lungs	5
Bealing	2	Inflammation of the pulmonary organ	2
Burns	2	Inflammation of the spinal organ	3
Catarrh	9	LaGrippe	9
Canker	1	Measles	47
Cerebro-spinal meningitis	26	Mumps	7
Cholera	1	Paralytic stroke	1
Chicken pox	1	Ricketts	1
Cold	51	Sunstroke	1
Congenital	533	Scabs	1
Congestion of the brain	48	Scrofula	1
Diphtheria	9	Scald head	4
Dysentery	2	Sore throat	4
Drank carbolic acid	1	Shocks	5
Eczema	2	Sickness, undefined	36
Falls	27	Spinal disease	3
Fever, Rheumatic	1	Swelling of the neck	2
Fever, Bilious	5	Teething	18
Fever, Brain	33	Vaccination	7
Fever, Intermittent	2	Water on the brain	17
Fever, Scarlet	88	Whooping cough	9
Fever, Spinal	23	Worms	145
Fever, Malarial	2	Cases undefined and unknown	9
Fever, Typhus	6		
Fever, Typhoid	11	Total	1,352
Fever, undefined	27		
Fits	16		

DATE OF DEAFNESS AFTER BIRTH.

Under one year	181	Between ten and eleven years	6
Between one and two years	162	Between eleven and twelve years	2
Between two and three years	140	Between twelve and thirteen years	3
Between three and four years	72	Between thirteen and fourteen years	4
Between four and five years	45	Between fourteen and fifteen years	2
Between five and six years	31	Unknown at what age they lost their hearing, but not born deaf	140
Between six and seven years	16	Congenital	519
Between seven and eight years	16		
Betwen eight and nine years	3		
Between nine and ten years	10	Total	1,352

RELATIONSHIP OF PARENTS.

First cousins	66	Not related	1,174
Second cousins	31	Unknown	30
Third cousins	24		
Distantly related	27	Total	1,352

NUMBER OF DEAF MUTE FAMILIES REPRESENTED.

3 families containing 5	15	1,032 families containing 1	1,032
3 families containing 4	12		
31 families containing 3	93	Total	1,352
100 families containing 2	200		

Minister of the Government in Charge:

HON. DR. R. A. PYNE.

Officers of the Institution:

R. MATHISON, M. A. ..... *Superintendent and Principal.*
WM. COCHRANE ..... *Bursar.*
P. D. GOLDSMITH, M. D. ..... *Physician.*
MISS M. ROSS ..... *Matron.*

Teachers:

D. R. COLEMAN, M.A. (Head Teacher).
P. DENYS.
JAMES C. BALIS.
W. J. CAMPBELL.
GEORGE F. STEWART.
T. C. FORRESTER.
H. L. INGRAM.
MRS. J. G. TERRILL.
MISS S. TEMPLETON.
MISS MARY BULL.
MRS. SYLVIA L. BALIS.
MISS GEORGINA LINN.
MISS ADA JAMES.

Teachers of Articulation:

MISS AGNES A. GIBSON.
MISS FLORENCE CROSS.

Teacher of Fancy Work:

MISS MARY BULL.

Teacher of Manual Training:

T. C. FORRESTER.

Teacher of Domestic Science:

MISS HATTIE H. GOSWELL.

MISS A. G. CHISHOLM ..... *Stenographer and Clerk.*
WM. NURSE ..... *Storekeeper and Associate Supervisor.*
W. S. MINNS ..... *Supervisor of Boys, etc.*
MISS M. DEMPSEY ..... *Seamstress, Supervisor of Girls, etc.*
MISS FLORENCE E. BATES ..... *Trained Nurse.*
JOHN T. BURNS ..... *Instructor of Printing.*
ALEX. MORRICE ..... *Master Shoemaker.*
CHAS. J. PEPPIN ..... *Engineer.*
JOHN DOWRIE ..... *Master Carpenter.*
D. CUNNINGHAM ..... *Master Baker.*

Farmer and Gardener:

JAMES FORGE.

LIST OF PUPILS IN THE ONTARIO INSTITUTION OF THE DEAF AND DUMB FOR THE YEAR ENDING SEPTEMBER 30TH, 1905, WITH THE POST OFFICE ADDRESSES.

Counties.	P. O. Address.
Algoma:	
Barker, Sara Isabel.	Sault Ste. Marie.
Beatty, Rachel	Bruce Mines.
Dalgleish, Elizabeth.	Sault Ste. Marie.
Orr, Helen Mary	Gore Bay.
Zinke, Charles	Steelton.
Brant:	
Hustwayte, John F.	Paris.
Johnston, Anetta	Brantford.
Mitchell, George L.	Brantford.
Lloyd, Ruth Gladys.	Brantford.
Pierce, Percy Earl	Paris.
Smith, William R.	Tuscarora.
Bruce:	
Gerolamy, Edna M.	Tara.
Green, Mary Annie	Chesley.
Green, James	Chesley.
Komph, Spray	Kincardine.
Lobsinger, Alex.	Mildmay.
Lorentz, Mary	Mildmay.
Murray, Joseph	Langside.
Schwalm, Mary	Mildmay.
Weiler, Diana	Mildmay.
Yager, Jeanette	Chesley.
Yager, Norman	Chesley.
Carleton:	
Chaine, Joseph	Hintonburg.
Cummings, Bert	City View.
Evoy, James Elign	Carp.
Gauvreau, Telesphore.	Ottawa.
Green, Minnie May.	Diamond.
Green, Thomas John.	Diamond.
Gauthier, Alfred	Hintonburg.
Groulx, Achil.	Clarkston.
Groulx, Welde	Clarkston.
Huband, Gerald B.	Ottawa.
Henault, Charles	Ottawa.
Brigham, Thomas L.	Ottawa.
Larocque, Rosanna.	Ottawa.
Parrent, Sophie	Ottawa.
Shaw, Robert Eric.	Ottawa.
White, Mary I.	Ottawa.
Durham:	
Brooks, Effie M.	Solina.
McMillan, Joseph I.	Newcastle.
Sheckleton, Alfred	Burton.
Dufferin:	
Aldcorn, Barbara	Corbetton.
Granger, Martha	Honeywood.
Elgin:	
Buller, Henry	Ridgetown.
Carpenter, Lena M.	Rodney.
Paul, Edward, G.	St. Thomas.
Shepley, May	Clachan.
Essex:	
Bain, Olive	Windsor.
Bertiaume, Marilda.	Tecumseh.
Berthiaume, Lionel.	Tecumseh.
Berthiaume, Dorina.	Tecumseh.
Bain, Josephine	Windsor.
Langlois, Louis	Windsor.
Essex:—Con.	
Meloche, Edmund	Amherstburg.
Penprase, Ruth	Elmstead.
Penprase, Alfred	Elmstead.
Petrimoulx, George.	River Canard.
Walker, Achille	St. Joachim.
Frontenac:	
Barnett, Winnifred.	Sydenham.
Barnett, Gerald	Sydenham.
Watts, David Henry.	Kingston.
Grey:	
Brown, Mary Louisa.	Chesley.
Brown, Thomas H.	Markdale.
Dand, William T.	Lady Bank.
Fleming, Daniel	Craigleith.
Johnston, Bertha	Owen Sound.
Kindree, Earle	Owen Sound.
McGuire, Lily	Holstein.
Scott, William W.	Keldon.
Wilson, Janet B.	Harkaway.
Goetz, Gregory	Owen Sound.
Glengarry:	
Gordon, Daniel C.	Bridge End.
Gordon, Mary Jane.	Bridge End.
Gordon, Annie M. E.	Bridge End.
Hastings:	
Courneya, Mary A.	Bogart.
Farnham, Leona	Canifton.
Hough, Ethel Viola.	Holloway.
Herman, Nina Pearl.	Stirling.
Nelson, Ethel	Belleville.
Edward. Mary Ann	Boulter.
Smith, Percy	Deseronto.
Smith, Earle A.	Deseronto.
Young, Arthur	Madoc.
Young, Fred	Madoc.
Ward, Albert Edw.	Stirling.
Haliburton:	
Eastman, Alma May.	Kinmount.
Gray, Violet	South Lake.
Otto, Charles	Haliburton.
Rooney, Francis	Kinmount.
Whistle, Many Jane.	Minden.
Huron:	
Anderson, Harvey	Dungannon.
Cole, Amos B.	Clinton.
Cole, Mabel	Clinton.
Balkwell, Clara	Exeter.
Doubledee, Lena	Belmore.
Sours, Gladys	Clinton.
Thompson, Beatrice	Dungannon.
Thompson, Arthur.	Dungannon.
Young, Clara E.	Londesboro.
Halton:	
Hartley, Clara	Milton.
James, Mary T.	Campbellville.
Haldimand:	
Forrester, Harry	Dunnville.
Young, Rosetta	Dunnville.
Forrester, Asa	Dunnville.

LIST OF PUPILS IN THE ONTARIO INSTITUTION OF THE DEAF AND DUMB, ETC.—*Continued.*

Counties.	P. O. Address.
Kent:	
Chevalier, William	Tilbury.
Gibson, Winnifred	Dresden.
Gibson, Maggie	Dresden.
Neville, Mamie	Dresden.
Parker, Beatrice	Dresden.
Toll, Nova Rose	Ridgetown.
Thibeault, Mary	Fletcher.
Wilson, Herbert	Chatham.
Lambton:	
Breault, Gertie	Sarnia.
Jennings, Frank	Forest.
Moore, George H.	Forest.
Lanark:	
Blake, Frederick	Almonte.
McGregor, Ruby	Almonte.
Pollock, Bessie	Appleton.
Lincoln:	
Fretz, Cora	Grimsby.
Hoare, Ethel M.	St. Catharines.
Heaslip, Myrtle	Wellandport.
McCready, Aletha	Caister Centre.
Swick, Amos	Beamsville.
Lennox and Addington:	
Dopking, Carrie	Moscow.
Hartwick, James	Napanee.
Hartwick, Archibald	Napanee.
Meeks, Esley	Napanee.
McAdam, Wesley	Tamworth.
Muskoka District:	
Allen George	Uffington.
Croucher, John	Huntsville.
Dierks, Caroline	Kilworthy.
Ireland, Louis	Bracebridge.
Russell, Alice	Dorset.
Stowater, Belle	Byng Inlet.
Leeds and Grenville:	
Countryman, Harvey	Prescott.
Middlesex:	
Courscey, Jane Viola	Lucan.
Fishbein, Sophie	London.
Fishbein, Eddie	London.
Porter, Annie	Newbury.
Russell, Mary Bell	Ailsa Craig.
Ryan, Charles	Lucan.
Laugheed, Annie E.	London.
Norfolk:	
Boomer, Duncan	Windham Centre.
Cole, Rosa	Bookton.
Earl, Charles	Blayney.
Franklin, Sarah J.	Clear Creek.
Northumberland:	
Bellamy, George	Wicklow.
Chatten, Elizabeth	Brighton.
Nipissing District:	
Dorschner, Charles	Mattawa.
Ontario:	
Quigley, Walter	Oshawa.
Oxford:	
Brown, Florence	Woodstock.
Cone, Benjamen	Woodstock.
Oxford:—Con.	
Garner, Esther	Ingersoll.
McFarlane, Mona	Eastwood.
Pipher, Celia	Woodstock.
Peel:	
Duke, Ettie	Sleswick.
Curry, Duncan	Burnhamthorpe.
Zimmerman, Candace	Palgrave.
Perth:	
Harris, Carl	Mitchell.
Robertson, Stewart	Stratford.
Parry Sound District:	
Veitch, Elizabeth	Spence.
Prescott and Russell:	
Gelineau, Arthur	Pendleton.
Hughes, Myrtle	Treadwell.
Hughes, Iva	Treadwell.
McLaren, George D.	Spring Hill.
McLaren, John Chas.	Spring Hill.
Simpson, Alexander	Edwards.
McDougall, Elsie	Grant.
McDougall, Peter	Grant.
Peterboro:	
Charliebois, Walter	Peterboro'.
Kennaley, Winnifred	Peterboro'.
Lawson, Lila	Peterboro'.
Lawson, Violet	Peterboro'.
O'Brien, Gerald	Peterboro'.
Harper, Madeline	Peterboro'.
Harper, Marion	Peterboro'.
Tretheway, Roy	Gooderham.
Renfrew:	
Cuddy, Edward	Brudenell.
Derochie, Caroline	Arnprior.
Derochie, Clara	Arnprior.
Bruss, Henry	Pembroke.
Lacombe, Joseph	Arnprior.
Marquardt, Gustave	Hardwood Lake.
Reilley, Mary	Pembroke.
Rhemus, Herman	Strathtay.
Smith, Edward S.	Renfrew.
Tracey, John	Pembroke.
Simcoe:	
Boyle, Mary T.	Midland.
Graham, Victor	Collingwood.
Gannon, Ellen	Phelpston.
Hall, Ewart	Midland.
Nelson, Florence	Marchmount.
Paddison, Thomas	Elmsdale.
Tudhope, Laura	Orillia.
Carefoot, Seymour	Collingwood.
Hamilton, Alma	Everett.
Stormont, Dundas:	
King, Joseph	South Lancaster.
Lalonde, Emma Ida	Cornwall.
Legault, Mary	Cornwall.
Tackaberry, Ernest	Cornwall.
Loper, Cyril	Morrisburg.
Morton, Floyd	Newington.
Thunder Bay District:	
Burke, Elsie	Port Arthur

LIST OF PUPILS IN THE ONTARIO INSTITUTION OF THE DEAF AND DUMB, ETC.—*Concluded.*

Counties.	P. O. Address.
Victoria:	
Fountain, Herbert	Coboconk.
Fountain, Farley	Coboconk.
Jewell, Ena	Manilla.
Rutherford, Emma	Fenelon Falls.
Sipe, Thomas	Allsaw.
Whitworth, Florence	Lindsay.
Windrim, Rita	Dongola.
Waterloo:	
Cherry, Ida P.	Preston.
Hagen, William	Berlin.
Roth, Edwin	New Hamburg.
Walter, Jno. T.	Hawkesville.
Martin, Absalom	Waterloo.
Golds, Margaret	New Hamburg.
Wellington:	
Clark, Adeline	Guelph.
MacLachlan, Wm.	Mount Forest.
Kraemer, Johanna	Glen Allan.
Wentworth:	
Carter, Stella	Bartonville.
Depew, Georgie	Hamilton.
Gillam, Walter	Grimsby.
Gilliam, Wilbert	Grimsby.
Maas, Annie	Hamilton.
Salmon, Albert	Hamilton.
Taylor, Joseph	Dundas.
Etherington, Mabel	Hamilton.
Gummo, Gertie	Hamilton.
Welland:	
Tossell, Harold	Niagara Falls.
York:	
Barclay, Helen	Toronto.
Bowman, Ellsworth	Newmarket.
Brown, Frederick	Toronto.
Brown, Lily	Toronto.

Counties.	P. O. Address.
York:—Con.	
Buchan, Drucilla	Toronto.
Buchan, Alexander	Toronto.
Buchan, Jno. P. A.	Toronto.
Brown, Daisy	Toronto.
Best, Olive	Toronto.
Burley, William	Toronto.
Cunningham, Martha	Toronto.
Curtis, Lilian	Toronto.
Cratchley, Mabel	Toronto.
Chestnut, Arlie	Toronto.
Elliott, George	Toronto.
Ellis, Wesley Earle	Cobalt.
Ensminger, Maggie	Markham.
Fleet, Ellen	Toronto.
Hazlitt, Dorothy	Toronto.
Hazlitt, Evelyn	Toronto.
Hazlitt, William	Toronto.
Holbrook, Agnes	East Toronto.
Henderson, Clara	Toronto.
Johnson, William	Swansea.
Kelly, James	Toronto.
Kennedy, Muriel H.	Toronto.
Law, Theodore	Toronto.
Lawson, Frank	Toronto.
Mason, Myrtle	Toronto.
McCaul, Alexander	Toronto.
McCallum, Roy	Strange.
Noble, Edgar	Toronto.
Peacock, Ada	Toronto.
Pinder, Clarence	Davenport.
Shannon, Anne	Islington.
Stevens, Grace	Toronto.
Wilson, Arthur	Toronto.
Watson, Muriel	Toronto.
Marks, Jennie	Toronto.

Statement of Cost per Pupil, September 30, 1905.

Heading of Expenditure	Total Exp. year ending Sept. 30, 1904	Yearly Cost per pupil Sept. 30, 1904	Weekly Cost per pupil Sept. 30, 1904	Total Exp. year ending Sept. 30, 1905	Yearly Cost per pupil Sept. 30, 1905	Weekly Cost per pupil Sept. 30, 1905
Medical Dep't	$1,079 43	$ 4 55	$ 09	$ 393 44	$ 1 75	$ 03
Butcher's Meat, Fish	3,227 43	13 62	26	3,189 76	14 24	27
Flour	1,194 21	5 04	10	1,439 09	6 42	12
Butter and Milk	2,431 78	10 26	20	2,409 37	10 75	21
General Groceries	2,631 69	11 10	21	2,670 54	11 92	23
Fruit and Vegetables	684 23	2 90	06	803 97	3 59	07
Bedding and Clothing	878 73	3 70	07	689 16	3 08	06
Fuel	6,539 26	27 59	53	6,773 92	30 24	58
Light	1,017 00	4 29	08	1,018 20	4 55	08
Laundry	667 90	2 82	05.5	788 56	3 52	07
Books and Apparatus	449 66	1 90	04	409 71	1 83	04
Printing, Postage, etc.	835 98	3 53	07	885 70	3 95	08
Furniture	419 87	1 77	03.5	671 95	3 00	06
Farm	652 74	2 75	05	964 71	4 31	09
Repairs	873 66	3 68	07	1,212 79	5 41	10
Sewage Works	366 00	1 55	03	384 90	1 72	03
Water	900 00	3 80	07	900 00	4 02	08
Miscellaneous	697 24	2 94	06	1,097 20	4 90	10
Salaries and Wages	25,313 99	106 81	2 05	24,730 98	110 41	2 12
	$50,860 80	$214 60	$4 13	$51,433 95	$229 61	$4 42

Average No. of Pupils 1903-04	237	Average No. of Pupils 1904-05	224
Annual Cost " "	$214 60	Annual Cost " "	$229 61
Weekly " "	4 13	Weekly " "	4 42

Certified correct.

M. COCHRANE,
Bursar.

REPORT

OF THE

Minister of Education

Province of Ontario

FOR THE YEAR

1905

PART II.

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO.

TORONTO:
Printed and Published by L. K. CAMERON, Printer to the King's Most Excellent Majesty.
1906.

WARWICK BRO'S & RUTTER, LIMITED, PRINTERS
TORONTO.

THE LATE JOHN MILLAR, B.A.

The Late John Millar, B.A.

Deputy Minister of Education for Ontario, 1890-1905.

The death of Mr. John Millar, Deputy Minister of Education, was an event so much regretted in educational circles as to call for some reference in the official records of the Department, as well as some expression of appreciation of the work he was so assiduous in performing. Mr. Millar's relations with the teaching profession were those of a friend and counsellor. This was well shown in his administrative position when he championed the cause of his underpaid professional brethren. He advocated throughout life the imparting of character before knowledge—Christian culture before erudition. In his work "Canadian Citizenship," he says: "To teach children grammar, chemistry, etc., without teaching them that passions uncontrolled, impulses unrestrained, and appetites unregulated, are sure to bring irretrievable ruin, is to omit the best training of citizenship."

He was ever considerate of others, as all with whom he was associated in official life or otherwise could testify, and many found in him a friend of alert sympathies and never failing unselfishness. His deep devotion of many years to his duties has left high traditions connected with the office of Deputy Minister of Education.

Mr. Millar was born in Ireland in 1842, and while only a few months old he came to Canada with his parents, who settled in the Township of Brock, in the County of Ontario, and it was in one of the public schools of that township that he received his elementary education. When seventeen years of age he received a certificate of qualification as teacher, and he began to teach in one of the rural schools of the township. At the completion of the term for which his certificate was valid, he attended for one session the Toronto Normal School, and was awarded a Second Class Grade A certificate. After attendance for the succeeding session he obtained a First Class Grade A certificate. In the following two years he taught in the Township of Barton, in the County of Wentworth, and for the next five years in the schools of the City of London. During this latter period Mr. Millar became an extra-mural student of the University of Toronto in the Faculty of Arts, and after attendance for a short period at University College he received the degree of Bachelor of Arts from the University of Toronto in 1872. In 1870 he was appointed

Assistant Master in the St. Thomas High School, of which he became Principal in 1875. Under his management it underwent such development that it was raised to the rank of Collegiate Institute. While serving as its Principal, he acted as Principal of the Public Schools of St. Thomas. He prepared himself also for special service in connection with the public schools by obtaining qualification as a Public School Inspector.

Mr. Millar's energies brought him into a wider field. He took a very deep interest in educational problems, and because of his experience in these he served two years as Chairman of the High School section of the Ontario Teachers' Association, and was twice elected to represent the High Schools of Ontario in the Senate of the Provincial University, serving in that capacity four years (1884-1888).

It was, one may say, on account of his wide experience in teaching in the Public and High Schools of the Province, as well as because of his capacity to deal in an executive way with educational matters, that he was in 1890 appointed by the Provincial Government Deputy-Minister of Education, in succession to the late Mr. Alexander Marling, who died in that year. From that time his work was official and executive, but he spent his holidays each year in mastering the details of some new problem in education, and for this purpose went on several occasions on tours of inspection of educational institutions in the United States. The results of these investigations were presented in the form of reports to the Minister of Education, some of which were published. Among these may be named: "The School System of the State of New York" and "Technical Education; A Visit to the Schools of Massachusetts, and Opinions on the Subject." He served in 1895 as Vice-President of the Dominion Educational Association, and was in 1904 elected President for the meeting to take place in 1907.

Mr. Millar during his service as Principal of the Collegiate Institute annotated several editions of the English Classics selected for the High school curriculum. After his appointment as Deputy Minister he continued his literary work, and in 1893 appeared "The Educational System of the Province of Ontario," which he had prepared for distribution at the World's Fair of Chicago of the previous year. He was the author of "School Management" (1896), which is authorized for the teaching profession of the Province; of "Books: A Guide to Good Reading," which appeared in 1897, and also of "Canadian Citizenship," which was published in 1899.

Mr. Millar was married twice, his first wife, Miss Susan Dingle, of Barton, dying in 1889. His second wife, Kate, daughter of the late Neil McCallum of the Township of North Dorchester, survives him. He was an active member of the Methodist Church, and took a strong interest in its work, being a member of the Official Board of Central Methodist Church, Toronto.

TABLE OF CONTENTS.

PART II.

THE RITTENHOUSE PUBLIC SCHOOL.

The Rittenhouse Public School, illustrations of which appear herewith, is Union School Section No. 1 Township of Clinton and No. 2 Township of Louth. It is in a pretty location, three-quarters of a mile from Jordan Harbour on Lake Ontario, and one mile from Jordan Station on the Grand Trunk Railway.

The school building was erected in the year 1890 and owes its existence chiefly to the generosity of Mr. M. F. Rittenhouse, now of Chicago, but formerly a pupil of the old stone school, which the present building displaces. While on a visit to the home of his youth in the above year, Mr. Rittenhouse conceived the idea which resulted in the erection of a school building with internal equipment and outside surroundings that are truly models of neatness, beauty and practical utility.

The premises are very tastefully laid out, and include two ample play grounds for summer, and an open air skating rink and toboggan slide for winter. Native and imported trees and shrubs have been set out, and beds of flowers and a fountain beautify the front.

The school is probably the best equipped rural school in Canada. It has an excellent concrete basement and winter play room for small children, and is heated by a hot water furnace. The school room is provided with the latest and best single desks; its floor is covered with linoleum and its walls artistically hung with pictures. In one wing to the south is the library of over two thousand volumes, including the Encyclopædia Britannica, books of art, and the leading English and American magazines. The wing to the north is used as a museum, in which may be seen specimens of the plants, insects and minerals of the district.

Immediately in front of the school and across the road is Victoria Hall; attached to it is the caretaker's residence and to the north a driveway and sheds for horses. Victoria Hall stands on a plot of two acres, mostly wooded; the building, together with its land and equipment, was also the gift of Mr. Rittenhouse. The hall is used for school entertainments, and for public lectures, and to assist in securing good talent for these latter the benefactor has provided for an annual grant.

The hall has a seating capacity of six hundred, is equipped with opera chairs, a large stage with fixture, a piano and a good projection lantern. It is heated by steam and lighted by acetylene gas. Water is supplied to the school, the hall, and the grounds by means of a gasoline pumping engine at the lake.

The cost of this public hall, its surroundings and equipment has been over sixteen thousand dollars. Attached to the hall, on the south side, is a conservatory for the care of flowers in winter, and to provide nature study material for the pupils. Plans are also in preparation, by Mr. Rittenhouse, for the improvement of the walks and of the road from the lake to the Grimsby line, and for the introduction of school gardening.

A very interesting object lesson is here given that may be the inspiring cause of many other localities being similarly benefited by men of wealth and public spirit.

THE RITTENHOUSE PUBLIC SCHOOL.
(Arboriculture, view of front.)

THE RITTENHOUSE PUBLIC SCHOOL.
(Floraculture, view of front.)

THE RITTENHOUSE PUBLIC SCHOOL.
(Victoria Hall and Residence, front view.)

THE RITTENHOUSE PUBLIC SCHOOL.
(Victoria Hall and Residence, side view.)

THE RITTENHOUSE PUBLIC SCHOOL.
(Victoria Hall.)

McKeough Public School, Chatham.

Central Public School, Chatham (Rear view).

Roman Catholic Separate School, Cobalt.

REPORT

OF THE

MINISTER OF EDUCATION

For the Year 1905.

PART II.

APPENDIX M—*MANUAL TRAINING AND TECHNICAL EDUCATION.*

REPORT OF THE INSPECTOR.

HON. R. A. PYNE, M. D., M. P. P.,
Minister of Education,
Education Department, Toronto.

SIR,—I have the honour to submit herewith my fifth annual report on Manual Training, Art Instruction and Technical Education as carried on in the schools of this Province during the year ending December 31st, 1905.

It was written of old "of making many books there is no end," and if the word "books" were changed to read "reports" it would be just as true. On this subject many reports have been presented to the Education Department in times past, but what they have accomplished, what notice has been taken of them, and what effect they have had it would be difficult to discover. Of these reports the chief are :

"Schools of Technical Science"	—Hodgins and Machattie	1871
"Technical Education"	—Ross	1889
"Technical Education"	—McEvoy	1900
"Technical Education"	—Millar	1899
"Manual Training"	—Seath	1901
"Learning How to Do"	—Bengough	1902
"Domestic Science"	—Hoodless	1899

Reports of Inspector of Technical Education, 1901-2-3-4.

All the above have been printed and published, but as far as practical application have not received the attention the importance of some of them deserves. This is presented with the hope that it will meet a better fate and that neither apathy, indifference nor mistaken economy will prevent earnest consideration of the suggestions made.

As the subjects under my charge are still in the process of introduction and, where introduced, of development, it will be neither possible nor desirable to avoid repeating observations that I have previously made, and the necessity for doing this will exist until their purpose is understood, their benefits appreciated, and their adoption general. Thirty-five Manual Training centres are now established as follows: Toronto (7), Ottawa (10), Guelph (3), Brockville, Alvinston, Cornwall, Woodstock, Kingston, Brantford, Essex, Renfrew, Cobourg, Hamilton (2), Berlin, Ingersoll, Stratford and London. Preparations are being

made to install a department for this work at Galt, St. Thomas, Owen Sound and Sault Ste. Marie, which centres it is hoped will be in active operation at the re-opening of the schools in September, 1906.

Twenty-five centres, in which Household Science is taught, are aided by the Department. These are situated as follows: Toronto (9), London (2), Hamilton (3), Guelph (3), Ottawa, Renfrew, Berlin, Stratford, Brantford, Woodstock, Belleville, Kingston.

The organization of the school is much simplified where these two departments are taken together, as both boys and girls are thus provided for.

The basis of a thoroughly practical education is the Kindergarten. "As the child is father of the man, so the Kindergarten is father of the Manual Training School. The Kindergarten comes first in the order of development and leads logically to the Manual Training School. The same principle underlies both. In both it is sought to generate power by dealing with things in connection with ideas. Both have common methods of instruction and they should be adapted to the whole period of school life and applied to all schools."

The next step from the Kindergarten is the Art and Constructive Work, which was placed in the curriculum in August, 1904. I am of opinion that the inclusion of these subjects in the course of study marks one of the greatest reforms that have taken place in our educational system in many years, though it will probably be long before their influence will be generally admitted and recognized. It is obvious that the history of these practical subjects in the Public School repeats that of every reform movement. It is natural that they should be looked upon as unnecessary and undesirable innovations by those who feel that the old methods are good enough and that what was good enough for the parents is good enough for the children.

"Whatever has been shall be,
As did the fathers so do we."

It is likewise natural that these new methods should receive scant welcome from those who are wedded to the use of the old. Notwithstanding all this, these subjects are gradually being adopted wherever the qualifications of the teacher admit of him successfully teaching them, and whenever adopted, they are received with enthusiasm by the children and later by the parents. Much, however, remains to be done before every child in the Province has the opportunity given to do some practical work, the doing of which will bring into play those powers by which he or she will in later years have to earn a livelihood.

All students now graduating from the Normal Schools have such a course in constructive work as will enable them to successfully teach these subjects, but there are many teachers employed in the schools of the Province who have not had the advantage of this training, and something should be done in order to help these in this newer work. Some steps, which suggest themselves, are as follows:

1. Centres of Instruction, to be held during the evenings or on Saturdays, might be established in the larger towns for the teachers of the neighborhood.
2. More attention should be given to these subjects in the various Teachers' Institutes throughout the Province — in the way of practical demonstrations of the methods of teaching this work, rather than academic discussions on its advantages.
3. Bulletins might be issued by the Department such as are issued by various educational bodies in the United States. These would describe methods, material, courses, principles, etc., to be followed in the adoption of the work.

4. Several libraries of the most helpful books should be formed by the Department and circulated amongst the teachers through the medium of their Institutes. These could well be accompanied by a short explanatory pamphlet.

5. Three months' courses should be established at the Macdonald Institute for the purpose of instructing teachers in Primary Manual Training, and inducements should be offered to them to take up the work.

The purpose of education has been said to be the making of good citizens. Before a man can become a good citizen he must be capable of doing two things:

(1). Earning a livelihood for himself and those dependent upon him; and

(2). Performing some useful service to the community in which he lives.

Ninety-five per cent. of the boys and girls in our schools will probably have to earn their livelihood by the work of their hands, and our curriculum in view of this fact should have some concern with the life to be lived by the pupil after leaving the four walls of the school room. This ideal of educational effort is gradually coming to be accepted by the most progressive nations. In our own Province 56.93 per cent. of the children attending the schools are receiving their education in rural districts, and consequently the kind of education given in the rural school becomes of great importance. Practical work of some kind or other should have a recognized place in all these schools. This is as necessary to the boy and the girl in the rural school as it is to the pupil in the town school. Of course the rural child has greater opportunities of doing things round the house and on the farm than the town boy, but, what is needed is a systematic course of well ordered practical work, combining in perhaps equal proportions, two elements, the educational and the utilitarian. In the home to-day the utilitarian aspect predominates to the exclusion of the educational. Two obstacles seem to stand in the way of the general introduction of hand work into the rural school:

1. The inability of the teacher to take up these newer branches; and

2. The general opinion of the section that education is a matter of books only, and that time devoted to anything else is wasted and mis-spent.

The first of these difficulties will gradually be removed by the steps which are being taken in all our normal schools to train the teachers in these newer subjects, and by the adoption of such steps as have been suggested above. The removal of the second also lies very largely in the hands of the teacher. The teacher who thinks his (or her) duties ended directly the schoolroom door is locked, has not yet reached the right conception of his duties. The school should be the centre of the social life of the community, and it is part of the teacher's work to educate the parents and ratepayers of the section. The people need education as much as the children, and the teacher has it in his power to show the parents not only the educational value of the handwork and the part it has played in the development of the race, but also its after effects in practical life, and he should lay stress upon the fact that the man who only knows but cannot "do" is but a drone in the hive.

The Agricultural Department of this Province has achieved much success by the adoption of up-to-date business methods in spreading right ideas of, and the necessity for scientific-practice in agricultural operations. The travelling dairy school adopted in some Provinces is a prominent example. I can not see why some of the same business sense could not be applied to educational affairs. A travelling Manual Training and Household Science School could do good work, not only in explaining to the parents by striking object lessons the place and purpose of these subjects, but also in giving practical instruction to the boys

and girls of the Province. Such a school could be located in a suitable district for say one year and then moved to some other locality. Many sections which do not now understand the educational and practical significance of Manual Training and Household Science would be thus induced to take them up.

The moulding and training of public opinion along right lines in educational matters is or should be part of the function of any Department of Education. During the year large public meetings have been addressed in Cornwall, St. Catharines, Sault Ste Marie and Ottawa, and arrangements have been completed to deliver nearly one hundred illustrated lectures in various parts of the Province during 1906 on "Practical Education." It is hoped by means of these lectures to show what other parts of our own Province are doing and also to inspire enthusiasm, interest and discussion from what other countries have to show us. We have talked long and enough on these subjects, and it is thought by exhibiting, through a powerful lantern, actual photographs of the schools, equipments and work of other nations that a "divine discontent" may be aroused and the people incited to follow the example of the United States, Germany and Japan and "invest" their money in educational effort.

Though considerable progress has been made in the introduction of Manual Training and Household Science into the Public and High Schools, yet beyond this we have accomplished little in the way of real Technical Education. Manual Training is not strictly Technical Education, but bears the same relation to it as the alphabet does to literature. These subjects have a strong utilitarian element yet their distinctive aim is educational and only secondarily utilitarian. In the School of Practical Science, the School of Mines and the Ontario Agricultural College we have institutions of the highest technical grade, but we have as yet no efficient feeders to these schools. We need two new types of schools—Agricultural High Schools and Technical High Schools. Numerous examples of these are to be found across the border and will well repay careful investigation. At various suitable centres Agricultural High Schools should be established. These would have preparation for rural life as their objective point and prepare in some degree for the higher work of the Agricultural College. The American Manual Training High School which is a type we could well adapt prepares students for industrial pursuits by a parallel course of academic and practical instruction—the one helping the other. One such school in the States has adopted the following for its motto:—

"Hail to the skilful cunning hand
Hail to the cultured mind,
Striving for the world's command
Here let them be combined."

Such a school should

(1.) Offer three or four year courses for those boys and girls whose bent is industrial rather than academic, and

(2.) Have a well thought out plan of evening classes for those engaged at the trades during the day.

We have no Technical High School in this Province, for the one to which that name is attached is, for reasons which need not be here specified, totally unfit to bear the name. Boards of Trade, Manufacturers' Associations and Labour Organizations are taking great interest in these subjects, and all are becoming convinced that our industrial future depends very largely on these educational facilities being offered. That the people will avail themselves of these educational opportunities is shown by the astonishing success of those American Correspondence Schools, which profess to give instruction in technical subjects. It is estimated that $1,500,000 is annually paid out of this Province to the most successful of these schools in the States, owing to the fact that no facilities exist in our own Province for obtaining the necessary instruction—

instruction which will have a direct bearing on the amount of wages received at the end of the week. The report of the Mosely Commission accentuates this strongly, and the organizer of that Commission is showing his opinion of the practical nature of American education by sending his two sons to Technical Schools in the United States. Probably, the nation that has made the greatest progress along these lines in recent years is Japan. In that country, according to a late official report, there are 869 Technical Schools, and the Japanese attribute a great part of their success among the nations of the earth to their enlightened educational policy. The aim of Technical education is to effect a rise in the level of intelligence and efficiency among all on whom our industries depend, in the confidence that this will mean to the workmen increased wages and increased power of adaptation to the changes which so often dislocate our industries. And we must keep in view the fact that the interests of all are vitally concerned in the maintenance of a high standard of excellence among those on whom may depend our power to maintain a place in the markets of the world and the very subsistence of a large portion of our population. The employers of labour throughout the Province could encourage the spread of Technical Education by giving preference to those who are making an effort to obtain it, and by granting privileges in the way of time or bonus to those of their employees who are attending classes for their own improvement, and incidentally for the benefit of their employers. Some English manufacturers allow the young men employed by them to reach the factory one or two hours later in the morning if they have been attending an approved Technical class the evening before, while others have established classes within their own works, and offer increased wages to all those successfully taking the courses offered.

In the educational and general literature of the past twelve months, the question of trade schools has received much attention. In the United States the necessity for their establishment has been repeatedly urged. It is neither possible nor desirable for us to adopt the educational systems or the type of schools existing in any foreign country, but from all of them we may get suggestions that will help us to settle our own educational problems according to our own peculiar requirements. Regarding the success of Trade Schools in Germany, Governor Douglas of Massachusetts says:

"The method of conducting trade schools in Germany and the thoroughness of the education are the best in the world. Germany saw the need of such schools many years ago. Trade schools were organized, graduates sent out, and the effect was so marked on the industrial situation that other countries were attracted by the progress made, and finally realized that Germany was distancing them in excellence of her manufactured goods. Germany with her technical schools and army of educated workers, has demonstrated that great economic principle that finer and better goods can be manufactured at a less cost than by uneducated and unskilled labour. Throughout the empire of the Kaiser, trade schools are to be found in all the cities, towns and large villages. New factories are springing up everywhere and Germany is increasing her export trade wonderfully. In Berlin, as well as in most German cities, trade schools for shoemakers, tailors, carpenters, metal workers, masons, etc., are being conducted with friendly relations with the labor unions, and in many cases the boards of inspection have upon them members of trade unions."

There can be little doubt that the immense strides Germany has taken in supplying the world's markets are in no small measure due to this policy. The urgent need of consideration of this question is well set forth by Governor Douglas, thus:

"Trade schools have been made necessary to the community by the great changes that have taken place in the last generation in processes of production.

Formerly the master gave time to the young men in order to bring them up in his business. He could give his personal attention to the young man, who was accordingly apprenticed to him to learn the trade. The system of apprenticeship properly belonged to a condition of production where the young man could meet his employer and be taught. Under the present system of production it is impossible for the employer to give personal care to the young man who wishes to learn a trade.

"The apprenticeship idea cannot meet the requirements of the present factory system. It has been outgrown. We must find a broader, larger way to assist the young man who desires to learn. The school for the many who may learn at once must take the place of the master who formerly taught his apprentices.

"The specialization by which one worker learns but a minute part of the whole process in manufacturing any commodity tends to narrow his capacity and prevent his obtaining a complete knowledge of his art. The extent to which the present factory system has limited the range of the workman can only be appreciated by those who have given the matter careful examination; but it is undoubtedly true to-day, and each year is becoming more true, that the introduction of machinery, supplanting hand work and a general knowledge of the business, and introducing in place of it a special knowledge of one minute part, has caused a weakness in our industrial system which should be properly, compensated for."

So important is this question now considered in the State, that a Commission has been appointed to investigate the whole subject of practical education and its relation to the industries. There can be hardly any doubt that there is a demand for instruction which shall qualify both directly and indirectly for the mechanical trades. Various manufacturing interests are constantly impressing upon our educational authorities the fact that they are suffering from the absence of training which will fit our youth for them. This need has been kept in the background owing to our great wealth of natural resources, the importationof skilled labour, and foreign competition being shut off by means of a protective tariff; but the need is real and vital, and during the past few years it has begun to assert itself. We were once a purely agricultural people, but are rapidly becoming a nation of manufacturers. When we compare our almost total lack of this training, with the scientific organization of instruction in Germany, the wonder is that so much has been accomplished industrially, and we must be impressed with the danger of neglecting to provide this training for the future. The report of the Mosely Commission, lately sent to the United States, is full of convincing arguments of the necessity of this instruction for any nation that aspires to achieve an industrial position among the nations of the earth, and the organizer of that Commission shows the faith that is in him by sending his two sons to American Schools.

Closely connected with Technical Education, if not actually a part of it, are the subjects of Art, Design and Mechanical Drawing. Every manufacture depends in some way or other on an adequate knowledge of these subjects. A New York firm of bootmakers pays a man $5,000 a year for the designing of shoes. Six years ago, there were in this Province half a dozen Art Schools so called; last year there were three, and this year there are two, both of which are tottering to their fall through inability to meet modern requirements owing principally to the lack of adequate financial support. The Province has surely arrived at a stage in its development when it can support a properly equipped and efficiently taught Provincial Art School. The mistake has been made in the past of frittering away our energies on half a dozen small and inefficient school-efforts which, if concentrated on one, would have achieved success and have accomplished something for the industrial development of the Province.

The Macdonald Institute which has been established by the Provincial Government for the training of teachers in Manual Training, Household Science and Nature Study should be better known to and more widely used by the the teachers of the Province. A bonus has been offered to teachers taking up Nature Study with beneficial results, and this practice could be well applied to Manual Training—particularly primary Manual Training or Constructive work. One of the crying needs of the Public Schools to-day is teachers who can take up the newer work of the curriculum. A three months' course for this work should be established at the Institute, and a small bonus offered to suitable teachers as an inducement. A Certificate should be granted by the Department, and Boards of Education throughout the Province should be willing to pay a higher salary to those teachers holding it. It is, at present difficult to see where teachers are to be secured for the newer centres that are being opened in September unless some such inducements are offered teachers to encourage them to take up the work. The plan of granting a degree to properly qualified teachers with the necessary academic qualifications as is done at Columbia University, and as is now done in connection with Household Science, is worthy of consideration. In the Provincial Museum we have an excellent institution which deals admirably with the records and relics of the past. But we need in the Provincial Museum, which shall have for its object the growth of the present and the development of the future, an industrial museum which would show the development of machinery from its first conception to the masterpiece of to-day; methods of manufacture from the raw product to the finished article; the conservation of energy and the development of power; all of which would do much towards stimulating thought and ingenuity along industrial lines. Such museums form an integral part of many of the highest technical institutions in Germany.

Two years ago a very successful exhibition was held in Toronto consisting of classes at work in Manual Training and Household Science. These classes were visited by many thousands of people and excited much interest. It is a point to be considered whether a permanent educational building should not be erected in the Exhibition grounds for the purpose of demonstrating the value of this training to the people who provide the sinews of war, for efficiency of education depends very largely on adequate expenditure.

During the year I have carried on correspondence with many teachers in the Province on Construction Work, answering their questions and removing their difficulties. Letters have also been received from South Africa, Australia, New Zealand, Japan and many parts of the United States, making enquiries about the work we are doing. These have been answered giving all information possible.

As requests have continually been received during the past two years for information concerning books on Practical and Technical subjects considerable time was spent in preparing such a list for publication by the Department as a bulletin. Over five hundred books have been carefully examined and four hundred included in the list submitted to you. Each book has been briefly described in order that the teacher in search of a book may have something more to go by than a mere title.

This report is somewhat shorter than usual owing to the immense amount of work entailed by preparation for the practical carrying out of my lecture tour throughout the Province.

Thanking you for the great help and encouragement you have given me in my work.

I am yours obediently,

TORONTO, February, 1906. ALBERT H. LEAKE.

MODEL SCHOOLS, 1905.

	No. with other class.	Time assistant relieved Principal from Public School work daily.	Is separate room provided?	No. of volumes in professional library.	Government grant.	Municipal grant.	Fees.	No. of divisions in school or schools.	No. of divisions used for Model School purposes.	No. of students sent at one time to observe.	No. of students sent at one time to teach.	Length of time students are trained before being sent to the divisions to observe.	Length of time students are trained before being sent to the divisions to teach.
1	.....	All day	Yes	30	$150	$150	$205	5	5	8 or 9	8 or 9	4 weeks	6 weeks
2	.....	.....	"	170	150	150	160	8	8	4	4	6 "	6 "
3	.....	All day	"	194	150	150	85	4	4	4 or 5	4 or 5	5 "	6 "
4	.....	"	"	160	300	300	65	9	9	4 or 5	4 or 5	6 "	6 w'ks& 2 days
5	1	"	"	150	300	.....	65	10	7	2	2	6 "	6 weeks
6	.....	"	"	156	150	150	130	4	4	3 or 4	3 or 4	6 "	7 "
7	.....	"	"	163	150	250	90	9	7	3 or 4	3 or 4	6 "	7 "
8	.....	.....	"	150	150	.....	125	45	17	1	1	4 "	7 "
9	.....	All day	"	175	150	150	75	4	4	3 or 4	3 or 4	6 "	6 "
10	4	"	"	450	150	150	160	20	18	4	4	2 "	6 "
11	.....	"	"	171	150	150	165	7	7	4 or 5	4 or 5	6 "	6 "
12	.....	"	"	270	150	150	150	12	12	3	3	5 "	6 "
13	1	"	"	120	150	150	50	8	5	5	2	4 "	6 "
14	.....	"	"	169	150	150	150	5	5	5	5	6 "	7 "
15	.....	"	"	166	150	150	110	6	5	5	5	6 "	6 "
16	.....	"	"	203	150	150	40	12	6	2	2	6 "	7 "
17	.....	"	"	168	150	150	135	11	11	5	5	6 "	6 "
18	2	"	"	650	150	150	130	12	9	26	26	3 days	7 "
19	.....	"	"	171	150	150	80	14	12	3	3	5 weeks	7 "
20	.....	"	"	144	150	150	115	7	7	3 or 4	3 or 4	6 "	6 "
21	.....	"	"	230	150	150	150	45	42	3 or 4	3 or 4	6 "	6 "
22	.....	"	"	90	150	150	115	20	12	2	2	5 "	7 "
23	.....	"	"	146	150	102	190	10	9	4	4	2 "	4 "
24	.....	"	"	275	150	250	95	6	6	3 or 4	3 or 4	4 "	4½ "
25	.....	"	"	160	150	150	75	9	7	3	3	6 "	7 "
26	.....	"	"	164	150	200	70	7	5	3 or 4	3 or 4	6 "	6 "
27	1	.....	"	205	150	150	55	2	2	5 or 6	5 or 6	7 "	8 "
28	.....	All day	"	158	150	150	105	7	7	4	4	6 "	6 "
29	.....	"	"	175	150	150	150	8	7	3 or 4	3 or 4	7 "	7 "
30	1	.....	"	250	150	150	125	10	8	3 or 4	3 or 4	6 "	6 "
31	.....	All day	"	186	150	175	90	7	6	3	3	6 "	7 "
32	.....	"	"	153	150	150	130	5	5	5	5	7 "	8 "
33	.....	"	"	170	150	150	80	10	8	2	2	7 "	7 "
34	.....	.....	"	296	150	150	145	12	12	3	3	5 "	7 "
35	2	All day	"	168	300	.....	75	13	8	3	3	6 "	6 "
36	.....	"	"	180	150	150	150	10	10	3 or 4	3 or 4	7 "	7 "
37	.....	"	"	140	150	150	55	8	8	3	3	5 "	5 "
38	.....	"	"	200	150	300	120	15	15	2	2	6 "	6 "
39	.....	"	"	173	150	150	50	6	6	3 or 4	3 or 4	6 "	6 "
40	.....	"	"	210	150	150	110	7	7	3 or 4	3 or 4	6 "	6 "
41	.....	"	"	150	150	150	210	9	9	5 or 6	5 or 6	5 "	6 "
42	.....	.....	"	187	150	150	150	11	11	5	5	5 "	5 "
43	.....	All day	"	80	300	.....	60	10	10	3	3	6 "	6 "
44	.....	.....	"	165	150	150	145	9	8	3 or 4	3 or 4	6 "	6 "
45	.....	All day	"	232	150	150	120	9	8	3	3	6 "	7 "
46	.....	.....	"	512	150	150	210	29	29	3	3	6 "	6 "
47	.....	All day	"	162	150	150	50	9	9	1 or 2	1 or 2	6 "	6 "
48	.....	"	"	261	150	.....	75	12	11	15	15	2 "	5 "
49	.....	"	"	200	150	150	100	11	11	3	3	6 "	6 "
50	.....	"	"	211	150	450	95	4	4	4 or 5	4 or 5	3 "	7 "
51	.....	"	"	180	150	150	60	9	9	2	2	2 "	6 "
52	.....	"	"	109	150	150	80	5	5	3 or 4	3 or 4	5 "	6 "
53	3	"	"	199	150	150	70	7	7	4	4	6 "	7 "
54	.....	"	"	166	150	150	125	10	10	2 or 3	2 or 3	5 "	6 "
55	1	"	"	300	150	150	105	30	20	2	2	6 "	8 "
	16	.....	.....	10,873	$8,850	$8,327	$6,075	.....	.....	.....	.....	.....	.....

Central Public School, Chatham (Rear view).

Roman Catholic Separate School, Cobalt.

Students Admitted, Session 1905-06.

Male	45
Female	125
Total	170

APPENDIX P.—HIGH SCHOOL CADET CORPS, 1905.

Name of School.	Number of Officers N. C. Officers and Boys in the Corps.	Drill.	Remarks of Militia Officers on the Efficiency of the Corps.
Arthur	42	Very good	Satisfactory
Barrie	39	Good	Satisfactory
Brantford	47	Very good	Satisfactory
Brockville	30	Very good	Satisfastory
Cobourg	44	Good	Satisfactory
Collingwood	27	Good	Satisfactory
Dundas	28	Very good	Satisfactory
Galt	42	Good	Satisfactory
Goderich	40	Very good	Satisfactory
Guelph	53	Very good	Satisfactory
Hamilton	40	Very good	Satisfactory
Ingersoll	41	Excellent	Satisfactory
Lindsay	39	Very good	Satisfactory
London	35	Very good	Satisfactory
Morrisburg	39	Good	Satisfactory
Mount Forest	38	Excellent	Satisfactory
Napanee	43	Very good	Satisfactory
Newmarket	31	Good	Satisfactory
Niagara Falls	31	Good	Satisfactory
Orillia	40	Very good	Satisfactory
Ottawa	50	Very good	Very satisfactory
Owen Sound	50	Very good	Satisfactory
Peterborough	44	Good	Satisfactory
Ridgetown	41	Good	Satisfactory
St. Catharines	37	Very good	Satisfactory
St. Thomas	57	Excellent	Very satisfactory
Sarnia	44	Good	Satisfactory
Seaforth	43	Very good	Satisfactory
Strathroy	42	Very good	Satisfactory
Toronto:			
Harbord	48	Excellent	Very satisfactory
Jameson	38	Very good	Satisfactory
Jarvis	46	Very good	Satisfactory
Public Schools, Toronto:			
Jessie Ketchum	52	Good	Satisfactory
Dufferin	50	Good	Satisfactory
Ryerson	50	Fair	Satisfactory
Givens Street	45	Fair	Satisfactory
Wellesley Street	53	Excellent	Satisfactory
Parkdale	50	Good	Not satisfactory as regards the condition of the arms
Uxbridge	40	Good	Satisfactory
Vankleek Hill	41	Good	Satisfactory
Woodstock	43	Excellent	Satisfactory
Total	1733 41 Corps		

Beck Shield Competition, 1905.

Colonel J. Peters, D. O. C., Military District No. 1, reported as follows:

The following is the list of the scores made by the various High Schools and Collegiate Institutes in the shooting competition for the shield presented by the Hon. Adam Beck:

	Score.	Average %.
St. Thomas	160	80
Seaforth	143	71.5
Sarnia	130	65
Strathroy	130	65
London	113	56.5
Ingersoll	120	60
Mt. Forest	118	59
Arthur	118	59
Galt	102	51
Ridgetown	98	49

Goderich and Guelph were entered in the competition, but did not shoot.

Sergt. Rappel, of the St. Thomas Collegiate Institute Cadets, won the $10.00 prize donated by Mr. Beck for the highest individual score.

APPENDIX Q.—SUPERANNUATED TEACHERS.

(Continued from Report of 1904).

*1. Allowances Granted during 1905.

Regulation Number.	Name.	Age.	Post office.	Years of Service.	Allowance.
					$ c.
1138	Eckert, William D	71	London	54½	379 50
1139	Ludlow, John	49	Centre Augusta	28	168 00
1140	Heydon, William H	59	Charlemont	25	150 00
1141	Telfer, John	60	Newbury	10	65 50
1142	Ward, Henry	60	Thornhill	32	224 00
1143	Waterson, John A	60	Kemptville	23½	164 50
1144	Ross, John	70	Hamilton	47	329 00
1145	Hicks, David	63	Woodbridge	26½	185 50
1146	Stuart, William	55	Aldershott	35	245 00
1147	†Wightman, George Easton	56	Essex	36½	248 50

2. Summary for Years 1882-1905.

Year.	Number of teachers on list.	Expenditure for the year.	Gross contributions to the fund.	Amount refunded to teachers.
		$ c.	$ c.	$ c.
1882	422	51,000 00	13,501 08	3,660 10
1887	454	58,295 33	1,489 00	3,815 80
1892	456	63,750 00	1,313 50	786 86
1897	424	62,800 33	847 00	620 27
1902	407	64,244 92	1,073 50	722 78
1903	398	63,267 43	996 00	470 25
1904	392	64,259 75	934 75	987 48
1905	388	62,663 55	545 00	940 15

Six teachers' subscriptions were withdrawn from the fund during 1905.

*As the sum of $4 is deducted from each Superannuated Teacher's allowance, as subscription to the fund, the payments were $4 less in each case than given in this list.

†Allowance commences with 1906.

APPENDIX R.

ANNUAL REPORT OF SCHOOL OF PRACTICAL SCIENCE.

To the Hon. R. A. Pyne, M.D., LL.D., M.P.P., Minister of Education.

SIR:—I have the honour to submit the annual report of the School of Practical Science for the year 1905.

The calendar year not being conterminous with the academic year, this report will cover the second term of the academic year, 1904-05 and the first term of the academic year, 1905-06, except when otherwise stated.

The number of students in attendance was as follows:

In the Regular Departments.	2nd Term Session 1904-05	1st Term Session 1905-06.
I Year	201	236
II Year	137	159
III Year	75	108
IV Year	47	35
Occasional	3	0
	463	538

Students of the Faculty of Arts taking instruction in Applied Chemistry, Assaying, Surveying and Drawing, ... 14

The fees for the academic year, 1904-05, were $33,758.

Of the above amount $2,783 were paid to the Bursar of the University of Toronto for instruction in Mathematics and Biology, under the authority of an Order-in-Council, dated Feb. 3rd, 1905; $1,638.40 to the Examiners of the School for the Session 1904-05, under the authority of an Order-in-Council, dated Feb. 3rd. 1899, and the remainder, $29,336.60, to the Honorable the Provincial Treasurer.

The number of regular students who presented themselves for examination at the annual examinations of the academic year 1904-05 was four hundred and eight. Of these three hundred and twenty-one passed.

The number of candidates who graduated was fifty-three. The total number of graduates to date is five hundred and twenty-three.

The following statement shows the geographical distribution of the graduates now living:

	Number,	Percentage.
Canada	386	76
United States	111	22
Other countries	11	2
	508	100

The number of graduates who proceeded to the degree of B.A.Sc. at the iversity examinations of 1905 was forty-seven. The total number of gradus who have received the degree of B.A.Sc. is one hundred and eighty-six.

Eighteen graduates have received the degree of C.E., two the degree of M.E. ining Engineer), four the degree of M.E. (Mechanical Engineer), and three e degree of E.E. in the University of Toronto.

The regular departments of instruction are :

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical and Electrical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry.
6. Chemical Engineering.

GENERAL.

STATISTICS OF COST, ATTENDANCE, ETC., FOR SESSION 1904-05.

laries and Maintenance	$69,053 84
es Paid into Provincial Treasury	29,336 60
annual cost to Province	39,717 24
aries of Teaching Staff	33,259 00
mber of Students	482
mber of Instructors	35
t per Student	$ 82 00
rage Salary of Instructor	950 00
l Expenditure on Buildings and Equipment from 1877 to end of 1905	621,795 00

The salaries of the professors and lecturers are too small; they should not less than those paid in the Faculty of Arts.

The number of instructors in the higher grades should be increased. The k of instruction is suffering on account of the large number of students in y of the classes. In large classes the attention of students is easily diverted the lecturer is subjected to undue nervous strain. The remedy is subsion of the classes and additions to the number of professors and lecturers.

Chemistry and Mining Building.

Work has been carried on during the whole of the present session (1905-06) Chemistry and Mining building. The equipment of the Milling laboratory yet fully installed.

Owing to various causes the ventilation system of this building is not yet rking order.

Engineering Building.

All the space vacated in this building by the removal of certain departments Chemistry and Mining building has been taken up by the extension of maining departments.

Future Extensions.

Within the last ten years the number of students in attendance has increased five-fold. Within the last four years the number has doubled. The attendance for the session 1905-06 is 538. The gradual increase of the work in each department will soon render it necessary to replace the present three years' course by a four years' course. The effect of this on the attendance may best be shown by comparing the present attendance (1905-06) with an estimate of the attendance if the three years' course were replaced by a four years' course. The present attendance is as follows: First year, 235; Second year, 159; Third year, 108; Post-Graduate year, 36; total, 538. If a four years' course were in existence the attendance would probably be: First year, 235; Second year, 159; Third year, 108; Fourth year, 95; Post-Graduate year, 40; total, 637. The effect of the change would be to force the majority of the third year men to return for their fourth year. At present no such compulsion exists, as the fourth year is post-graduate and purely optional.

With the present building accommodation it is impossible to carry on a four years' course. The work in the fourth year at present is greatly incommoded on account of want of space and in all the years the classes are too large.

For these reasons new buildings should be provided without delay. On account of steam, heat, noise, vibration, dirt, etc., it is advisable that separate buildings be erected for certain classes of work. All the buildings should be near each other and should be heated and lighted from a central station.

In the design of the buildings provision should be made for the probable increase in the number of students, and in the subjects of study, the estimate covering at least the next ten years.

The buildings to be erected are the following six, viz.:

1. Electrical Engineering.
2. Thermodynamics and Hydraulics.
3. Central Station.
4. Strength of Materials, Machine Shop.
5. Cement, brick, stone, etc., tests.
6. Surveying, Architecture, Drawing, etc.

The buildings 1, 2, 3, should be erected with as little delay as possible. The site of the present engineering building could then be utilized for part of the space required for the buildings 4, 5, 6.

I have the honour to be, Sir,

Your obedient servant,

J. GALBRAITH,
Principal.

TORONTO, February, 1906.

APPENDIX S.—REPORT OF THE PRESIDENT OF THE UNIVERSITY OF TORONTO.

HIS HONOR THE HON. WILLIAM MORTIMER CLARK,
Lieutenant-Governor of Ontario.

MAY IT PLEASE YOUR HONOR:

I have the honor to submit the following report for the year ended June 30th, 1905:

THE TEACHING STAFFS

The following is a tabular statement of the numbers engaged in teaching during the year in the faculties named. These numbers include the Arts staffs University College, Victoria College, and Trinity College:

	Arts.	Medicine.	Applied Science.
Professors and Associate Professors	55	44	7
Lecturers and Demonstrators	26	12	9
Instructors and other Assistants	39	40	11
	120	96	27

STUDENTS IN ARTS, MEDICINE AND APPLIED SCIENCE.

Arts.

(1) B. A. Course:

Regular	1010	
Occasional	144	
Graduate	35	
(2) Ph.D. Course	20	
		1209

Medicine.

Regular	622	
Occasional	30	
		652

Applied Science.

Regular	478	
Occasional	5	
		483

STUDENTS IN AFFILIATED COLLEGES.

Ontario Agricultural College: Regular Students	785	
Royal College of Dental Surgeons	143	
Ontario College of Pharmacy	140	
Toronto Conservatory of Music (proceeding to the degree of Mus. Bac.)	4	
Hamilton Conservatory of Music (proceeding to the degree of Mus. Bac.)	2	
		1074
		3418

Candidates Examined.

Arts	1332	
Ph.D	1	
Medicine	676	
Law	30	
Applied Science and Engineering	455	
Pedagogy	3	
Agriculture	30	
Dentistry	107	
Pharmacy	50	
Music	484	
Physical Training	2	
Household Science	16	
Commercial Course	3	
		3189

Degrees Conferred.

LL.D. (Hon.)	7	
Ph.D	1	
M.A	58	
B.A	183	
M.D. (Hon.)	1	
M.D.	3	
M.B.	115	
M.D., C.M	57	
LL.B	13	
D.C.L.	3	
B.C.L.	3	
D.D.S.	62	
B.A.Sc.	42	
M.E.	1	
E.E.	1	
B.S.A.	30	
Phm.B	45	
		625

Diplomas and Certificates.

Engineering	45	
Local Examinations in Music	390	
Licentiate in Music	2	
Physical Culture	2	
		439

Research Work.

In several of my previous reports I have emphasized the importance o search; and I am gratified to report that in this respect considerable progr being made both in the numbers of students and in the character of the done. In order, however, to complete the organization of such work it is, i opinion, indispensable that the scheme should be extended without delay to include the remaining Arts departments, viz.: Classics, Modern Langu and History. It would be desirable also, in my opinion, to encourage stu in the prosecution of research, by offering scholarships or fellowships, as i practice in the leading universities of the United States.

A list of publications by members of the various faculties or by adv students will be found in the Appendix.

For report of the general Editor of the "University of Toronto Studie Addendum K.

Special University Lectures.

The usual course of Saturday popular lectures was delivered in January and February by Dr. W. H. Drummond, Rev. E. A. Wicher, Dr. James Fletcher, Right Rev. P. T. Rowe, Mr. Clyde Fitch, Dr. A. H. Abbott and Professor A. B. Macallum.

The Library.

From the report of the Librarian, which is appended, it will be seen that the total accumulation of books in the Library since the destruction of the former Library by fire in 1890, now amounts to 80,937 and upwards of 21,000 pamphlets. The number of volumes added during the year was 3,292, of which 303 were presented to the Library. I desire to repeat here what I stated in my last report with regard to an increase in the annual appropriation for the purchase of books, and to point out further that increased accommodation both in the reading-room and the stack-room has now become a necessity and cannot much longer be delayed.

New Buildings.

The building for Applied Chemistry, Mineralogy, Geology and Mining, the erection of which was begun in 1902, has been completed since the date of my last report, and the departments mentioned are now installed therein.

During the session 1904-5 a building known as Queen's Hall was opened as a residence for the women students of University College. The success of the residence was so immediate and so marked that steps were taken during the summer for the erection of a considerable addition, which at the date of writing has already been completed and occupied. It contains thirty-nine rooms for students, a large dining-hall, and the necessary bath-rooms, kitchens, and other accommodation. The cost, exclusive of furnishing, was $28,000.

Satisfactory financial arrangements having been completed for the erection of the new Convocation Hall, work on the building was begun in August of 1905, and at the time of writing the walls are almost completed and the steel frame of the roof has been placed in position. This hall will accommodate about 2,000 persons, and its cost is estimated at $160,000.

Plans for a new building for the use of the department of Physics are in course of preparation and are at present almost completed. It is expected that the building will be ready for occupation at the beginning of 1907. In general plan it will resemble the new Medical Building. Two large lecture-rooms for experimental lectures constitute a special feature. It will thus be possible to carry on work with two different classes simultaneously. The remainder of the building consists mainly of laboratories planned on the unit system, like those of the Medical Building. The equipment is intended to include all the most modern appliances for facilitating the work of the staff and students. The total cost is estimated at $225,000.

Plans are also under preparation for plant-houses in connection with the department of Botany, the probable site being the east side of the ravine, north of Hoskin Avenue.

The project of a new hospital, while not strictly speaking a University building, is vitally connected with the clinical teaching of the Medical Faculty. A sum of nearly $1,200,000 has already been provided from various sources, $500,000 having been given by the Legislature, $50,000 from the funds of the University, and $50,000 by the Medical Faculty. The site, though not yet

selected, it is reasonable to suppose, will be convenient to the University; and it is expected that the erection of the building will be commenced in the very near future.

The project for University men's residences on an extensive scale has assumed practical shape. The intention is to erect four houses, each containing accommodation for fifty students, at a cost of about $50,000 each. The sum of $50,000 has been provided by the Legislature; $50,000 has been contributed by Mr. E. C. Whitney; and about $50,000 has already been raised by private subscription, largely through the exertions of Mr. Z. A. Lash, K.C., Chairman of the Residence Trustees.

Building Requirements.

With regard to the new Mineralogical and Geological Museum, the desirability of which I urged in my last report, I may say that the project of erecting such a building is being delayed for the present by the consideration of a larger scheme involving the erection of a general museum to meet the wants of the above departments together with those of Archæology, Ethnology, etc.

Mention should also be made of the following additions which will be required for the full and symmetrical development of the University in the near future: (1) An administration building; (2) a central plant for the economical supply of heat, light and power to the whole group of University buildings; (3) the further extension of the present Biological building; (4) increased accommodation for examination purposes and for the classes in languages, literature and philosophy.

New Teaching Departments.

I beg to express the hope that the recommendation made in former reports with reference to the subjects of Botany, Forestry and Education will be carried out at no distant day.

I am gratified to report that during the year arrangements were made for the holding of a summer session, especially designed to meet the wants of teachers in the Public and High Schools. The first session under this arrangement was held in July and August of 1905, and was so successful that it is now considered desirable to continue these special courses and to increase its length, with the addition of such subjects as may be found necessary.

A similar new departure has been made, in connection with the work of the regular session, by the organization of classes in various subjects, and the delivery of lectures in the afternoon and evening, to meet the wants of teachers and others who find it impossible to attend during the day. Lectures have been provided for in Latin, English, French, German, Mathematics and Physics. The attendance has been very gratifying and it is intended that the work done shall be considered equivalent to that done in the regular courses leading to a degree.

Finances.

The following figures exhibit the total revenues and expenditures for the three Faculties of Arts (University and University College), Medicine, and Applied Science and Engineering.

	Revenue.	Expenditure.
Arts	$174,597 44	$213,720 12
Medicine	61,240 83	60,418 44
Applied Science and Engineering	73,475 24	73,475 24

Details of these figures will be found in the Addendum. The deficit in Arts was met by a Legislative grant.

The figures relating to Applied Science and Engineering are extracted mainly from the public accounts of the Province, the financial administration of the School of Practical Science being directly under Government control. The net cost of the school to the Province would appear to be $39,717.24.

I have the honor to be, sir,
Your obedient servant,

University of Toronto,
February 26th, 1906.

J. LOUDON,

ADDENDUM A.—REPORT OF THE DEAN OF THE FACULTY OF ARTS.

UNIVERSITY OF TORONTO,
February 14th, 1906.

JAMES LOUDON, ESQ., LL.D.,

President of the University of Toronto:

SIR,—I beg to submit herewith a detailed list, for the academic year 1904-05, of the personnel of the teaching staff of the Faculty of Arts of the University of Toronto, and also statistics as to the attendance of students in the various subjects taught by the members of the staff. As will be seen, certain classes are taken advantage of by students of the Faculties of Medicine and Applied Science.

FACULTY OF ARTS.

Physics:
Professor, James Loudon, M.A., LL.D.
Associate-Professor, W. J. Loudon, B.A.
Associate-Professor and Director of the Physical Laboratory, J. C. McLennan, B.A., Ph.D.
Lecturer, C. A. Chant, M.A., Ph.D.
Assistant Demonstrators, H. F. Dawes, B.A.; Miss L. B. Johnston, B.A.
Lecture Assistant, W. C. Jaques, B.A.
Class-Assistants, G. A. Brown; J. W. Cantelon, B.A.; L. Gilchrist, B.A.; W. Keast; A. G. McPhedran, B.A.; A. Thomson, B.A.

Mathematics:
Professor, Alfred Baker, M.A.
Associate-Professor, A. T. DeLury, M.A.
Associate-Professor, J. C. Fields, B.A., Ph.D.
Associate-Professor, M. A. Mackenzie, M.A.
Fellow, J. G. Parker, B.A.

Chemistry:
Professor and Director of Chemical Department, W. R. Lang, D.Sc., F.C.S., F.I.C.
Associate-Professor of Chemistry, W. L. Miller, B.A., Ph.D.
Lecturer, F. B. Allan, M.A., Ph. D.

Lecturer, F. B. Kenrick, M.A., Ph.D.
Fellow, R. E. DeLury, B.A.
Assistant, E. Forster, B.A.
Assistant, E. H. Jolliffe, B.A.
Class-Assistant, L. Gilchrist, B.A.

Biology:
Professor, R. Ramsay Wright, M.A., LL.D.
Lecturer on Zoology and Assistant Curator of the Biological Museum, B. A. Bensley, B.A., Ph.D.
Lecturer in Elementary Biology and Histology, W. H. Piersol, B.A., M.B.
Lecturer in Botany, J. H. Faull, B.A.
Lecturer in Botany, R. B. Thomson, B.A.
Class-Assistants, E. A. McCulloch, B.A., M.B.; M. H. Embree, B.A., M.B.; A. H. Adams, B.A., M.B.; A. C. Hendrick, M.A., M.B.; A. J. McKenzie, B.A., LL.B., M.B.; M.D. McKichan, B.A., M.B.; J. D. Loudon, B.A.; F. J. Munn, B.A.; H. M. McNeil, B.A.; A. B. Rankin, B.A.

Physiology:
Professor, A. B. Macallum, M.A., M.B., Ph.D.
Demonstrator, V. E. Henderson, M.A., M.B.
Class-Assistants, E. C. Dickson, B.A.; W. J. O. Malloch, B.A., M.B.; A. Henderson, B.A.; A. C. Hendrick, M.A., M.B.; W. P. Kaufmann, B.A.; Miss L. M. Menten, B.A.

Geology:
Professor, A. P. Coleman, M.A., Ph.D.
Associate-Professor, W. A. Parks, B.A., Ph.D.

Mineralogy and Petrography:
Professor, T. L. Walker, M.A., Ph.D.
Class-Assistants, H. L. Kerr, B.A.; W. H. Collins, B.A.

Comparative Philology:
Professor, Maurice Hutton, M.A., LL.D.

Modern History:
Professor, G. M. Wrong, M.A.
Lecturer, E. J. Kylie, B.A.

Political Economy:
Professor, James Mavor.
Lecturer, S. M. Wickett, B.A., Ph.D.
Lecturer, T. Fraser Scott, M.A.

Philosophy:
Professor of History of Philosophy, J. G. Hume, M.A., Ph.D.
Professor of Philosophy and Director of the Psychological Laboratory, A. Kirschmann, M.A., Ph.D.
Lecturer, F. Tracy, B.A., Ph.D.
Lecturer and Assistant in Psychological Laboratory, A. H. Abbott, B.A., Ph.D.
Assistant in Psychological Laboratory, W. G. Smith, B.A.

Italian and Spanish:
Professor, W. H. Fraser, M.A.
Lecturer, F. J. A. Davidson, M.A., Ph.D.

Roman Law, Jurisprudence, and History of English Law:
Professor, A. H. F. Lefroy, M.A.

Constitutional and International Law and Constitutional History:
Professor, J. M. Young, M.A.

The following tables exhibit the numbers attending lectures in University subjects, together with the numbers of those taking the practical work in the laboratories:

MATHEMATICS.

	Pass.	Pass and Honors.	Honors.
Arts—First Year	202	.....	23
Second Year	.....	.....	51
Third Year	.....	.....	13
Fourth Year	18	.....	8
Applied Science—First Year	.....	210	.....
Second Year	.....	.....	139
Totals	220	210	234

PHYSICS.

	Pass.	Pass and Honors.	Honors.	Laboratory.
Arts—First Year	24	.....	75	75
Second Year	.....	.....	93	45
Third Year	10	.....	27	27
Fourth Year	.....	.....	5	5
M. A. Students	.....	4	.....	4
Medicine—First Year	.....	141	.....	141
Dentistry—First Year	39	.....	.....	.....
Household Science—First Year	.....	4	.....	4
Totals	73	149	200	301

BIOLOGY.

	Pass.	Pass and Honors.	Honors.	Laboratory.
Arts—First Year	147	58	.....	58
Second Year	.....	.....	27	27
Third Year	.....	.....	19	19
Fourth Year	.....	.....	14	14
Medicine—First Year	.....	142	.....	142
Second Year	.....	148	.....	148
Household Science—First Year	4	.....	.....	.....
Second Year	.....	.....	6	6
Third Year	.....	.....	2	2
Applied Science	.....	.....	2	2
Graduate Students	.....	.....	.....	1
Totals	151	348	70	419

PHYSIOLOGY.

	Pass.	Pass and Honors.	Honors.	Laboratory
Arts—Second Year	.....	.....	.....	.....
Fourth Year	.....	.....	15	15
Graduate Students	.....	.....	.....	2
Medicine—First Year	.....	159	.....	.....
Second Year	.....	154	.....	154
Fifth Year	.....	6	.....	.....
Household Science—Second Year	.....	6	.....	.....
Third Year	.....	2	.....	2
Totals	.....	327	15	173

CHEMISTRY.

	Pass.	Pass and Honors.	Honors.	Laboratory
Arts—First Year	.....	.....	61	61
Second Year	5	.....	31	31
Third Year	.....	.....	33	33
Fourth Year	.....	.....	6	6
Graduate Students	.....	.....	.....	4
Medicine—First Year	.....	147	.....	147
Second Year	.....	148	.....	148
Household Science—Third Year	.....	.....	2	2
Totals	5	295	133	432

GEOLOGY.

	Pass.	Pass and Honors.	Honors.	Laborator
Arts—First Year	.....	.....	51	.....
Second Year	93	.....	7	7
Third Year	.....	.....	17	5
Fourth Year	.....	.....	7	1
Ph.D. Students	.....	.....	.....	.....
Applied Science—Second Year	.....	87	.....	.....
Third Year	.....	39	.....	.....
Fourth Year	.....	.....	6	.....
Totals	93	126	88	13

MINERALOGY.

	Pass.	Pass and Honors.	Honors.	Laboratory.
Arts—Second Year			8	8
Third Year			12	12
Fourth Year			8	8
Graduate Students			1	4
Applied Science—First Year			117	117
Second Year			21	84
Third Year				12
Fourth Year			6	6
Totals			173	251

PHILOSOPHY.

	Logic.		Physchology.			Logic.		Metaphysics.	Philosophy
			Pass.	Honors.					
	Pass.	Honors.		Phil. Stu.	Nat. Sci. Stu.	Pass.	Honors.	Honors.	Honors.
Second Year			179	48		173	44	47	48
Third Year		30		30			30	30	30
Fourth Year	39	19		19	8		19	19	19
Graduate Students				11					11
Ph.D. Students				5					5
Totals	39	49	179	113	8	173	93	96	108

POLITICAL SCIENCE AND HISTORY.

	Economics.		History.		Constitutional History.		Law.
	Pass.	Honors.	Pass.	Honors.	Pass.	Honors.	Honors.
Second Year	15	38	61	45		38	
Third Year	8	22	45	44	23	22	22
Fourth Year	31	26	35	49	31	26	26
Graduate Students			10	3			
Commercial Students :							
First Year	12						
Second Year	1						
Household Science	3						
Occasional Students	1						
Totals	71	86	151	141	54	86	48

ITALIAN, SPANISH AND PHONETICS.

	Italian.	Spanish.		Phonetics.
	Honors.	Pass.	Honors.	Honors.
First Year	52	3	26	59
Second Year	30	4	12	.....
Third Year	6	.....	6	.....
Fourth Year	4	.....	2	.....
Occasional Students	2	.....	1	.....
Totals	94	7	47	59

I also subjoin statistics as to the courses selected by regular students proceeding to a degree in the University. The following table indicates whether the students in question are enrolled in University College, Victoria College or Trinity College:

SESSION 1904-1905.

	First Year.			Second Year.			Third Year.			Fourth Year.				
	U.C.	V.C.	T.C.	U.C.	V.C.	T.C.	U.C.	V.C.	T.C.	U.C.	V.C.	T.C.	M.A.	Ph.D.
General	73	51	26	22	13	....	17	6	....	17	14	....	....	....
Classics	8	1	3	8	2	....	7	5	....	7	5	....	3	....
English & History (Class)	5	3	1	3	....	....	3	2	....	6	2	....	....	....
English & History (Mods)	8	6	3	7	....	....	....	....	....	5	....	....	....	....
Modern Languages	32	11	6	27	14	....	21	5	....	18	7	....	12	....
Semitic Languages	....	....	....	2	4	....	1	1	....	1	....	....	8	1
Greek and Hebrew	....	2	....	1	....	....	1	....	....	....	....	....	....	....
Philosophy	....	....	....	21	15	....	18	14	....	12	6	....	4	....
History	7	3	....	....	....	....	....	....	....	3	....	....	10	....
Political Science	....	....	....	25	4	....	16	3	....	22	3	....	5	....
Mathematics and Physics	14	5	2	15	5	....	8	6	....	6	1	....	1	....
Science	39	9	2	23	5	....	....	....	....	6	....	....	4	....
Biological & Phys. Sci'ces	....	....	....	....	....	....	13	2	....	....	....	....	....	....
Natural Science (Div. I)	....	....	....	....	....	....	4	....	....	6	1	....	1	....
Natural Science (Div. II)	....	....	....	....	....	....	1	....	....	7	1	....	....	....
Chemistry & Mineralogy	....	....	....	1	3	....	9	4	....	1	....	....	....	....
Trinity College	....	....	....	....	....	36	....	....	45	4	3	....	2	....
Household Science	....	4	....	3	5	....	....	2	....	....	....	....	7	....
Commercial Course	2	1	....	1	....	....	....	....	....	....	....	....	....	....
	188	96	43	159	70	36	119	50	45	121	43	....	57	1

(Sgd.) R. RAMSAY WRIGHT,
Dean of the Faculty of Arts.

ADDENDUM B.—REPORT OF UNIVERSITY COLLEGE.

Principal, Maurice Hutton, M.A., LL.D.

Greek:

Professor, Maurice Hutton, M.A., LL.D.
Associate-Professor, Adam Carruthers, M.A.
Instructor, W. H. Tackaberry, M.A.

Latin:
Professor, John Fletcher, M.A., LL.D.
Associate-Professor in Latin and in Ancient History, W. S. Milner, M.A.
Lecturer, G. W. Johnston, B.A., Ph. D.

English:
Professor, W. J. Alexander, B.A., Ph.D.
Associate-Professor of Anglo-Saxon, D. R. Keys, M.A.
Lecturer, M. W. Wallace, B.A., Ph.D.

German:
Professor, W. H. Vandersmissen, M.A.
Lecturer, G. H. Needler, B.A., Ph.D.
Instructor, P. Toews, M.A., Ph.D.

French:
Professcr, John Squair, B.A.
Associate-Professor, John Home Cameron, M.A.
Instructor, St. Elme de Champ, B. ès L.

Oriental Literature:
Professor, J. F. McCurdy, Ph.D., LL.D.
Lecturer, T. Eakin, M.A., Ph.D.
Instructor, C. A. McRae, M.A.

Ethics:
Professor, J. G. Hume, M.A., Ph.D.

The following table exhibits the number of students in attendance during the session:

First Year:		
Regular	197	
Occasional	10	
		207
Second Year:		
Regular	173	
Occasional	5	
		178
Third Year:		
Regular	128	
Occasional	12	
		140
Fourth Year:		
Regular	127	
Occasional	10	
		137
Graduates		3
Ph.D.		4
		669

The following tables exhibit the number of students in attendance upon lectures in subjects of the General and Honor Courses:

GENERAL COURSE.

	Greek.	Latin.	Ancient History.	English.	German.	French.	Orientals.	Ethics.
First Year	24	165	68	102	101	81	32	.....
Second Year	18	81	.....	83	64	56	16	.....
Third Year	5	28	.....	79	14	12	3	69
Fourth Year	3	13	.....	38	9	16	.....	.....
Totals	50	287	68	302	188	165	51	69

HONOR COURSE.

	Greek.	Latin.	Ancient History.	English.	German.	French.	Orientals.	Ethics.
First Year	8	17	29	90	54	67	2	.....
Second Year	10	11	44	59	34	37	3	.....
Third Year	7	10	10	34	24	25	2	18
Fourth Year	10	11	7	45	24	23	1	15
Graduate Students	1	.....	.....	.....	.....	.....	1	2
Ph. D. Students	.....	.....	.....	.....	.....	.....	3	1
	36	49	90	228	136	152	12	36

ADDENDUM C.—VICTORIA UNIVERSITY.

Rev. Nathanael Burwash, S.T.D., LL.D., F.R.S.C., President.

Rev. Alfred H. Reynar, M.A., LL.D., Dean of the Faculty of Arts and William Gooderham Professor of English Literature.

A. R. Bain, M.A., LL.D., Nelles Professor of Ancient History.

Rev. E. I. Badgley, M.A., LL.D., Egerton Ryerson Professor of Mental and Moral Philosophy.

Rev. Francis Huston Wallace, M.A., D.D., Dean of Faculty of Theology and Geo. A. Cox Professor of Biblical Greek.

A. J. Bell, M.A., Ph.D. (Bresl.), Macdonald Professor of Latin Language and Literature.

Rev. John Burwash, M.A., D.Sc., LL.D., H. A. Massey Professor of English Bible.

L. E. Horning, M.A., Ph.D. (Goettingen), Professor of German and Old English.

Rev. J. F. McLaughlin, B.A., B.D., Eliza Phelps Massey Professor of Oriental Languages and Literature.

J. C. Robertson, B.A., W. E. H. Massey Professor of the Greek Language and Literature.

Pelham Edgar, Ph.D., Eliza Gooderham Professor of the French Language and Literature.

A. L. Langford, M.A., Associate-Professor of the Greek Language and Literature.

A. E. Lang, M.A., Associate-Professor of the German Language and Literature.

E. Masson, Instructor in French.

A. P. Misener, M.A., Lecturer in Oriental Languages and Literature.

J. H. Sheppard, Instructor in Elocution.

The following table exhibits the number of Arts students in attendance during the session of 1904-05 :

First Year:		
Regular	96	
Occasional	15	
		111
Second Year:		
Regular	70	
Occasional	12	
		82
Third Year:		
Regular	50	
Occasional	8	
		58
Fourth Year:		
Regular	43	
Occasional	11	
		54
Graduates:		
Occasional	6	
Ph. D.	2	
		8
		313

ADDENDUM D.—TRINITY COLLEGE, FACULTY OF ARTS, 1904-1905.

Provost..... Rev. T. C. S. Macklem, M.A., D.D.
Dean..... Rev. H. T. F. Duckworth, M.A.
Registrar..... A. H. Young, M.A.
Librarian..... G. Oswald Smith, M.A.
Bursar..... Rev. William Jones, M.A., D.C.L.

J. W. G. Andras, Ph.D. (Tübingen)—Lecturer in Modern Languages.
Rev. William Clark, M.A. (Oxon.), D.D. (Queen's), D.C.L. (Trin.)—Professor of English Literature; Professor of Mental and Moral Philosophy.
Rev. H. T. F. Duckworth, M.A. (Oxon.)—Professor of Divinity and Lecturer in Classics.
Rev. T. H. Hunt, M.A., D.D.—Lecturer in Hebrew and Theology.
Rev. A. W. Jenks, M.A. (Dartmouth), B.D. (Gen. Theol. Sem., N. Y.)—Professor of Divinity.
Rev. C. B. Kenrick, M.A. (Trin.)—Lecturer in Divinity.
Rev. E. L. King, B.A. (Man.)—Lecturer in Divinity and Moral Philosophy.
M. A. Mackenzie, A.I.A., M.A. (Trin. and Cantab.)—Professor of Mathematics.
H. Montgomery, M.A. (Tor.), Ph.D. (Wesleyan, Ill.)—Professor of Natural Science.
E. T. Owen, M.A. (Trin.)—Fellow in Classics.
E. M. Sait, M.A. (Trin.)—Lecturer in History.
T. F. Scott, M.A. (Edin.)—Lecturer in Political Science.
H. C. Simpson, B.A. (Oxon.), M.A. (Trin.)—Lecturer in English.
G. O. Smith, B.A. (Oxon), M.A. (Trin)—Professor of Classics.
Rev. E. A. Welch, M.A. (Cantab.), D.C.L. (Trin.)—Special Lecturer in Divinity.
A. H. Young, B.A. (Tor.), M.A. (Trin.)—Professor of Modern Languages.
Rev. E. C. Cayley, M.A. (Trin.)—Special Lecturer in Divinity.

The following table exhibits the number of Arts students in attendance during the session 1904-05:

First year	40 (29 men, 11 women).
Second year	36 (28 men, 8 women).
Third year	45 (35 men, 10 women).
Total	121

ADDENDUM E.—FACULTY OF MEDICINE.

Dean of the Faculty of Medicine, Professor R. A. Reeve, B.A., M.D., LL.D.

Professors Emeriti:

M. H. Aikins, M.D., W. W. Ogden, M.D., J. H. Richardson, M.D., Uzziel Ogden, M.D.

Professors of Surgery and Clinical Surgery:

I. H. Cameron, M.B.,Tor., F.R.C.S.,Eng.; F. LeM. Grasett, M.B., C.M., F.R.C.S., Edin.; G. A. Peters, M.B., Tor., F.R.C.S., Eng.; L. Teskey, M.D., C.M.,Trin.

Associate Professor of Clinical Surgery and Clinical Anatomy:

G. A. Bingham, M.D., C.M.,Trin., M.B.,Tor.

Associate Professors of Clinical Surgery:

A. Primrose, M.B., C.M.,Edin.; N. A. Powell, M.D., C.M.,Trin., M.D., Bellevue, N.Y.; W. Oldright, M.A., M.D.,Tor.; H. A. Bruce, M.B.,Tor., F.R.C.S.,Eng.; F. N. G. Starr, M.B.,Tor.

Associate Professor of Clinical Surgery in charge of Orthopœdics:

C. L. Starr, M.B.,Tor.

Demonstrators of Clinical Surgery:

W. McKeown, B.A., M.B.,Tor.; C. A. Temple, M.D., C.M.,Trin.; A. H. Garratt, M.D., C.M.,Trin.; C. B. Shuttleworth, M.D., C.M.,Trin., F.R.C.S.,Eng.; T. B. Richardson, M.D. C.M.,Trin., F.R.C.S., Edin.; J. F. Uren, M.D., C.M.,Trin.

Professor and Director of the Anatomical Department:

A. Primrose, M.B., C.M.,Edin.

Associate Professor of Anatomy:

H. W. Aikins, B.A., M.B.,Tor.

Demonstrator of Anatomy:

C. B. Shuttleworth, M.D., C.M.,Trin., F.R.C.S.,Eng.

Assistant Demonstrators of Anatomy:

W. J. McCollom, M.B.,Tor.; W. J. O. Malloch, B.A., M.B.,Tor.; S. W. Westman, M.B.,Tor.; G. Elliott, M.D., C.M.,Trin.; E. R. Hooper B.A., M.B.,Tor.; W. J. Wilson, M.B.,Tor.; A. C. Hendrick, M.A., M.B.,Tor.; A. J. Mackenzie, B.A., LL.B., M.B.,Tor.; D. McGillivray, M.B.,Tor.; E. S. Ryerson, M.D., C.M.,Trin.; F. W. Marlow, M.D., C.M.,Trin., F.R.C.S.,Eng.; W. A. Scott, B.A., M.B.,Tor. F.R.C.S., Eng.

Professor of Medicine and Clinical Medicine:

A. McPhedran, M.B., Tor.

Associate Professors of Medicine:

J. T. Fotheringham, B.A.,Tor., M.D., C.M.,Trin.; R. D. Rudolf, M.D. C.M.,Edin., M.R.C.P.,Lond.

Professor of Clinical Medicine:

J. L. Davison, B.A.,Tor., M.D., C.M.,Trin.

Associate Professors of Clinical Medicine:

A. M. Baines, M.D., C.M.,Trin.; W. P. Caven, M.B.,Tor.; W. B. Thistle, M.B.,Tor.; J. T. Fotheringham, B.A.,Tor., M.D., C.M. Trin.; A. R. Gordon, M.B.,Tor.; R. J. Dwyer, M.B.,Tor., M.R.C.P. Lond.; H. B. Anderson, M.D., C.M.,Trin.

Associates in Clinical Medicine:

R. D. Rudolf, M.D., C.M.,Edin., M.R.C.P.,Lond.; G. Chambers, B.A. M.B.,Tor.; G. Boyd, B.A., M.B.,Tor.; F. Fenton, M.D., C.M. Trin.; H. C. Parsons, M.A., M.D., C.M., Trin.; W. Goldie, M.B. Tor.

Professor of Pathology and Bacteriology and Curator of the Museum and Laboratories:
J. J. McKenzie, B.A., M.B., Tor.
Associate Professor of Pathology and Bacteriology:
J. A. Amyot, M.B., Tor.
Laboratory Assistant in Bacteriology:
T. D. Archibald, B.A., M.B.,Tor.
Demonstrators in Pathology:
G. Silverthorn, M.B.,Tor.; C. J. Wagner, M.B.,Tor.
Assistant Demonstrators of Pathology:
W. H. Pepler, M.D., C.M.,Trin.; H. C. Parsons, B.A., M.D., C.M., Trin.; M. M. Crawford, M.B., Tor.; F. A. Clarkson, M.B., Tor.; E. S. Ryerson, M.D., C.M., Trin.; G. W. Howland, B.A., M.B., Tor., M.R.C.P.,Lond.; A. H. W. Caulfield, M.B.,Tor.
Assistants in Clinical Laboratory:
H. S. Hutchison, M.B.,Tor.; F. E. Watts, M.B.,Tor.
Professor of Preventive Medicine:
C. Sheard, M.D., C.M.,Trin.
Professor of Materia Medica, Pharmacology and Therapeutics:
J. M. MacCallum, B.A., M.B.,Tor.
Demonstrator of Pharmacology:
V. E. Henderson, M.A., M.B., Tor.
Demonstrator of Pharmacy:
C. P. Lusk, M.D., C.M.,Trin.
Professor of Gynæcology and Operative Obstetrics:
J. Algernon Temple, M.D., C.M.,McGill.
Professor of Obstetrics:
A. H. Wright, B.A., M.B.,Tor.
Professor of Gynæcology:
J. F. W. Ross, M.B.,Tor.
Associate Professor of Obstetrics and Pediatrics:
H. T. Machell, M.B.,Tor.
Associate Professor of Pediatrics:
A. M. Baines, M.D., C.M.,Trin.
Associates in Obstetrics:
K. C. McIlwraith, M.B.,Tor.; F. Fenton, M.D., C.M.,Trin.
Professors of Ophthalmology and Otology:
R. A. Reeve, B.A., M.B., LL.D., Tor.; G. S. Ryerson, M.D., C.M., Trin.; G. H. Burnham, M.D.,Tor., F.R.C.S.,Edin.
Associate-Professor of Ophthalmology and Otology:
C. Trow, M.D., C.M.,Trin.
Associate in Ophthalmology and Otology:
J. M. MacCallum, B.A., M.B.,Tor.
Professor of Laryngology and Rhinology:
G. R. McDonagh, M.B.,Tor.
Associate Professor of Laryngology and Rhinology:
D. J. G. Wishart, B.A.,Tor., M.D., C.M.,McGill.
Associate in Laryngology and Rhinology:
G. Boyd, B.A., M.B.,Tor.
Professor of Hygiene:
W. Oldright, M.A, M.B.,Tor.
Professor of Toxicology:
W. H. Ellis, M.A., M.B.,Tor.

Professor of Medical Jurisprudence:
N. A. Powell, M.D., C.M.,Trin.; M.D., Bellevue, N.Y.
Extra-Mural Professors of Mental Diseases:
N. H. Beemer, M.B.,Tor.; J. C. Mitchell, M.D., C.M.,Trin.
Professor of Physics:
James Loudon, M.A., LL.D.,Tor.
Lecturer on Physics:
C. A. Chant, B.A.,Tor., Ph.D.,Harv.
Professor of Chemistry:
W. R. Lang, D.Sc.,Glasg.
Associate Professor of Medical Chemistry:
W. T. Stuart, M.D., C.M.,Trin.
Lecturers in Chemistry:
F. B. Kenrick, M.A.,Tor., Ph.D.,Leipzig; F. B. Allan, M.A., Ph.D.,
Tor.
Professor of Biology:
R. Ramsay Wright, M.A., B.Sc.,Edin., LL.D.,Tor.
Lecturer in Zoology:
B. A. Bensley, B.A.,Tor., Ph.D..Col.
Lecturer in Elementary Biology and Histology:
W. H. Piersol, M.B.,Tor.
Professor of Physiology:
A. B. Macallum, M.A., M.B.,Tor., Ph.D., Johns Hopkins.
Demonstrator of Physiology:
V. E. Henderson, M.A., M.B.,Tor.
Assistant Demonstrators of Physiology:
W. J. O. Malloch, B.A., M.B.,Tor.; A. C. Hendrick, M.A., M.B.,To
E. C. Dickson, B.A., Tor.; A. Henderson, B.A.,Tor.; W. P. Kaufmann, Miss M. L. Menten, B.A.,Tor.

The following table exhibits the number of students registered as in attendance upon lectures given by the staff of the Faculty of Medicine:

Graduate students	11
Fourth year students	164
Third year students	124
Second year students	154
First year students	169
Occasional (Dental) students	30
	652

ADDENDUM F.—APPLIED SCIENCE AND ENGINEERING.

Dean of the Faculty, Principal GALBRAITH, M.A., LL.D.

Chemistry:
Professor W. H. Ellis, M.A., M.B.
Lecturer, J. W. Bain, B.A. Sc.
Demonstrator, E. G. R. Ardagh, B.A.Sc.
Fellow, E. Wade, Grad. S.P.S.
Fellow, S. Dushman, B.A.
Lecture Assistant, J. A. Horton, Grad. S.P.S.
Geology, Mining and Metallurgy:
Professor, A. P. Coleman, Ph. D.
Professor, G. R. Mickle, B.A.
Fellow, J. G. McMillan, B.A. Sc.

Applied Mechanics:
Professor, J. Galbraith, M.A.
Lecturer, J. McGowan, B.A., B.A. Sc.
Lecturer, R. W. Angus, B.A. Sc.
Demonstrator, H. G. McVean, B.A.Sc.
Demonstrator, P. Gillespie, B.A.Sc.
Fellow, J. A. McFarlane, B.A.Sc.
Architecture and Drawing:
Professor, C. H. C. Wright, B.A.Sc.
Demonstrator, J. R. Cockburn, B.A.Sc.
Fellow, M. R. Riddell, Grad. S.P.S.
Fellow, A. E. Gibson, B.A.Sc.
Surveying and Geodesy:
Professor, L. B. Stewart, D.T.S.
Fellow, J. L. R. Parsons, B.A.
Fellow, N. D. Wilson, B.A.Sc.
Electricity:
Professor, T. R. Rosebrugh, M.A.
Demonstrator, H. W. Price, B.A.Sc.
Fellow, G. J. Manson, Grad. S.P.S.
Fellow, H. G. Smith, B.A.Sc.
Physics:
Lecturer, G. R. Anderson, M.A.

Number of Students by Years.

First year	210
Second year	146
Third year	76
Fourth year	47
Occasional	5
	484

Number of Students by Departments.

1. Civil Engineers	188
2. Mining Engineers	55
3. Mechanical and Electrical Engineers	213
4. Architecture	7
5. Applied Chemistry	19
6. Chemical Engineering	2
	484

Addendum G.—The Library.

The Librarian of the University begs to submit his annual report for e year ending June 30th, 1905:

1. The number of bound volumes added to the Library during the year s 3,292, of which 303 were presentations, making the total contents of e Library 80,937 volumes. The number of pamphlets added during the ar was 1,509. The total number of pamphlets now exceeds 21,000.

2. During the session 1904-5, the average continuous number of readers the reading-room is estimated at 63. The largest number counted was

149 in the morning of April 17th. The statistics of the use of books by students are as follows, comparison being made with similar statistics for previous years:

	1902-3.	1903-4.	1904-5.
Average number of books read in the reading-room during term, per week	819	768	729
Average number of books borrowed by students over night, per week	328	338	302
Total number of books taken out by students for periods longer than one night	2,788	3,390	3,846

Under the arrangement for giving students access to the stack-room on recommendation of a professor, 30 persons were admitted during the year for various periods; the number for the previous year was 33.

3. The number of institutions and learned societies on the exchange list of the Library, to which the University of Toronto Studies and the University Calendar and Examination Papers are sent is now 375. The Library receives 339 periodicals and serial publications in return, besides University Calendars and many occasional publications from Institutions included in the above total of 375 to which the University's publications are sent.

4. A beginning was made last year towards a more adequate appropriation for expenditure on books and periodicals, when the total sum from current income and insurance on the old library was raised from $6,000 to $6,500. The policy thus begun of making a yearly increase should be followed until such an annual appropriation is reached as will be commensurate both with the increased cost and number of books and periodicals required, and with the growing number of subjects now studied in the University.

5. In the reports of the last two years attention was drawn to the insufficient accommodation afforded by the existing library building. Since the date of the last report, a library fee has been imposed upon students in Medicine, and funds for the purchase of text-books in Medicine for their special use have been provided. It is likely, therefore, that the number of readers and borrowers will be considerably swelled within the next few years, by the addition of the Undergraduates in Medicine to those in Arts, who alone, hitherto, have been in the habit of using the library. An increase of half as many readers as are now accommodated would pack the reading-room to its utmost capacity during the winter months, and on about half a dozen days during the session some intending readers would have to be turned away for want of space. With the continually increasing number of Arts Students and the newly awakened interest of the Medical Students in the Library, it is obvious that the extension of the reading-room has become as pressing a necessity as the extension of the stack-room which was chiefly urged in previous reports. In fact, an entire reconstruction of the building, making provision not for ten or fifteen years, but for twenty-five, fifty, or a hundred years, is the only proper solution of the problem of lack of accommodation in all branches of the library service. It will be remembered that the present building is not yet fifteen years old, and that it was supposed, at the time of erection, to be adequate to any expansion of the University for at least double the number of years that have since elapsed.

All of which is respectfully submitted.

(Sgd.) H. H. LANGTON,
Librarian.

Addendum H.—Biological Museum.

Feb. 21, 1906.

To the President of the University of Toronto.

Sir,—I beg to report as follows with regard to the condition of the Biological Museum, during the present academical year:

1. Considerable progress has been made with the Botanical collection referred to in last year's report, and the cases for its accommodation and display are in course of preparation.

2. The work of arranging the Zoological collection has also progressed chiefly in the group of the Mollusca, the arrangement of which has been undertaken by Mr. Williams.

3. Professor Montgomery has continued to give some time to the Museum and is at present engaged in arranging the Echinodermata.

4. I beg to repeat, however, that some permanent provision must be made in the near future for the diagnosis, cataloguing, arrangement and display of our Zoological collections, the time of the various members of the staff being wholly occupied by the largely increased demands in teaching.

5. The circumstance that "Nature Study" has been given a prominent place in the Educational Programme for the Public and High Schools of Ontario renders it necessary that a special collection of the Natural History of Ontario arranged from this point of view, should be made.

Such a collection would primarily be of service to those students who are preparing themselves as specialists in the High Schools, but would also be very useful to the students of the summer session who are, in many cases, Public School Teachers seeking to qualify themselves to carry out the Educational programme in its entirety, and I may add that it would also be very instructive to the numerous pupils of the Public and Secondary Schools of the City who visit the Museum in increasing numbers.

I have the honor to be, Sir,

Your obedient servant,

(Sgd.) R. RAMSAY WRIGHT.

Addendum J.—Memorandum Regarding Geological and Mineralogical Museum.

In view of the occupation of the new Science Building, it is necessary to consider the space available for museum purposes. Owing to the cutting down of the plan, the wing intended for the museum was omitted, and it has been arranged that a large lecture-room shall be used temporarily for museum purposes. The ground space thus provided is about 50 by 80 feet. The palæontological material now on hand, including the collection being transferred to the department by Mr. B. E. Walker, is sufficient to fill the whole space. Other departments require accommodation as well, showing that the present provision is entirely insufficient. To provide for the present collections and future expansion, it is desirable that a suitable building should be erected as soon as possible. At present this material is stored in drawers and is being transferred into the new cases purchased during the last year; a large number more of similar cases will be required to properly exhibit the specimens already in the possession of the department, without any allowance for a much needed increase. The present museum accommodation is entirely inadequate for the needs of the Departments of Geology and of Mineralogy.

(Sgd.) A. P. COLEMAN,
Professor of Geology.

Addendum K.—University of Toronto Studies.

To the President of the University of Toronto.

Sir,—I beg to submit the following report on University of Toronto Studies for the year 1905:

1. The publications of the year were as follows:—

History and Economics—Review of Historical Publications, Vol. 9, edited by Messrs. Wrong and Langton.

History and Economics—A colony of Emigrés in Canada, 1789-1816. by Lucy Elizabeth Textor.

Psychology—Combinations of colours with tints and with shades, by F. Louis Barber; Stereoscopic vision and intensity (second paper), by T. R. Robinson.

Biology—The megaspore-membrane of the gymnosperms, by R. B. Thomson.

Papers from the Chemical Laboratories—The determination of phenol, by S. J. Lloyd.

Tribromphenolbromide, its detection, estimation, rate of formation and reaction with hydriodic acid, by S. J. Lloyd.

Chemical industries of the Dominion, by Professor W. R. Lang.

All of which is respectively submitted.

(Sgd.) H. H. LANGTON,
General Editor.

Addendum L.—Marine and Lacustrine Biological Stations of Canada.

February 21, 1906.

To the President of the University of Toronto:

Sir,—I beg to submit the following report as to the co-operation of members of the University in the scientific work carried on at these stations. The appropriation made by the Board of Trustees has been expended in meeting, in part or in whole, the expenses of workers not provided for out of the Dominion appropriation.

Marine Station at Gaspe, P. Q.

Owing to absence in Europe, I was unable to be present at the Marine Station during the past summer. Two students, however, of the Biological Department were assisted from the appropriation to go there and worked under the guidance of Dr. J. Stafford, Curator of the Station and formerly an Assistant in this Department of the University.

Lacustrine Station on Georgian Bay.

Dr. B. A. Bensley, who was in charge, reports as follows: "During the season of 1905, the laboratory was occupied from June 1st to September 15th, the following workers being present throughout this period:—Mr. A. G. Huntsman, B.A., Laboratory Assistant in Biology, Mr. I. R. Bell and Mr. J. R. G. Murray, students of the University of Toronto. Mr. A. Pearson, B. A., Science Master at Ingersoll Collegiate Institute, was also in attendance during a considerable portion of the summer.

Experiments in fish-hatching were made during June, and observations on the growth and feeding habits of important fishes during the remainder of the season. Mr. Bell undertook a preliminary study of the microscopic forms of life in the water with particular reference to the primary food of the black bass. Mr. Murray made a valuable series of illustrations of these forms and of the typical stages in development of the black bass young. Periodic visits were made with fishermen to the whitefish grounds and data collected bearing on the natural history of food-fishes. Mr. Huntsman assisted in the latter work and also rendered valuable service in the preparation of museum and laboratory material for the University.

The expenses of Messrs. Huntsman, Bell, and Murray were met out of the appropriation made for this purpose by the Trustees of the University."

I have the honor to be,
Sir,
Your obedient servant,
(Sgd.) R. RAMSAY WRIGHT.

ADDENDUM M.—FINANCIAL STATEMENT.

I. FACULTY OF ARTS.

Receipts, 1904-5.

Interest on purchase moneys	6,646 80
" loans	10,995 35
" debentures	11,524 67
" bank balances	1,659 48
" cost of new building payable by Medical Faculty	3,000 00
" share of equipment " "	1,159 39
Rentals, University Park Lands	13,324 26
" business properties	3,462 69
" School of Science site	925 00
" Biological Building	1,900 00
" City of Toronto (park)	6,000 00
Sundry land earnings	926 42
Fees	67,056 15
Legislative Grant, 60 Vict., Cap. 59	7,000 00
Wild land sales	1,647 72
	$137,227 93
Reserve for interest on Retirement Fund, Scholarship and other Trust Funds	10,262 98

Summary of Expenditure

1. Salaries	108,510 89
2. Bursar's Office	900 62
3. Registrar's Office	3,882 22
4. Vice-Chancellor's Office	725 00
5. President's Office	908 82
6. Law Costs	1,263 07
7. General Incidentals	1,249 00
8. Insurance	2,000 00
9. Telephones	345 87
10. Convocation Expenses	1,260 93
11. Examinations	9,334 48
12. Library	4,268 15
13. Grounds	3,286 40
14. Main Building	7,346 52
15. Biological Department	7,952 17
16. Physiological Department	3,865 55
17. Psychological Department	450 00
18. Mathematics	52 83
19. Political Science	36 85

20. History	93 50
21. Italian and Spanish	34 75
22. Advertising (University)	432 60
23. Incidentals (University)	195 45
24. University College Departments :	
Classics	.....
English	150 00
French	180 00
German	175 00
Oriental Literature	25 00
Stationery	62 20
Printing	57 41
Advertising	19 60
Incidentals	444 71
25. Gymnasium and Students' Union	1,534 50
26. Dining Hall	500 00
27. University Press	1,250 00
28. Educational Association Reception	243 00
29. Observatory Removal	1,075 00
30. Senate Elections	792 00
31. Unforeseen and unprovided for	1,183 20
Total Expenditure (exclusive of Departments sustained by Government).	$166,087 60

Salaries.

1. Bursar's Office :	
Bursar	2,550 00
Clerk and Bookkeeper, formerly Accountant	1,072 80
Fees Clerk	800 00
Assistant and Stenographer (6½ months)	227 50
	4,650 30
2. Library :	
Librarian	2,300 00
First Assistant	600 00
Second Assistant	550 00
Cataloguer	500 00
Two Delivery Clerks	375 00
Caretaker	600 00
	4,925 00
3. University of Toronto :	
President (also paid as Professor of Physics)	2,300 00
Vice-President	400 00
Registrar	2,000 00
Registrar's Assistant	750 00
General Typewriters	585 00
Bedell (with house)	650 00
Architect	100 00
Janitor	550 00
Engineer (with house and fuel)	650 00
Fireman (8 months)	320 00
Carpenter	650 00
Cleaners	802 00
Gardener (with house ; 10 months)	375 00
Messenger	230 00
Nightwatchman	567 00
	10,929 00
4. Teaching Staff, etc., University of Toronto ;	
(*a*) Modern History and Ethnology :	
Professor	3,200 00
Lecturer	1,300 00
	4,500 00
(*b*) Political Science :	
Professor	3,200 00
Professor of Constitutional and International Law and Constitutional History	1,800 00
Professor of Roman Law, Jurisprudence and History of English Law	1,000 00
Lecturer, Economics (one-third time)	433 00
Lecturer (sessional)	1,300 00
	7,733 00

(c) Mathematics:	
Professor	3,200 00
Associate Professor	2,000 00
Associate Professor (one-third time)	666 67
Associate Professor	1,600 00
Fellow	500 00
	7,966 67
(d) Biology:	
Professor	3,200 00
Lecturer in Zoology and Assistant Curator Museum	1,500 00
Lecturer in Biology and Histology	1,200 00
Lecture and Laboratory Assistant (sessional)	500 00
Class Assistants (9) sessional	500 00
Sub-Curator Museum	750 00
Attendant and Caretaker	550 00
Laboratory Attendant (8 months)	177 50
Messenger (9 months)	102 50
	8,480 00
Sub-Department of Botany:	
Lecturer in charge of sub-department	1,250 00
Instructor (sessional)	500 00
	10,230 00
(e) Physiology:	
Professor	3,200 00
Demonstrator (sessional)	600 00
Class Assistants (6) sessional	700 00
	4,500 00
(f) Italian and Spanish:	
Professor	2,800 00
Lecturer	1,075 00
Instructor in Italian	500 00
Duplicate lectures at Trinity, in accordance with federation agreement	400 00
	4,775 00
(g) Philosophy:	
Professor	2,600 00
Lecturer	1,775 00
Lecturer and Laboratory Assistant	1,300 00
Lecturer and Laboratory Assistant	400 00
	6,075 00
4. Teaching Staff, University College:	
(a) Ethics, Professor	3,200 00
(b) Greek:	
Professor	3,200 00
Associate Professor	1,900 00
Instructor	800 00
	5,900 00
(c) Latin:	
Professor	3,200 00
Associate Professor	2,000 00
Lecturer	1,775 00
	6,975 00
(d) Oriental Literature:	
Professor	3,200 00
Lecturer	1,775 00
Instructor	1,000 00
	5,975 00
(e) English:	
Professor	3,200 00
Associate Professor Anglo-Saxon	2,000 00
Lecturer (Easter Term)	1,000 00
	6,200 00

(*f*) French.		
Professor		2,800 00
Associate Professor		2,000 00
Instructor		1,000 00
		5,800 00
(*g*) German:		
Professor		2,800 00
Associate Professor		1,900 00
Instructor		1,000 00
		5,700 00
6. University College, general:		
Principal		400 00
		400 00
7. Gymnasium:		
Secretary		600 00
Instructor		900 00
Caretaker		576 00
		2,076 00
Expenses.		
2. Bursar's Office:		
Office supplies, postage, printing and incidentals		600 62
Auditor's remuneration		300 00
		900 62
3. Registrar's Office:		
Stationery and office supplies		501 32
Postage		747 24
Printing, other than Calendar		147 03
Printing Calendar and Curricula		2,066 63
Occasional assistant (also with duties at printing office)		420 00
		3,882 22
4. Vice-Chancellor's Office:		
Honorarium		400 00
Expense indemnity		325 00
		725 00
5. President's Office:		
Secretarial allowance		200 00
Postage and incidentals		85 13
Travelling expenses		623 69
		908 82
6. Law Costs		1,263 07
7. General incidentals, including commissions on real estate transactions		1,249 00
8. Insurance		2,000 00
9. Telephones		345 87
10. Convocation expenses		1,260 93
11. Examinations:		
(*a*) Remuneration to examiners:		
Arts		1,030 55
Medicine		2,172 50
Law		80 00
Engineering and Applied Science		400 00
Dentistry		467 50
Agriculture		443 85
Music		1,029 61
Pharmacy		435 10
Pedagogy		40 00
Matriculation		95 75
Household Science		80 00
Physical Drill		12 00
		6,286 86

(b) Stationery and supplies:	1,148	34
(c) Cost of printing examination papers and class lists	1,957	78
(d) Clerical assistance May examinations	266	50
	9,659	48
Less Government share for departments of Chemistry and Physics	325	00
	9,334	48
12 Library:		
(a) Maintenance:		
Fuel	557	46
Water	28	96
Cleaning	170	00
Repairs and incidentals	274	98
	1,031	40
(b) Customary grant for books	3,000	00
(c) Occasional clerical assistance	236	75
	4,268	15
13 Grounds:		
Labour, protective service, gravel, culverts, new roadway, etc.	2,786	40
Portion of $1,500 outstanding on new granolithic walks	500	00
	3,286	40
14 Main Building:		
Changing thermostat system	967	00
Watchman's recorder	500	00
Repairs (including carpentry and plumbing) and sundries	2,685	14
Fuel	3,989	26
Water	203	64
Gas and electric light	1,001	48
	9,346	52
Less Government share for Department of Physics	2,000	00
	7,346	52
15. Biological Building:		
(a) Maintenance of Structure		
Fuel	1,159	31
Gas and electric light	185	32
Water	101	37
House furnishings and cleaning materials	256	50
Repairs, including carpentry, plumbing and painting	924	76
Additional attendance and cleaning assistance	371	89
Additional lockers, etc.	127	05
	3,126	20
Less Government share for Department of Mineralogy and Geology	100	00
	3,036	20
(b) Biological Department:		
Laboratory and Lecture Room supplies	372	34
Museum specimens	400	00
Museum supplies and cases	1,000	00
Marine and Lake Laboratories	300	00
Students' laboratory supplies	1,191	50
Assistance in preparation of catalogue	250	00
New microscopes	472	50
Sub-department of Botany:		
Apparatus	337	04
Herbarium	592	59
	4,915	97
16. Physiological Department:		
Maintenance, including students' laboratory supplies	1,165	55
Apparatus for equipping laboratory	200	00
Share of maintenance, medical building	2,500	00
	3,865	55

17.	Psychological Department:	
	Maintenance	450 00
18.	Mathematics:	
	Class room supplies and arithmometer	52 83
		52 83
19.	Political Science:	
	Class room supplies	36 85
20.	History:	
	Class room supplies	93 50
21.	Italian and Spanish:	
	Class room supplies	34 75
22.	Advertising	432 60
23.	Incidentals	195 45
24.	University College Departments:	
	English:	
	Class room supplies and provision for reading essays	150 00
	French:	
	Class room supplies	180 00
	German:	
	Class room supplies	175 00
	Oriental Literature:	
	Class room supplies	25 00
	Stationery	62 26
	Printing	57 41
	Advertising	19 66
	Incidentals	444 77
25.	Gymnasium and Students' Union:	
	Fuel	575 93
	Water	120 16
	Gas	66 69
	Cleaning	75 00
	Repairs and incidentals	450 78
	Apparatus, labor, etc	246 00
		1,534 56
26.	Dining Hall:	
	Grant towards maintenance	500 00
27.	University Press:	
	Final payment to be provided for cost of presses and type	650 00
	Additions to type and equipment	600 00
		1,250 00
28.	Educational Association Reception	243 00
29.	Observatory removal:	
	Compensation to officials for vacation of premises	1,075 00
30.	Senate Elections:	
	Allowance to scrutineers and assistants	340 00
	Postage, printing and incidentals	452 05
		792 05
31.	Unforeseen and unprovided:	
	Appropriation to meet unforeseen expenditure	1,183 25

DEPARTMENT MAINTAINED BY THE GOVERNMENT

SUMMARY.

1.	Chemistry:	
	Salaries	10,620 00
	Maintenance	4,054 85
2.	Physics:	
	Salaries	12,300 00
	Maintenance	6,401 42
3.	Mineralogy and Geology:	
	Salaries	7,358 33
	Maintenance	6,572 89
4.	Examination Expenses:	
	Share of above departments	325 00
		47,632 49

DETAILS.

1. Chemistry:		
(a) Salaries:		
Professor	2,900	00
Associate Professor	2,200	00
Lecturer	1,375	00
Lecturer	1,375	00
Fellow (sessional)	500	00
Assistant (sessional)	500	00
Two junior assistants (sessional)	700	00
Attendant and caretaker	550	00
Cleaner	240	00
Fireman (8 months)	280	00
	10,620	00
(b) Maintenance of building:		
Fuel	703	79
Gas and electric light	211	51
Water	87	59
Cleaning	99	00
Repairs and incidentals	958	23
	2,060	12
(c) Maintenance of department:		
Chemicals, glassware and materials	1,500	86
Appropriation for sub-department of physical chemistry	493	87
	4,054	85
2. Physics:		
(a) Salaries:		
Professor	3,200	00
Associate Professor	2,000	00
Associate Professor	2,000	00
Lecturer	1,800	00
Assistant demonstrators (3 at $500, sessional)	1,500	00
Lecture assistant (sessional)	500	00
Class assistants (sessional) 6	500	00
Mechanician	800	00
	12,300	00
(b) Maintenance of department:		
Supplies, apparatus, etc	4,101	42
Cataloguing of apparatus, etc	300	00
Proportion of fuel, water, light, cleaning, repairs and incidentals, Main Building account	2,000	00
	6,401	42
3. Mineralogy and Geology:		
(a) Salaries:		
Professor Geology	800	00
Professor Mineralogy	2,775	00
Curator of new Museum (one-third time)	833	33
Associate Professor Geology	1,450	00
Assistants (2 at $500, sessional)	1,000	00
Attendant Mineralogy	500	00
	7,358	33
(b) Maintenance of department:		
Mineralogy:		
Apparatus	1,358	51
Maintenance, including expenses collecting minerals, etc.	706	02
Museum cases, specimens and clerical assistance	949	83
Proportions of fuel, water, light, cleaning, repairs and incidentals, Biological Building account	100	00
	3,114	36

Geology:		
Fossils, and travelling expenses in connection therewith		968 52
Supplies and sundries		605 78
Clerical assistance in labelling, card catalogue, etc.		384 23
Museum cases		1,500 00
		6,572 89
4. Examination expenses:		
Share of above departments		325 00

II. MEDICAL FACULTY.

Receipts.

Fees:		
First year	$14,660 00	
Less Arts portion	1,806 00	
		$12,854 00
Second year	14,716 00	
Less Arts portion	2,070 00	
		12,646 00
Third year		12,196 00
Fourth year		15,687 00
Fifth year		150 00
Miscellaneous		890 00
Registration		805 00
Examination		1,856 00
Psychology		500 00
Interest on Bank Account		638 08
New Medical Building, share of maintenance from Physiological Department		2,500 00
New Medical Building, rent of rooms to Provincial Board of Health		500 00
Sale of animals		18 75
		$61,240 83

Expenditure.

Summary.

Salaries		$38,814 80
Maintenance:		
Anatomical Department	$4,173 72	
Departments other than Anatomy	6,910 76	
New Building	5,738 57	
General Expenses	4,780 59	
		21,603 64
Balance 30th June, 1905		822 39
		$61,240 83

Details.

Salaries.

Professors:		
A. Primrose, Anatomy	$2,000 00	
J. J. Mackenzie, Pathology, etc.	2,000 00	
I. H. Cameron, Surgery and Clinical Surgery	950 55	
F. LeM. Grasett, Surgery and Clinical Surgery	922 05	
G. A. Peters, Surgery and Clinical Surgery	950 55	
L. Teskey, Surgery and Clinical Surgery	922 05	
A. McPhedran, Medicine and Clinical Medicine	950 55	
J. L. Davison, Clinical Medicine	922 05	
C. Sheard, Preventive Medicine	922 05	
J. Algernon Temple, Operative Obstetrics, etc	922 05	
A. H. Wright, Obstetrics	950 55	
W. Oldright, Hygiene	950 55	
J. F. W. Ross, Gynæcology	633 70	
J. M. MacCallum, Pharmacology, etc	633 70	
N. A. Powell, Medical Jurisprudence	614 70	
R. A. Reeve, Ophthalmology, etc	380 22	
G. R. McDonagh, Laryngology, etc	380 22	
W. H. Ellis, Toxicology	316 95	
G. S. Ryerson, Ophthalmology, etc	245 88	
G. H. Burnham, Ophthalmology, etc	253 48	
		$16,821 85

Associate Professors:		
H. A. Bruce, Clinical Surgery	$506 96	
D. J. G. Wishart, Laryngology, etc	289 06	
G. A. Bingham, Clinical Anatomy and Clinical Surgery	614 70	
W. P. Caven, Clinical Medicine	633 70	
H. W. Aikins, Anatomy	633 70	
A. M. Baines, Clinical Medicine	614 70	
J. T. Fotheringham, Clinical Medicine	614 70	
H. B. Anderson, Clinical Medicine	614 70	
C. Trow, Ophthalmology, etc	368 82	
F. N. G. Starr, Clinical Surgery	380 22	
J. A. Amyot, Pathology	380 22	
W. B. Thistle, Clinical Medicine	380 22	
C. L. Starr, Orthopædics	380 22	
R. D. Rudolf, Medicine, etc	380 22	
A. R. Gordon, Medicine, etc	380 22	
R. J. Dwyer, Medicine, etc	380 22	
H. T. Machell, Obstetrics, etc	266 14	
W. T. Stuart, Medical Chemistry	500 00	
		$8,318 72
Demonstrators and Associates:		
G. Boyd, Clinical Medicine	264 00	
G. Chambers, Clinical Medicine	264 00	
F. Fenton, Clinical Medicine	158 40	
H. C. Parsons, Clinical Medicine	158 40	
W. Goldie, Clinical Medicine	158 40	
W. McKeown, Clinical Surgery	264 00	
C. A. Temple, Clinical Surgery	264 00	
A. H. Garratt, Clinical Surgery	264 00	
C. B. Shuttleworth, Clinical Surgery	158 40	
T. B. Richardson, Clinical Surgery	158 40	
J. F. Uren, Clinical Surgery	158 40	
K. C. McIlwraith, Obstetrics	264 00	
F. Fenton, Obstetrics	158 40	
C. B. Shuttleworth, Anatomy	450 00	
W. J. McCollum, Anatomy	150 00	
W. J. O. Malloch, Anatomy	150 00	
G. Elliott, Anatomy	150 00	
E. R. Hooper, Anatomy	150 00	
W. J. Wilson, Anatomy	150 00	
A. C. Hendrick, Anatomy	150 00	
A. J. MacKenzie, Anatomy	150 00	
D. McGillivray, Anatomy	150 00	
E. S. Ryerson, Anatomy	150 00	
F. W. Marlow, Anatomy	100 00	
W. A. Scott, Anatomy	50 00	
T. D. Archibald, Pathology, etc	250 00	
G. Silverthorn, Pathology, etc	150 00	
C. J. Wagner, Pathology, etc	150 00	
M. M. Crawford, Pathology, etc	150 00	
F. A. Clarkson, Pathology, etc	150 00	
W. H. Pepler, Pathology, etc	150 00	
H. C. Parsons, Pathology, etc	150 00	
H. S. Hutchison, Clinical Laboratory	250 00	
F. E. Watts, Pathology, etc	100 00	
E. S. Ryerson, Pathology, etc	100 00	
A. H. W. Caulfield, Pathology, etc	50 00	
C. P. Lusk, Pharmacy, etc	250 00	
V. E. Henderson, Pharmacology	500 00	
D. McGillivray, Medicine	50 00	
G. W. Howland, Medicine	50 00	
T. D. Archibald, Medicine	50 00	
		$7,192 80
General Service:		
A. Primrose, Secretary to Faculty	$1,200 00	
J. J. Mackenzie, Assistant Secretary	100 00	
Thos. Motton, Caretaker	720 00	
J. S. Pollock, Chief Engineer	766 68	
J. Magee, Assistant Engineer (4½ mos.)	203 00	
C. Powers, Assistant Engineer (1½ mos.)	59 42	

General service—*Continued*,		
Alex. Wilson, Janitor	600 00	
George Lynne, attendant, Anatomy Dept.	660 00	
J. Sherman, attendant, Anatomy Dept., (9½ mos.)	327 00	
H. Harrison, Laboratory boy (4 mos.)	64 00	
J. Henry, Laboratory boy (1 mo.)	20 00	
Miss M. Armour, Stenographer	528 00	
Miss M. E. Foote, Library Assistant (7 mos.)	233 33	
		5,481
Miscellaneous:		
Dr. N. H. Beemer, Psychology fees	500 00	
Dr. J. H. Richardson, Honorarium as retired Professor	250 00	
Dr. Uzziel Ogden, Honorarium as retired Professor	250 00	
		1,000
		$38,814

III. FACULTY OF APPLIED SCIENCE AND ENGINEERING.

(School of Practical Science.)

EXPENDITURE.†

Summary.

Salaries (details below)	$45,301 90	
Expenses	8,287 68	
Maintenance and repairs	17,464 26	
Instruction in Arts Faculty	2,783 00	
Examiners	1,638 40	
	73,475 24	
Receipts from fees	33,758 00	
Showing a difference of (being the excess of expenditure over receipts supplied from vote of Legislature.)	$39,717 24	

DETAILS OF SALARIES.

Principal and Professors.

J. Galbraith, Principal and Professor in Engineering	$3,200
A. P. Coleman, Professor in Geology	2,200
W. H. Ellis, Professor in Applied Chemistry	2,000
L. B. Stewart, Professor in Surveying	2,100
C. H. C. Wright, Professor in Architecture	2,100
T. R. Rosebrugh, Professor in Electrical Engineering	2,100
G. R. Mickle, Professor in Mining	1,800
	$15,500

Lecturers and Registrar.

J. McGowan, Lecturer in Applied Mechanics	1,400
R. W. Angus, Lecturer in Mechanical Engineering	1,500
J. W. Bain, Lecturer in Analytical Chemistry	1,400
G. R. Anderson, Lecturer in Physics	1,200
H. W. Price, Lecturer in Electrical Engineering, 3 mos	300
P. Gillespie, Lecturer in Applied Mechanics, 3 mos	300
J. R. Cockburn, Lecturer in Drawing, 3 mos	300
A. T. Laing, Registrar and Librarian	1,500
	$7,900

Demonstrators.

H. G. McVean, Demonstrator, Mechanical Engineering, 9 mos	750
H. W. Price, Demonstrator Electrical Engineering, 9 mos	750
E. G. R. Ardagh, Demonstrator, Chemistry	700
P. Gillespie, Demonstrator, Applied Mechanics, 9 mos	525
H. R. Cockburn, Demonstrator, Drawing, 9 mos	525
H. G. Smith, Demonstrator, Electrical Engineering, 3 mos	175
J. G. McMillan, Demonstrator, Mining Engineering, 3 mos	175
M. C. Boswell, Demonstrator, Chemistry, 3 mos	175
	$3,775

† These figures are for the year ending Dec. 31st. 1905.

Fellows and Assistants.

J. Horton, Lecture Assistant, Chemistry, 9 mos	375 00
J. Parke, Lecture Assistant, Chemistry, 3 mos	125 00
A. E. Gibson, Fellow in Civil Engineering, 9 mos	375 00
J. T. M. Burnside, Fellow in Civil Engineering, 2 mos	84 00
J. A. McFarlane, Fellow in Mechanical Engineering, 9 mos	375 00
S. E. McGorman, Fellow in Mechanical Engineering, 3 mos	125 00
J. G. McMillan, Fellow in Mining Engineering, 9 mos	375 00
S. Dushman, Fellow in Chemistry	500 00
F. Wade, Fellow in Chemistry	500 00
J. L. R. Parsons, Fellow in Surveying, 9 mos	375 00
C. M. Teasdale, Fellow in Surveying, 3 mos	125 00
N. D. Wilson, Fellow in Surveying, 9 mos	375 00
S. R. Crerar, Fellow in Surveying, 3 mos	125 00
W. E. Douglas, Fellow in Surveying, 3 mos	125 00
H. G. Smith, Fellow in Electrical Engineering, 9 mos	375 00
R. H. Armour, Fellow in Electrical Engineering, 3 mos	125 00
G. J. Manson, Fellow in Electrical Engineering, 9 mos	375 00
R. B. Ross, Fellow in Electrical Engineering 3 mos	125 00
M. R. Riddell, Fellow in Drawing, 9 mos	375 00
J. D. Sheply, Fellow in Drawing, 3 mos	125 00
D. T. Townsend, Fellow in Drawing, 3 mos	125 00
W. M. Bristol, Fellow in Drawing, 3 mos	125 00
W. W. Gray, Fellow in Thermodynamics, 3 mos	125 00
E. W. Walker, Fellow in Hydraulics, 3 mos	125 00
L. W. Morden, Fellow in Physics, 3 mos	125 00
	$6,084 00

Attendants.

David Sinclair, Attendant in Chemistry	700 00
George Lamb, Attendant in Metallurgy	340 00
[illegible] Deacon	50 00
[illegible] Tozer, Attendant in Mining	350 00
P. K. Armbrust, Attendant in Drafting Room	350 00
E. Thompson, Attendant in Electrical Laboratory	300 00
R. Fullerton, Assistant in Mechanical Laboratory	500 00
J. D. Pettitt, Attendant in Chemical Laboratory	50 00
A. J. Rickard, Stenographer	400 00
A. Enright, Messenger	120 00
B. G. Lyons, Messenger	15 00
D. Hamilton, Messenger	17 00
T. R. Ardagh, Messenger	19 50
W. J. Graham, Caretaker	900 00
E. Allan, Attendant	50 00
W. Simpson, Engineer	1,200 00
A. F. McKay, Fire and Stoker	160 00
W. B. Scott, Night Fireman	135 00
J. Cowan, Fireman	150 00
[illegible] Kerr, Fireman	100 00
[illegible] Lepper, Night Fireman	50 00
E. A. Bishop, Caretaker, Chemistry and Mining Building	733 33
[illegible] McBrearty, Engineer, Chemistry and Mining Building	1,200 00
[illegible] Hunter, Assistant Engineer, Chemistry and Mining Building	800 00
[illegible] Foggett, Fireman, Chemistry and Mining Building	600 00
[illegible] McMahon, Fireman, Chemistry and Mining Building	550 00
[illegible] Kennedy	56 67
[illegible] McCraken, Carpenter	146 40
	$10,042 90
	$43,301 90

Addendum N.—List of Papers and Works by Members of Faculties and Research Students for the Year 1904-1905.

Anderson, H. B.:

"The Etiology and Pathology of Arteriosclerosis," (American Medicine.)

"A Case of General Infection by the Streptococcus pyogenes with a Remarkable Series of Secondary Manifestations." (Dominion Medical Monthly.)

"Strain as a Factor in the Causation of Cardio-aortic Lesions." British Medical Journal.)

Baker, Alfred:

"Analytical Geometry for Beginners." (W. J. Gage & Co., Toronto.)

Bell, A. J.:

"Virgil and the Drama." (The School Review.)

Burwash, N.:

"A Review of the Development of the University of Toronto as a Provincial Institution." (Trans. Royal Soc. Can.)

"Reviews of Life of Dr. Grant and other Historical Works." (University of Toronto Studies.)

Cameron, J. Home and Squair, J.:

"Le Voyage de Monsieur Perrichon par E. Labiche." Edited with notes and vocabulary. (W. J. Gage & Co., Toronto.) (Copp, Clark Co., Toronto.)

Chant, C. A.:

"Experiments on the Reception by Wires of Electric Waves." (American Journal of Science, Vol. XVIII, Dec., 1904.)

"Some New Determinations of the Reflecting Powers of Glass and Silvered-Glass Mirrors." (Astrophysical Journal Vol. XXI, April, 1905). (Trans. Royal A. Soc. Can. 1904.)

"Progress of Astronomy and Astrophysics in 1904." (Trans. R. A. S. C., 1904, p. XIII.)

Eakin, Thomas:

"The Text of Habakkuk." (Apted, E., Toronto.)

Edgar, Pelham:

"The Makers of Canada." (Editor.)

Faull, J. H.:

"Development of Ascus and Spore Formation in Ascomycetes." (Proc. Boston Soc. Nat. His. Vol. 32, No. 4.)

Henderson, V. E.:

"Tabes Dorsalis." (Journal of Pathology.)

In conjunction with Professor Loewi of Marburg:

"Untersuchungen über den Mechanismus der Harnstoffdi."

"Ueber die Wirkung der Vasodilatatorenreizung."

"Ueber den Einfluss von Pilocarpin und Atropin auf die Durchblutung der Unterkieferspeicheldruse." (Archiv. Exp. Pathologie und Pharmacologie.)

Kenrick, F. B.:

"A Mechanical Model to Illustrate the Gas Laws." (Journal of Physical Chemistry.)

Keys, D. R.:

"The First English Imperialist." (Transactions of the Empire Club.)

"The Academisch-Neuphilologischer Verein of Leipzig." (Varsity.)

"Some Tendencies of the Modern Novel." (Toronto Sunday World.)

"On the Novel as a Guide to Conduct." (Proc. Can. Inst.)

"The English Pastoral Plays and Players." (University Alumni Monthly.)

Lang, W. R.:

"Some Compounds of Chromic Chloride with Substituted Ammonias." In collaboration with C. M. Carson. (Jour. Amer. Chem. Soc., July, 1904.)

"The Interaction of Hydrogen Sulphide and Sulphur Dioxide." In collaboration with C. M. Carson. (Proc. Chem. Soc. Vol. 21, No. 295, June, 1905.)

"Conceptions of Matter, Ancient and Modern." (University Alumni Monthly.)

"The Chemical Industries of the Dominion, 1905." (Trans. Can. Inst. Vol. VIII.)

The following papers were prepared under the direction of Professor Lang:

"Coal Firing in Full Depth Regenerator Benches." By G. W. McKee. (Progressive Age, Feb., 1904.)

"The Decomposition of Benzene at High Temperatures." By G. W. McKee. (Jour. Soc. Chem. Indy. April 30th, 1904.)

Lefroy, A. H. F.:

"Judge-Made Law." (Law Quarterly Review, London, England).

McLennan, J. C.:

"The Metric System." (Lecture before the Select Committee on Agriculture and Colonization, Printed by Order of the Parliament of Canada.)

"Note on the Use of Sensitive Quadrant Electrometers." (Phys. Rev. Vol. XX, No. 3, March, 1905.)

The following papers were prepared under the direction of Professor McLennan:

"On the Decay of Excited Radioactivity from Natural Gases." (Phys. Rev. Vol. XX, No. 3, March, 1905). By Miss L. B. Johnson.

"On the Secondary Radiation excited in Different Metals by the Rays from Radium." (Phys. Rev. Vol. XX, No. 3, March, 1905.) By H. F. Dawes.

Marlow, F. W.:

"Enlargement of the Prostate Gland." (Canada Lancet, 1904.) (American Journal of Dermatology and Genito-Urinary Diseases.)

"On the Surgical Treatment of Gastric Ulcer." (The Canadian Practitioner and Review, Sept., 1904.)

"Excision of the Wrist." (The Canadian Practitioner and Review, March, 1905.)

Mavor, James:

"Report to the Board of Trade on the North West of Canada with special reference to Agricultural Production." (Published as a Parliamentary Paper, London, 1905.)

"Recent Financial Movements in the United States." (London, 1904.)

Miller, W. Lash:

"The New Requirements in Chemistry for Junior Matriculation and for the Departmental Examinations of the Province of Ontario." (Issued by authority of the University.)

"A Home-made Balance." (Journal of Amer. Chem. Soc. XXVII, 1905.)

The following papers were prepared under the direction of Professor Miller:

"The Rate of the Reaction between Iodic and Hydriodic Acids." By S. Dushman. (The Jour. Phys. Chem. VIII, 1904.)

"The Electrolysis of Acid Solutions of Aniline." By L. Gilchrist. (The Jour. Phy. Chem. VIII, 1904.)

"Tribromphenolbromide; its Detection, Estimation, Rate of Formation, and Reaction with Hydriodic Acid." By S. J. Lloyd. (Jour. Amer. Chem. Soc. XXVII, 1905.)

"The Determination of Phenol," by S. J. Lloyd. (Jour. Amer. Chem. Soc. XXVII, 1905.)

Needler, G. H.:

"The Niebelungenlied, Translated into Rhymed English Verse in the Metre of the Original." (Henry Holt & Co., New York.)

Oldright, William:

"Some Cases Illustrating Difficulties in the Diagnosis and Treatment of Tumors." (Dominion Medical Monthly, 1904.)

Parks, W. A.:

"A Remarkable Parasite from the Devonian Rocks of the Hudson Bay Slope." (Amer. Jour. Soc. Vol. XVIII, August, 1904.)

"The Need of a Provincial Museum in Ontario." (Can. Min. Inst. Vol. VIII, March, 1905).

"Geology of a District from Lake Temiskaming Northward." (Geo. Sur. Can. 1904, Summary Report.)

"Palæontology in the University." (University Alumni Monthly.)

Rudolf, R. D.:

"Functional Heart Murmurs." Their Causation and Diagnosis. (International Clinics, Vol. VI, January, 1905.)

Squair, J. (See under Cameron, J. Home.)

Stewart, L. B.:

"The Computation of Geodetic Positions." (The Astronomical Journal Boston, Vol. 24, No. 18.)

"Stadia Topographic Surveying." (Trans. Assoc. Ont. L. S., 1905.)

Thomson, R. B.:

"The Megaspore Membrane of the Gymnosperms." (University of Toronto Studies, Bio. Ser. No. 4.)

Tracy, F.:

Six Articles on Teaching, entitled, "The Child and the Book," "The Boy and the Book," "The Youth and the Book," "Learning and its Motives", "Morality and its Motives", "Religion and its Motives." (Sabbath School Teachers' Monthly.)

"The Autobiography of a Philosophy", A Critical Review of the System of Herbert Spencer. (American Jour. Theology.)

"The Child's growth, with its new problems for the teacher." (Proc. Ont. Sabbath School Assoc., 1904.)

"The Nurture of the Moral Nature of the Child." (Proc. Ont. S. S. Assoc., 1904.)

"Sabbath School Methods, Studies in Teaching and Organization." (Teacher Training Handbook, R. D. Fraser, Toronto.)

"University Federation." (Canadian Baptist.)

Vander Smissen, W. H.:

"Johann Christoph Friedrich Schiller." (University Alumni Monthly.)

Wallace, F. H.:

"Wernle's Beginnings of Christianity." (Methodist Quarterly Review.)

"John Knox." (Methodist Magazine.)

Wright, A. H.:

"A Text-Book of Obstetrics." (D. Appleton & Co., New York.)

Wrong, G. M.:

"An English History." Edited for use in Canadian Elementary Schools.

"The Earl of Elgin." (Methuen & Co., London.)

"The Review of Historical Publications Relating to Canada." Vol. IX. Edited in collaboration with H. H. Langton.

PPENDIX T.—LIST OF CERTIFICATES ISSUED BY THE EDUCATION DEPARTMENT, 1905, ETC.

1. PUBLIC SCHOOL INSPECTORS.

ingham, Thomas David, B.A.
s. Marion Huntley, M.A.
right, Richard Christian.
k. James McLarty.
hild. Austin H., M.A.
k James Alexander, B.A.
Gilchrist, Dugald A., B.A.
Graham, Louis Hartley, B.A.
Hindle, George, B.A.
Hutchison, Robert Alexander, B.A.
Lougheed, William James, B.A.

2. HIGH SCHOOL PRINCIPALS AND SPECIALISTS.

. Robert Whiting, B.A.
. Harry Jellyman, B.A. (Science)
. Samuel James, B. A. (Mathematics).
. George Robert, B.A. (Classics, English and History)
. William Hugh, M.A. (Science)
. Henry J., B.A. (French and German)
. William Arthur, B.A.
. Peter Edward, B.A. (Moderns and History)
. Horace Alexander, B.A. (Science)
. Emily Jane, B. A. (English and History).
. Arthur Presland, B.A. (Science)
. Henry Wentworth, B.A. (Classics)
. Herbert William, B.A. (Moderns and History)
. David S., M.A. (Science)
Keith, Arthur W., B.A. (Science)
Knight, William Whittington, B. A. (Mathematics).
Lang, Hector, B.A. (Mathematics)
Lougheed, William James, B. A. (Mathematics).
Lucas, Gavin Allan, B.A.
MacLaurin, Peter Crawford, B.A. (Science)
McQueen, James M., B.A.
Rogers, William Henry, B.A. (Mathematics)
Rogers, Joseph Whyte, B.A.
Sealey, Ethel May, B.A. (Moderns and History).
Smith, Thomas Corlett, B.A.
Somerville, Thomas C,, B.A. (Moderns and History)
Voaden, John, M.A. (Science)
Watson, Ervin Herbert Alfred, B.A. (Moderns and History)

3. HIGH SCHOOL ASSISTANTS AND SPECIALISTS.

. Joseph James.
. Alice Maude, B. A. (Moderns and History).
. Robert Anthony, B.A. (Science).
. David London, B.A. (Mathematics).
. Evelyn Euphemia, B.A. (Mathematics).
. Mabel (Commercial).
. Ethel May (English and History).
. Annie Buchan, B.A. (Moderns and History).
. Hannah Mitchell.
. Helen Myrtle, B.A. (Classics).
. Barton.
. Edith May, B.A. (Moderns and History).
. Elizabeth, M.A. (English and History; French and German).
. Jessie, B.A. (Moderns and History).
. Reuben David, B.A.
. Thomas Henry, B.A. (Commercial).
McKechnie, John Henry, M.A. (Mathematics).
McQueen, Rose J.
Mercer, John S. (Manual Training).
Odlum, Eleanor Dora, B.A. (Moderns and History).
Robertson, John Nelson, B.A.
Rutherford, William Herbert, B.A. (Mathematics).
Shawcross, Mary Louise.
Shirreff, Robert Marshall (French and German).
Stephens, Robert H.
Stewart, Ernest John, B.A.
Stone, Allie B. (Commercial).
Story, Selina Gladys, M.A. Moderns and History).
Tapscott, Cora Ida, B.A.
Tompkins, Elizabeth Augusta.
Walker, Arthur J.
Ward, Clara Anne, B.A. Moderns and History.

4. Summary of Public School Teachers' Certificates.

—	Male.	Female.	Tot
First Class	39	60	9
Second Class	20	262	28
Third Class, per County Model School reports	301	885	118
Plantagent Bi-lingual Model School	4	15	1
Gore Bay District Model School	3	18	2

5. First Class Certificates.

Aldredge, Merlin A.
Armstrong, Delbert W.
Ayres, Marion Huntley, M.A.
Baker, Lena, A.M.
Baker, Sarah Jane (Honors).
Boskill, Florence Annie.
Bauer, Bertha Theresa.
Blake, Florence Margaret.
Beattie, Ada Mary.
Bartlett, Cora.
Croskery, Ella Spaulding.
Chant, Walter.
Cowan, Samuel George, B.A.
Drew, Edith M.
Davidson, Edna Frances, (Honors).
Dredge, Dora Edna.
Dorrington, Annie.
Eccles, Annie L.
Fox, Mattie.
Froats, Charles Willis M.A. (Honors)
Ferguson, George Arthur.
Grant, William Henry.
Gordon, Mary M.
Gibbard, Alexander Hanna, B.A.
Graham, Minnie E.
Gregory, Stella L.
Graham, Laura.
Gaboury, Valentine Hector.
Hawley, Blanche.
Hicks, Frederick Montford.
Hindle, George, B.A.
Hooper, Melvin L.
Hutchison, Robert Alexander, B.A.
Hall, Bertha Ellen.
Hollingshead, Hannah.
Hemming, Eva Maude.
Hindson, Hilda.
Hodgins, May Isabel.
Hemphill, John.
Hutchison, Robert H.
Jepson, Janet A.
Johnston, Katie B.
Job, Helen Theodora.
Keegan, Joseph D.
Kelly, William John.
Law, Elizabeth H.
Leighton, C. Edna.
MacDonald, Donald D.
McFaul, Harry E.
McLean, Eva Frances.
McLeish, Sarah.
McWilliam, William James.
McPherson, Jennette Florence,
Mackenzie, Marion Fasken.
Marlin, Lewis A.
Mitchener, James Sidney, B.A.
Morrow, Evelyn Maude.
Milburn, Clement.
Moore, John Leslie.
Mitchell, H. Blanche.
Magee, James Albert.
Nelson, Albert E.
Newcombe, Jean.
Nielson, Mary.
Pettit, Louis John, B.A.
Phillips, Ethel M.
Parr, Clara Edith.
Percy, Herbert Algernon.
Raycraft, Lillie J.
Robertson, Kenneth.
Robertson, Queenie Maie.
Robinson, Annie Frances.
Ritchie, Annie Jane.
Rabb, Lelah Beatrice.
Runians, Nellie.
Simpson, Benjamin L., M.A.
Smith, Frederick P.
Smith, John Charles, B.A.
Stewart, Leslie.
Sweeney, Agnes C.
Steer, George Hobson.
Smith, Margaret Jean.
Stidwell, Alberta.
Smith, George Richard.
Smith, Irene E.
Seery, Winifred.
Tompkins, M. Alice.
Trout, Agnes.
Truscott, Samuel Alfred, M.A.
Thackery, Barton Earl, B.A.
Tremeer, M. S. Rose.
Thomson, Olive O.
Waring, Cora Natalie.
Watson, Gertrude Vesta A.
Webb, Charles W., B.A.
Weatherston, Jeannie B.
Wilkinson, James Egerton.
Whyte, Marion Isabella.

Special First Class Granted under the Provisions of Sub-Section 6 of Section 82 of the Public Sch

Russell, Alexander.

6.—Second Class Certificates.

Alexander, Muriel.
Andrews, Daisy A.
Auld, Williamine.
Aylesworth, Mary.
Atkinson, William.
Aiton, Agnes.
Andrews, Lucie Eugenie (Honors).
Archer, Frances Lilian.
Bain, Maggie.
Black, Clara.
Brown, Birdie Sarah.
Brown, Mary.
Burry, Gertrude.
Boulger, Mary.
Brock, Eda.
Brown, Sadie (Honors).
Bissell, Elizabeth.
Bagshaw, Annie Maud.
Bain, Estella.
Baldwin, Lily C.
Barclay, May Mabel Clare.
Bremner, Mary Rebecca.
Bell, Margaret.
Bell, Victoria Maud.
Bennett, Madge Alice.
Bennett, Minnie Isabelle.
Bishop, Sadie Vera Victoria.
Bishop, Hattie Amelia (Honors).
Bole, Lorraine Alexandria.
Bolton, Winnifred Eva.
Borrowman, Edith Murray.
Brown, Belle Alina.
Browne, Jean Elizabeth (Honors).
Burriss, Claudia Beatrice.
Byam, Emma.
Campbell, Cora E.
Cates, Otto.
Coombs, Winnifred.
Cameron, Cecelia.
Carmichael, Margaretta (Honors).
Coe, Eva.
Colgan, Florence.
Currie, Mary.
Calder, Mary.
Chandler, Susie Elizabeth.
Colbert, Maggie Ethel (Honors).
Cole, Cora Mininetta.
Coleman, Edith Annie.
Corbett, Etta Catharine.
Corcoran, Mary.
Crowe, Annie (Honors).
Currie, Bessie Josephine.
Coughlin, Nona.
Craig, Minnie.
Dickie, Ella.
Dickie, Mary A. B.
Douglas, Teresa J.
Duff, M. Alice.
Durkin, Cordelia M. (Honors).
Dey, Marion.
Dixon, Laura.
Delaney, Mary.
Dwyer, Tessie.
Dane, Cora Anna Miller.
Delaporte, Alicia Henrietta.
Dempeey, Lulu Geraldine.
Donnelly, Katie.
Dwyer, Annie Beatrice.
Elliott, Anna Eva.
Elliott, Georgina.
Ellis, Ida Myrtle.
Evans, Kate Ann.
Fawkes, Zella.
Fitzgerald, Gertrude.
Ford, Melita N.
Fyle, M. May.
Forrest, Lizzie.
Fox, Catharine.
Fair, Bernice.
Fair, Lucy Georgina.
Farrant, Ethel Olga.
Farrow, Eliza Ethel.
Flesher, Lillian Maude.
Flock, Isabella Blanche.
Flock, Margaret Maud.
Foster, Lottie Lavina, (Honors).
Fraser, Florence Isabel, (Honors).
Grainger, Bevin.
Gillespie, Norah.
Gentleman, Isabella, (Honors).
Gayman, Harvey N.
Galna, Geraldina.
Galbraith, Amy Mary.
Gaynor, James F.
Govenlack, Janet.
Graham, Bida.
Griffin, Pearl.
Gallaher, Mary.
Gray, Bertha Elizabeth, (Honors).
Grant, Annie.
Green, Mrs. Louisa, (Honors).
Greenley, Myrtle.
Guiry, Kate.
Hedden, Fannie S.
Henderson, Liza.
Hindley, Hattie.
Hume, Annie E.
Humphries, Carrie.
Husband, Addie F., (Honors).
Hyatt, Ruth.
Halladay, Eva.
Hefferman, John.
Hodgson, Pauline.
Hunt, Annie.
Hamilton, Birdie Jemima,
Hammell, Ethel Eleanor Mary, (Honors).
Hanna, Minnie Richmond.
Hassett, Emily Blenna.
Hastie, Hannah Carrall.
Hilborn, Lilly.
Hoyle, Mabelle May, (Honors).
Hutt, Alice Lawson.
Hughson, Ida Rooker.
Irwin, Jennie Sarah, (Honors).
Irwin, Isabel.
Johnston, Bessie A.
James, Laura.
Jones, William.
Joyce, Katie.
Jamieson, Margaret Jane.
Jewell, Annie Richardson.
Jones, Clara.
Jewison, Bertha Louise.
Jackson, A. Gertrude.
Kadie, Louise.
Kenyon, Annie K. E.

6.—Second Class Certificates.—*Continued.*

Kennedy, Hector, (Honors).
Kingsbury, Sarah.
Lillico, Ina B.
Loucks, Harry A.
Landon, Mary.
Lanigan, Mary, (Honors).
Langtry, Margaret Louise.
Large, Emily.
Larkworthy, Dorothy Margaret.
Lediard, Ella.
Lightfoot, Jessie Hannah.
Limbert, Harriet Louise, (Honors).
Lowry, Violet Anna.
Lawson, Bertha Clare.
Lloyd, Hazel,
McCabe, Mary B.
McCallum, Elsie A., (Honors).
McChesney, Mary, (Honors).
McDonald, Mary Ella.
McIntyre, Isabel E.
McKellar, Kate.
McKerrall, Dora, (Honors).
McLean, Flora Lillie.
McLeod, Alexander.
McMillan, Allison.
McNair, Rebecca.
McDonnell, Charles.
McEvoy, Emma.
McEwen, Minnie.
McEwen, Nettie.
McBurney, Margaret Ethel.
McCarthy, Mary.
McCaughrin, Mattie.
McCannell, Edith Madge.
McHardy, Flora Margaret.
McKenzie, Lottie Eliza.
McNaught, Alberta.
McMurty, Mona L.
McConnell, Alice R.
MacKenzie, Margaret.
MacNaughton, Jessye Alenna.
Mahon, James Henry.
Maidement, Lillian C.
Mason, Lily Grace.
Mills, Sadie.
Mooney, Annie M.
Misener, Grace.
Morris, Edith (Honors).
Myers, Eva.
Myers, Willis.
Marett, Lillian May.
Marshall, Ella Jean (Honors).
Martin, Lillie Elizabeth.
Martindale, Edna Irene.
Mathews, Olive.
Metherell, Annie Caroline.
Mickle, Annie.
Mickle, Ethel (Honors).
Might, Hattie Louise.
Miller, Beulah Helen.
Miller, Edith May.
Montgomery, Alice Eliza.
Moon, Rebecca.
Moreau, Odile (Honors).
Morris, Helen Gertrude.
Manderson, Amy Isabel.
Masson, Jennie R.
Nolan, Anastasia.
Nichols, Louis L. (Honors).
Oxley, Alice.
Ovans, Euphemia.
Oakley, Laura.
O'Donohue, John (Honors).
Pettit, Jessie Louise.
Powell, Minnie Evilla.
Parrott, Luella.
Purdy, Ethel.
Paget, Mary Elizabeth.
Patterson, Anne Kathleen.
Pettigrew, Margaret Scouller (Honors).
Pilkey, Peter Thomas (Honors).
Pound, Della.
Powell, Bertha May.
Purvis, Mary Elizabeth.
Patterson, Clara Ellen.
Perkins, Ida Godwin.
Reid, James R.
Ritchie, Annie M.
Robinson, Margaret J.
Rennie, Jean Graham.
Reycraft, Edith Myrtle.
Reid, Ethel Charlotte (Honors).
Robertson, Margaret (Honors).
Shepherd, Zilla Electa.
Smibert, Mina.
Squire, Drusilla.
Stafford, Hannah.
Stirtzinger, Mabel E.
Scammell, Dawn (Honors).
Shaw, Laelia.
Smith, Annie.
Schissler, Vina.
Scoffield, Margaret Thompson.
Sauriol, Mary Elizabeth (Honors).
Shaw, Fannie Maude (Honors).
Sheldrick, Annie (Honors).
Shields, Ethel Sophia.
Sing, Ethel Mary.
Skinner, Mary Ann.
Sloggett, Helen Elizabeth.
Srigley, Bertha.
Stark, Mary Christine.
Steadman, Sara.
Stubbs, Mary Edna (Honors).
Switzer, May.
Salter, Alice.
Sloane, Anna Beresford.
Shortt, Edythe B.
Thorne, Florence Albert.
Taylor, Grace.
Taylor, Gertrude Jemima.
Tobey, Ida Alice (Honors).
Townsend, Ethel Ida.
Vance, Maggie.
Vallary, Lizzie Joan.
Veitch, Laura.
Vinini, Mary (Honors).
Whiddow, John W.
White, Gee.
Whiting, Arthur.
Whiting, Florence.
Wilson, Ethel.
Winter, Mabel M.
Wink, Edith.
Wallace, Annie Elizabeth
Watterworth, Martha Maude.

6. Second Class Certificates.—*Concluded.*

White, Mary Ethel (Honors).
Wiseman, Cora Melvina.
Wilson, Laura Graham (Honors).
Wills, Gertie May.
Wright, Nettie.
Wyatt, Isabella Jane.
Young, Alice.

Second-Class Certificates Granted by Order-in-Council.

Lafurgey, Nora.
McLeod, Margaret F.
MacDonald, Duncan A.

7. Kindergarten Directors.

[illegible]mbrack, Lovella.
Anderson, Mary.
Angus, Mary Maud.
Baker, Mildred A. (Honors
Barton, Edith (Honors.).
Bennett, Katharine E.
Daly, Georgina J.
Farquharson, Vida S.
Holman, Helen B.
Johnston, Elizabeth J.
Johnson, Ethel.
Leate, Annie H. (Honors).
MacRitchie, Norma (Honors).
Maybee, Mary Edna (Honors).
Marwood, Mabel (Honors).
Plummer, Maude I.
Pyfrom, Wilhelmina.
Reid, Jean Douglas (Honors).
Richardson, Zella.
Schaumberg, Maude.
Sherring, May E.
Sutherland, Jessie.
Turner, Mildred.
Tattersall, Ethel.
Willcocks, Georgina F. (Honors).
Wilson, Florence McLean.
Wilson, Margaret H.
Windsor, Nellie.
Ziegler, Edna.

8. Certificates in Domestic Science.

Armstrong, Mildred K.
Bell, Adna Mary.
Berry, Elizabeth.
[illegible]ham, Lorna C.
Deane, Jeanie Arbuthnott.
[illegible], Hilda.
[illegible], May Muriel.
Ferguson, Edna Maharry.
Fitzgerald, Eliza S., B.A.
Gowenlock, Mabel Jane.
[illegible]nn, Jeanette Catharine.
Hewitt, Felicia.
Henry, Florence.
[illegible], Ada Emelia.
Johnston, Margaret J. (Specialist).
[illegible], Charlotte G.
[illegible], Essa.
[illegible], Mae M.
MacNaughton, Amelia Maye.
MacVannel, Elizabeth.
McCrimmon, Rachel.
Matthews, Mary Mabel.
Miles, Ella Frances.
Osborne, Augusta M.
Powell, Muriel.
Rogers, Edith Thomson.
Rust, Alice Boyer.
Robertson, A. Enid.
Rath, Martha A.
Ross, Lottie Louis.
Strong, Isabel Wright.
Sheffield, Lillian.
Smillie, Agnes E.
Williamson, Frankie, G. E.
Wilson, Janet.

9. Certificates in Manual Training.

[illegible]er, John S. (Specialist).
[illegible]nions, James Everard.
Snider, Wilbert W. (Specialist).

10. TEMPORARY AND EXTENDED CERTIFICATES.

County, etc.	Temporary Certificates.	Third-class certificates extended.
Bruce	18	
Carleton	1	
Dundas	3	1
Essex	21	
Glengarry	12	1
Grey	21	
Haldimand	3	
Haliburton	19	1
Halton		1
Hastings	32	2
Huron	5	1
Kent	7	
Lambton	12	1
Lanark	11	1
Leeds and Grenville	6	2
Lennox and Addington	20	
Lincoln	1	
Middlesex	2	
Norfolk	21	
Ontario	1	1
Prescott and Russell	8	3
Prince Edward	8	
Renfrew	19	2
Simcoe	8	2
Stormont	2	
Victoria	7	
Welland	1	
Wellington	1	
Central Ontario, R.C.S. Schools	11	1
Eastern do	2	1
Western do	2	1
Bilingual do	8	
Districts	158	
Total 1905	451	22
Total 1904	343	88
Increase	108	
Decrease		66

11. PROFESSIONAL EXAMINATIONS.

Examinations.	Number of Candidates.	Certificates awarded.					
		First Class.	Second Class.	High School Interim.	Public School Interim.	Kindergarten Directors.	Kinder garten
* Normal College	196	44		109	117		
Normal School	305		258		26		
† Kindergarten	‡					29	

*First Normal College examination conducted under the provisions of regulations 79 and 80 (1904).

†First Kindergarten examination conducted under the provisions of regulation 55 (1904).

‡Not reported.

APPENDIX U.—MEMBERS OF THE EDUCATIONAL COUNCIL AND BOARDS OF EXAMINERS; LISTS OF ASSOCIATE EXAMINERS; AND HIGH SCHOOL PRINCIPALS AND ASSISTANTS.

I.—Educational Council, 1905–1906.

Prof. James Loudon, M.A., LL.D., President, Toronto University.
Prof. Maurice Hutton, M.A., Principal, University College, Toronto.
Prof. A. B. MacCallum, B.A., M.B., Ph.D., F.R.S., Toronto University.
Prof. Alfred Baker, M.A., Toronto University.
Rev. J. R. Teefy, M.A., LL.D., Toronto.
Rev. N. Burwash, M.A., LL.D., Chancellor, Victoria College, Toronto.
Prof. A. P. Knight, M.A., M.D., Queen's University, Kingston.
A. C. McKay, B.A., LL.D., Chancellor, McMaster University, Toronto.
J. W. Plewes, Principal, Model School, Chatham.
J. E. Wetherell, B.A., Principal Coll. Inst., Strathroy.
Allan Embury, Inspector of Schools, Co. Peel, Brampton.
Rev. T. C. Street Macklem, M.A., D.I., LL.D., Vice-Chancellor, Trinity College, Toronto.

II. Boards of Examiners, 1906.

(1) *District Certificate Board.*

T. Robb, B. A., I. P. S	Brussels.
H. I. Strang, B.A	Goderich.
W. W. Rutherford, B.A., Prin., Coll. Inst	Aylmer.
J. B. McDougall, B.A., I. P. S	North Bay.
R. G. Scott, B.A., I. P. S	Pembroke.

(2) *Junior and Senior Teachers' and University Matriculation Board.*

Andras, J. W. G., Ph. D	Trinity College.
Bain, A. R., M.A., LL.D	Victoria College.
Ballard, W. H., M. A	Public School Inspector, Hamilton.
Edgar, Pelham, Ph. D	Victoria College.
Hardy, E. A., B. A	Toronto.
Johnston, G. W., Ph. D	Toronto University.
Kenrick, F. B., Ph. D	Toronto University.
Matheson, J., M. A	Queen's University, Kingston.
McLay, W. S. W., M.A	McMaster University.
McLennan, J. C., Ph. D	Toronto University.
McNaughton, J., M. A	Queen's University.
Piersol, W. H., B.A	Toronto University.
Prendergast, W., B.A	Separate School Inspector, Toronto.
Robertson, J. C., M.A	Victoria College.
Squair, J., B.A	Toronto University.

(3) *Commercial Specialist Board.*

J. A. Dickenson	Collegiate Institute, London.
J. H. Packham, B.A	Collegiate Institute, Owen Sound.
R. H. Eldon, B.A	Technical School, Toronto.

(4) *Art Specialist Board.*

J. H. Cameron, B.A	Toronto University.
S. K. Davidson	Normal School, London.
A. H. Leake	Inspector Technical Schools, Toronto.

(5) *High School Entrance Board.*

I. M. Levan, B.A	Woodstock.
D. D. Moshier, B. Pæd	Sarnia.
D. M. Walker, B.A	Peterboro'.

III. Associate Examiners for Departmental Examinations, 1905.

(1) *District Certificate Examination.*

Algebra:
Murray, R. W.

Geometry:
Fairchild, A. H.

Dictation:
Kerfoot, H. W.

Literature:
Robinson, J. B.

Composition:
Lewis, T. N.

Arithmetic:
Graham, W. A.

Grammar:
McManus, Emily.

Geography:
Milne, J. W.

History:
Dickenson, E. N.

(2) *Junior Leaving and Senior Matriculation.*

Geography:
Emery, J. W.
Saunders, W. J.
Cornish, G. A.
Stevenson, Louis.
Kennedy, G. E.
McLean, E. M.
Cole, J. M.
Might, L.
Shepherd, M. W.

Chemistry:
Gundry, A. P.
Cosens, A.
Forbes, W. B.
Closs, F. D.
Wilson, W. J.
Corkill, E. J.
Preston, T.
MacMurchy, N.
Lennox, T. H.

Physics:
Gill, J.
Clarke, H. J.
Smeaton, W.
McDougall, N.
Sexton, J. H.
Voaden, J.
Ivey, T. J.
Lehmann, C.
Moore, J. R.
Keith, A. W.
Arthur, C. C.
Granger, H. A.
Hamiltcn, R. S.
Pugsley, E.

English Grammar:
Gibbard, A. H.
Asselstine, R. W.
French, B. E.
McCuaig, H. M.
Jamieson, J. S.
Malcolm, G. D.
Pattee, Mrs. Ada
McQueen, J.
Watson, A. H.
Kennedy, L. A.

History:
Burt, A. W.
Freeman, J. A.
Barron, R. A.
Dunkley, A. W.
Dolan, J. H.
McKinnon, C.
Marshall, J. W.
Dowsley, W. C.
Jefmyn, P. T.
Clark, C. J.
Mabee, G. E.

Arithmetic and Mensuration:
Davidson, J.
Seaton, E. T.
Courtice, S. J.
Wren, J. S.
Davidson, J. H.
Henry, T. M.
Potter, C.
Doidge, T. C.
Norris, J.

Algebra:
Gourlay, R.
Anglin, R. W.
Keith, G. W.
Hedley, R. W.
Massey, A. W.
Patterson, W. J.
Lick, Addie.

Geometry:
Kirkconnell, T. A.
Graham, R. G.
Gunn, D. W.
Cox, J. L.
Taylor, J. G.
Hills, Minnie.
Armstrong, F.
Saunders, W. R.
Jamieson, T.
Galbraith, R.
Henry, T. M.
Montizambert, J. M.

English Literature:
Wetherell, J. E.
Ball, Kathleen H.

(2) *Junior Leaving and Senior Matriculation.*—Continued.

English Literature.—*Con.*:
Henstridge, Eliza.
Meiklejohn, A. J.
Barr, Janet.
Race, W. B.
Jeffries, J.
Elliott, T. E.
Bennett, A. M.
Armstrong, W. G.
Newman, G. E.
Milburn, E. F.
Fleming, Edith M.

English Composition:
Redditt, T. H.
McPherson, Hattie G.
Bale, G. S.
French, F. W.
Dolan, G. R.
Horton, C. W.

Classics:
Mayberry, C.
Teskey, Edith A.
Wright, W. J.
Bell, J. J.
Bryan, H. W.
Dobson, P. C.
McKinley, J. M.

Classics:
Bonis, H.
Owen, E.
Kerr, C. S.
Messmore, J. T.
Coutts, R. D.
Munro, P. F.
Macdonald, J.
Treemer, J.

French and German:
Day, A. E.
Clothier, J. O.
Cook, Margaret.
Burnham, A. M.
Trenaman, Mabel M.
Denyes, J. M.
McDougall, I. J.
Tamblyn, W. T.
Rose, Marion.
Conlin, Evelyn E.
Sherriff, R. M.
Grant, Christine, C.
Tennant, Isabella.
Fleming, Ethel K.
Watterworth, Grace.
Lane, J. S.

Senior Leaving and Honor Matriculation.

Science:
White, D.
Hill, E. L.
Fife, J. A.
Ellis, W. S.

Classics:
Smith, L. C.
Passmore, S. F.
Colling, J. K.
Little, R. A.
Colling, James.

English Literature and Composition:
Christie, J. D.
Foucar, W. K.
Houston, J.
Lawler, Gertrude.
Perry, S. W.

Mathematics:
DeGuerre, A.
Cornwell, J. L.
Little, J. G.
Robertson, H. S.
Elliott, J.

History:
Glassey, F. A.
Hoag, J. P.

French and German:
Dales, J. N.
Lane, J. S.
Hogarth, E. S.
Ferguson, W. C.
McKellar, H. S.

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1906.—*Continued.*

Collegiate Institutes.	Names of Teachers.	Degrees.	Specialists.	Date of appointment.	Salary.
Goderich—*Continued*	Merritt, Robert Norris	B.A., Tor	Math	1902	950
	Robertson, George A	B.A., Tor	Sci. (Interim)	1905	900
	Parlee, Edith		Commercial	1903	800
	Bauer, Bertha -(Interim)	B.A., Tor		1906	600
Guelph	Davison, James	B.A., Vic	Math	1892	1,500
	Hill, Ethelbert Lincoln	B.A., Tor	Sci.	1889	1,100
	Skinner, Kate Clara	B.A., Tor	Eng., Hist., Fr., Ger.	1895	900
	Glassey, David Alex	B. A., Tor	Class	1903	1,100
	Charlesworth, John William			1888	950
	Taylor, Luther William		Commercial	1902	1,050
	Hughes, Frank Joseph..(Interim)		Commercial	1904	750
Hamilton	Thompson, Robert Allan	B. A., Tor	Math	1886	2,000
	Turner, John Burgess	B. A., Queen's	Math., Science	1885	1,600
	Paterson, Andrew	M. A., Trin		1874	1,200
	Crawford, John Thomas	B. A., Tor	Math	1889	1,400
	Logan, William McGregor	M. A., Tor	Class	1892	1,400
	Hogarth, Eber Septimus	B. A., Tor	Eng., Hist., Fr., Ger	1892	1,400
	MacPherson, Fred'ck Fotheringham	B. A., Tor	Eng., Hist., Fr., Ger	1894	1,400
	Gill, James	B. A., B. Pæd., Tor	Math	1892	1,200
	Morgan, Sydney Albert	B. A., D. Pæd., Tor	Class	1891	1,200
	Simpson, Benjamin L...(Interim)	M. A., Queen's	Math	1905	800
	Loughead, William James	M. A., Tor	Math	1904	900
	Johnston, George Lang	B. A., Queen's	Commercial	1888	900
	McArthur, Edith Mary			1901	600
	Taylor, Mabel Annie	B. A. Queen's		1904	600
	Kraft, Ernestine Lisette.(Interim)			1904	500
	Davidson, Margaret Cheyne			1876	400
	Syme, John James		(Drill Instructor)	1905	650
	Macpherson, Mary Constance	B. A., Queen's	(Domestic Science Instructor)	1902	750
	*Bailey, William		(Manual Training Instructor)	1903	1,000
Ingersoll	Briden, William	B. A., Queen's	Class., Eng	1886	1,300
	Macdonald, George Leslie	B. A., Tor	Eng., Hist., Fr., Ger	1895	1,000
	Cameron, John Shaw		Math	1898	1,000

	Emery, John Whitehall	B.A., Tor	Math	1892	1,100
	Giles, A. Edith	B.A., Tor	Commercial (Interim), Sci	1894	1,100
	Richardson, Kate		Commercial	1890	800
	Hopkings, Walter E. (Interim)			1898	800
				1904	700
Chatham	Twohey, William J.	M.A., Tor	Class	1904	1,550
	Paterson, David Smith	B.A., Tor	Eng., Hist., Fr., Ger.	1888	1,250
	Taylor, Wilson	B.A., Tor	Math	1894	1,250
	Jewett, Albert E	B.A., Queen's	Sci	1896	1,250
	Lane, James Stanley	B.A., Tor	Fr., Ger	1898	1,175
	Collins, Henry		Commercial	1902	1,250
	Jennings, Edwin William	B.A., Tor	Eng. Hist. (Interim)	1904	900
	Lafferty, Isabella Sarah Effie (Int.)	B.A., Tor		1903	600
	Ayers, Marion Huntley (Interim)	M.A., Queen's		1905	900
	McRitchie, Alex. Robinson	B.A., Tor	Sci.	1905	800
Clinton	Houston, John	M.A., Tor	Eng., Hist., Fr., Ger	1893	1,225
	McLean, Ebenezer M		Sci.	1894	1,000
	McKinnon, Charles (Interim)	B.A., Tor		1904	900
	Cranston, David London	B.A., Tor	Math	1904	750
	Watterworth, Grace McC		Commercial	1905	650
Cobourg	Mitchell, George Winter	M.A., Queen's	Class	1890	1,425
	Arthur, Colin Clayton	M.A., Queen's	Sci.	1893	1,000
	Odell, John William	B.A., Tor	Math	1895	1,000
	Jones, Laura L	B.A., Tor	Eng., Hist., Fr., Ger.	1898	800
	Jamieson, Clinton Egerton (Int'rim)		Com	1905	800
Collingwood	Hammill, George	B.A., Tor	Math	1892	1,200
	Colling, John Knowles	B.A., Tor	Class.	1899	950
	Stone, Alice B		Commercial	1902	750
	Cole, Agatha St. Osyth (Interim)	B.A., Tor	Mods. and Hist	1905	750
	Moore, E. S (Permit)	B.A., Tor		1906	975
	Jones, Louis E	B.A., Tor		1906	900
Galt	Carscadden, Thomas	M.A., Tor	Eng., Hist	1885	1,750
	DeGuerre, Ambrose	B.A., Tor	Math	1890	1,200
	Evans, William Edwin		Commercial	1892	1,200
	Hamilton, Robert S	B.A., Tor	Sci.	1894	1,200
	Carter, Janet Wishart	M.A., Tor	Eng., Hist., (Interim), Fr., Ger	1901	1,000
	Morrow, Archibald Elston	B.A., Tor	Class	1905	1,200
Goderich	Field, John M	B.A., Tor	Eng., Hist., Fr., Ger.	1900	1,200
	Strang, Hugh Innis	B.A., Tor	Class.	1871	1,000

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1906.—*Continued.*

Collegiate Institutes.	Names of Teachers.	Degrees.	Specialists.	Date of appointment.	Salary.
Goderich—*Continued*	Merritt, Robert Norris.....	B.A., Tor.....	Math.....	1902	950
	Robertson, George A	B.A., Tor.....	Sci. (Interim).....	1905	900
	Parlee, Edith	.....	Commercial	1903	800
	Bauer, Bertha .....-(Interim)	B.A., Tor.....	.....	1906	600
Guelph.....	Davison, James	B.A., Vic.....	Math.....	1892	1,500
	Hill, Ethelbert Lincoln.....	B.A., Tor.....	Sci.	1889	1,100
	Skinner, Kate Clara.....	B.A., Tor.....	Eng., Hist., Fr., Ger.	1895	900
	Glassey, David Alex	B. A., Tor.....	Class	1903	1,100
	Charlesworth, John William.....	.....	.....	1888	950
	Taylor, Luther William.....	.....	Commercial.....	1902	1,050
	Hughes, Frank Joseph..(Interim)	.....	Commercial.....	1904	750
Hamilton.....	Thompson, Robert Allan.....	B. A., Tor.....	Math.....	1886	2,000
	Turner, John Burgess.....	B. A., Queen's.....	Math., Science.....	1885	1,600
	Paterson, Andrew.....	M. A., Trin.....	.....	1874	1,200
	Crawford, John Thomas.....	B. A., Tor.....	Math.....	1889	1,400
	Logan, William McGregor	M. A., Tor.....	Class	1892	1,400
	Hogarth, Eber Septimus.....	B. A., Tor.....	Eng., Hist., Fr., Ger	1892	1,400
	MacPherson, Fred'ck Fotheringham	B. A,, Tor.....	Eng., Hist., Fr., Ger	1894	1,400
	Gill, James.....	B. A., B. Pæd., Tor.....	Math.....	1892	1,200
	Morgan, Sydney Albert.....	B. A., D. Pæd., Tor.....	Class	1891	1,200
	Simpson, Benjamin L...(Interim)	M. A., Queen's.....	Math.....	1905	800
	Loughead, William James	M. A., Tor.....	Math.....	1904	900
	Johnston, George Lang.....	B. A., Queen's.....	Commercial.....	1888	900
	McArthur, Edith Mary.....	.....	.....	1901	600
	Taylor, Mabel Annie	B. A. Queen's.....	.....	1904	600
	Kraft, Ernestine Lisette. (Interim)	.....	.....	1904	500
	Davidson, Margaret Cheyne.....	.....	.....	1876	400
	Syme, John James	.....	(Drill Instructor)	1905	650
	Macpherson, Mary Constance	B. A., Queen's.....	(Domestic Science Instructor).....	1902	750
	*Bailey, William.....	.....	(Manual Training Instructor).....	1903	1,000
Ingersoll	Briden, William	B. A., Queen's.....	Class., Eng	1886	1,300
				1895	1,000

	[illegible]	[illegible]	[illegible]	1905	1,000
	Lucas, Austin Allan (Interim)	B. A., Tor	Commercial (Interim)	1904	900
Kingston	Ellis, William Stewart	B. A., B. Sc. Vic	Commercial	1904	900
	Sliter, Ernest Oscar	M. A., Tor	Math., Sci	1893	1,800
	Dales, John Nelson	M. A., Tor	Class	1888	1,250
	Sills, William Ryerson	M. A., Queen's	Eng., Hist., Fr., Ger	1889	1,250
	Kemp, William	M. A., Queen's	Math	1897	1,250
	Dickey, Mary Ada	B.A., Tor	Mods. and Hist	1905	1,050
	Staples, Louis Edgar	M.A., Queen's	Mods. and Hist	1905	800
	Elliott, Thomas W (Interim)	B.A., Tor	Sci	1902	900
	Ramsay, James T (Interim)		Sci	1906	800
	Fraser, James William (Interim)	B.A , Tor	Com	1906	1,000
	Bale, George Sydney	B.A., Tor		1904	750
	Chown, Hattie Louise		Eng., Hist., Fr., Ger	1906	1,000
	Hatch, Augustus F	B.A., Bowdoin		1905	750
			(Manual Training Instructor)	1903	1,000
Lindsay	Harstone, John C	B.A., Tor	Math	1886	1,600
	Cornish, George Augustine	B.A., Tor	Sci	1903	1,100
	Rosevear, Howard Stanley	B.A., Tor., M.A., Harvard	Sci	1903	1,100
	Colling James	B.A., Tor	Class	1894	1,200
	Walks, Robert H	B.A., Tor	Eng., Hist.	1904	1,050
	Willson, Alice M	B.A., Tor	Fr., Ger (Interim)	1904	1,000
	McNab, Elizabeth M (Interim)	M.A., Queen's		1904	800
London	Radcliffe, Samuel John	B.A , Tor	Eng., Hist., Fr., Ger	1891	2,000
	Little, Robert A	B.A., Tor	Class	1886	1,500
	Ferguson, William Chalmers	B.A., Tor	Eng., Hist., Fr., Ger	1892	1,425
	McCool, John	M.A., Tor	Eng., Hist., Fr., Ger	1897	1,250
	Keith, Arthur W	B.A., Tor	Sci	1905	1,125
	Govenlock, William M	B.A., Tor	Math	1898	1,225
	Wilson, Nicholas			1866	1,050
	Andrus, Guy A			1888	1,225
	McVicar, Archibald	B.A., Tor	Eng., Hist	1903	1,225
	Riddell, Frank P	B.A., Tor	Class	1898	1,125
	Jones, Samuel S			1902	1,075
	Dickenson, James Arthur		Commercial	1895	1,150
	McCutcheon, Fred'ck Wm. Caswell	B.A., Tor	Fr., Ger. (Interim) Math., Eng., Hist.	1900	1,125
	Downing, John Henry			1900	1,050
	Stuart, Frederick Alfred	M.A., Tor	Sci	1903	1,225
	Mooney, Wm. H. Thomas. (Interim)	B.A., Tor	Class	1903	1,125
	Gray, Neil Roy	B.A., Tor	Mods. and Hist (Interim)	1904	1,125

* Part time teacher.

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1906.—*Continued.*

Collegiate Institutes.	Names of teachers.	Degrees.	Specialists.	Date of appointment.	Salary.
London.—*Continued*	Kelso, Alice C			1897	875
	McDonald, Jessie E. O	B.A., Tor	Mods. and Hist (Interim)	1904	825
	Davidson, S. Kelso		(Art Instructor)	1877	650
	Gregory, William		(Drill Instructor)	1902	700
	McIntosh, Christine		(Domestic Science Instructor)	1902	400
	*Pickles, Sugden		(Manual Training Instructor)	1905	150
Morrisburg	Jamieson, James Smyth	M.A., Vic	Eng., Hist	1882	1,300
	Massey, Arthur Wallace	B.A., Vic	Eng., Hist., Math	1892	1,000
	Saunders, William John	M.A., Queen's	Sci	1903	950
	Cooke, John Alexander	B.A., Queen's	Class	1904	950
	Davy, Robert Nelson....(Interim)	B.A., Tor		1905	825
	Houston, Jessie	B.A., Tor	Mods. and Hist	1905	800
Napanee	Flach, Ulysses J	M.A., Tor	Math	1900	1,400
	Reid, Marvin Ryckman	M.A., Queen's	Sci	1900	1,100
	Croskery, Robert Arthur	B.A., Queen's	Class	1903	1,000
	Henry, Edith May	B.A., Tor	Mods. and Hist	1904	800
	Nichol, Margaret A			1892	600
	Smith, Margaret		Com. (Interim)	1892	600
Niagara Falls	Dickson, James D	B.A., Tor	Math	1893	1,500
	Walker, David McKenzie		Com	1893	1,100
	Fleming, Ethel Katharine	B.A., Tor	Mods. and Hist	1900	1,000
	Will, George Edwin	B.A., Tor	Class	1901	1,100
	Voaden, John	M.A., Queen's	Sci	1903	1,100
	Dobbie, Mary I.....(Interim)			1900	600
Orillia	Dickson, John Elder	B.A., Tor	Class, Eng	1899	1,500
	Doidge, Thomas Clarke	B.A., Tor	Math., Com.	1899	1,100
	Madill, Alonzo James	B.A., McMaster	Sci	1905	900
	Miller, Nannie M. A		Com. (Interim) Eng. Hist	1905	850
	Elliott, Robert Leopold			1901	800
	[illegible] Christine Cameron	B.A., Tor	Mods. and Hist	1903	800

	Mathers, Hubert	B.A., Tor	Fr., Ger	1893	1,350
	Norris, Isaac Taylor	B.A., Queen's	Eng., Hist., Fr., Ger	1894	1,800
	Campbell, Daniel Alexander	B.A., Queen's		1887	1,500
	Scott, Bessie Mabel	B.A., Tor	Math	1898	1,375
	Armstrong, William Gilnochie		Sci	1896	1,650
	Simpson, Robert S	M.A., Tor		1892	1,000
	Hedley, James Walter		Mods. and Hist	1900	1,000
	Hardie, William	M.A., Tor	Com	1902	1,050
	Nelson, John	B.A., Tor	Math	1904	950
	Meiklejohn, Allan James	B.A., Queen's	Class	1905	1,300
	Smeaton, William	B.A., Tor	Math	1905	950
	Ewing, William Campbell	M.A., Queen's	Eng., Hist	1906	1,200
	Tomkins, Elizabeth Augusta		Sci	1906	1,000
	*Chitty, Louis M		Sci	1905	950
				1901	850
			(Drill Instructor)	1904	300
Owen Sound	Murray, Thomas	B.A., Tor	Math	1897	1,600
	Packham, James Henry	B.A., Vic	Math., Commercial	1884	1,200
	Whyte, David	B.A., Tor	Sci	1902	1,150
	McKellar, Herbert S	B.A., Tor	Fr., Ger	1898	1,150
	Howard, Edwy. S	B A., Vic	Eng., Hist	1902	1,150
	Brown, Lyman	M.A., Tor	Class	1903	1,150
	VanEvery, John F	B.A., Tor	Eng., Hist., Fr., Ger	1903	1,150
	Shields, Alfred J			1903	800
	Dowkes, William J. (Interim)			1903	800
Perth	McKim, William Andrew	B.A., Tor	Eng., Hist., Fr., Ger	1900	1,200
	Edmiston, James Alfred			1893	850
	Preston, Thomas	B.A., Tor	Sci	1903	900
	Davidson, John H	M.A., B.Pæd., Tor	Math	1906	1,000
	Fergusson, George Arthur	B.A., Tor	Class(Interim)	1905	900
Peterborough	Fessenden, Cortez	M.A., Tor	Math	1890	2,000
	Fife, James A	B.A., Tor	Math., Sci	1887	1,200
	Jeffries, John	B.A., Tor	Eng., Hist , Fr., Ger	1890	1,200
	Kenner, Henry R. H	B.A., Tor	Class	1893	1,200
	Srigley, Edgar Cooper		Commercial	1902	1,080
	Hodgson, Joseph Emerson	B.A., Tor	Sci. (Interim)	1905	1,040
	Weir, Annie	B.A., Tor	Eng., Hist., Fr., Ger	1904	1,040
Renfrew	McDowell, Charles	B.A., Queen's	Math	1879	1,250
	Berlanquet, Hugh S. (Interim)	B.A., Queen's	Class	1904	850

* Part time teacher.

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1906.—*Continued.*

Collegiate Institutes.	Names of Teachers.	Degrees.	Specialists.	Date of appointment.	Salary.
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Renfrew.—*Continued* . .	Smith, Arthur	B.A., Tor	Sci	1904	850
	Bennett, Maud	B A., Tor	Mods. and Hist	1902	700
	Reesor, Lillian M		Commercial	1904	750
	Corrigan, Eugene .....(Interim)		(Manual Training Instructor)	1905	800
	Johnston, Margaret J		(Domestic Science Instructor)	1902	500
Ridgetown	Little, John George	B.A., Tor	Math	1889	1,300
	Reid, Robert	B.A., Tor	Eng., Hist., Fr., Ger	1895	1,000
	Henderson, Jas. VanWyck (Int'm)	B.A., Tor	Class	1903	850
	McLaurin, Kate .....(Interim)	B.A., McMaster	Sci	1905	800
	White, Kate Elizabeth ..(Interim)		Commercial	1905	600
St. Catharines	Henderson, John	M.A., Tor	Class., Eng., Hist	1872	1,600
	Robertson, William, John	B.A., Tor., LL.B., Vic	Math	1874	1,200
	Giffin, James A	B.A., LL.B., Tor	Sci	1892	1,100
	Gloney, Sara Louisa	M.A., Queen's	Eng., Hist., Fr., Ger	1896	1,000
	Buchanan, John A. ....(Interim)		Commercial	1905	1,000
	Stevenson, William John			1892	750
	Caverhill, Arthur E			1894	750
St. Mary's	Martin, Stephen	B.A., Tor	Math	1886	1,350
	Ross, Alexander Herbert Douglas	M.A., Queen's	Sci., Math	1906	1,050
	Wilkinson, James Egerton (Interim)		Commercial	1904	800
	Conlin, Evelyn Elizabeth	B.A., Tor	Mods. and Hist	1904	800
	Logan, Charles John	B.A., Trin	Class	1906	1,000
St. Thomas	Quance, Noah	B.A., Tor	Class	1891	1,650
	Stevenson, Orlando, John	M.A., D. Pæd., Tor	Eng., Hist., Fr., Ger.	1897	1,200
	Voaden, Arthur		Commercial	1903	1,200
	McGee, Cyril Houghton	B.A., Trin	Math	1902	1,200
	Pettit, Louis John .....(Interim)	B.A., Queen's	Eng. and Hist	1905	850
	Webster, Charles Samuel	B.A., Tor		1902	800
			Eng., Hist., Fr., Ger.	1903	1,200

	[illegible], Archibald Mowbray	[illegible]	[illegible]	1903	1,000
	Dent, William Arthur	B.A., Tor	Eng., Hist., Fr., Ger.	1904	1,000
	Fleming, Ethel May	B.A., Tor	Sci	1902	1,000
	Bridgman, Clara Mary		Fr., Ger. (Interim), Eng. Hist.	1902	800
	Colquhoun, Thomas Alvin...(Int)	B.A., Tor	Commercial (Interim)	1904	750
Seaforth	Rogers, George F	B.A., Vic	Sci	1900	1,275
	Kirkwood, Florence Ethel	B.A., Tor	Class	1901	950
	Brown, Henry William	B.A., Tor	Eng., Hist., Fr., Ger.	1901	950
	Colling, George Featherstone	B.A., Tor	Math	1901	950
	Doherty, Mabel		Commercial	1905	700
Stratford	Mayberry, Charles Alexander	B.A., LL.B., Tor	Class	1890	1,650
	Robertson, Hugh S	B.A., Tor	Math	1900	1,200
	Lennox, Thomas H	B.A., Tor	Sci	1900	1,100
	Stevenson, Andrew	B.A., Tor	Eng., Hist	1901	1,100
	Malcolm, George	B.A., Queen's		1890	1,000
	Marty, Sophie E	M.A., Queen's	Eng., Hist., Fr., Ger	1900	1,100
	Robertson, George D	B.A., Queen's	Commercial (Interim)	1902	1,000
	Delmage, Emelyn Euphemia	B.A., McMaster	Math	1905	800
	Adams, W. A		(Manual Training Instructor)	1901	950
	Lewis, Esther		(Domestic Science Instructor)	1903	500
Strathroy	Wetherell, James Elgin	B.A., Tor	Class., Eng., Hist	1884	1,500
	Auld, Charles	B.A., Tor	Math	1900	1,050
	Conn, Henry	B.A., Tor	Sci	1900	1,000
	Kent, Eleanor		Commercial	1899	800
	Sealey, Ethel May	B.A., Tor	Mods. and Hist	1904	850
Toronto (Harbord St.)	Spotton, Henry Byron	M.A., Tor	Class., Sci	1891	3,000
	Hagarty, Edward William	B.A., Tor	Class	1891	2,000
	Balmer, Eliza May	B.A., Tor	Eng., Hist., Fr., Ger	1891	2,000
	Lawler, Gertrude	M.A., Tor	Eng., Hist., Fr., Ger., Math	1891	2,000
	Smyth, Thomas Henry	M.A., B.Sc., Tor.	Sci	1891	2,000
	Cox, John Loane	B.A., Tor	Math	1892	2,000
	Forfar, Charles	B.A., Tor	Eng., Hist., Fr., Ger	1892	1,600
	Kennedy, Lyman Aaron	M.A., Vic		1892	1,600
	Strath, Robert Smith	B.A., Tor	Math	1893	1,600
	Clark, Luther J	B.A., Queen's		1896	1,500
	Carstairs, John Stewart	B.A., Tor	Eng., Hist	1899	1,400
	Horton, Charles W	B.A., Queen's	Eng., Hist	1904	1,050
	Moore, John Rosington	M.A., Queen's	Sci	1904	1,050
	Fletcher, William Hugh	M.A., Queen's	Sci., Com	1905	1,050

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1906—*Continued.*

Collegiate Institutes.	Names of teachers.	Degrees.	Specialists.	Date of appointment.	Salary.
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Toronto (Harbord St.)—*Con.*	Irwin, Herbert W.	B.A., Tor.	Mods. and Hist.	1905	1,050
	Patterson, William John	M.A., Queen's	Math	1905	1,050
Toronto (Jameson Ave.)	Embree, Luther Edmund	M.A., Tor	Class., Eng., Hist., Fr. Ger.	1888	3,000
	Smith, Gilbert Acheson	B.A., Tor.	Sci.	1889	2,000
	Hillock, Julia S.	B.A., Tor.	Fr., Ger.	1900	1,700
	Birchard, Isaac J	M.A., Tor.	Math	1893	2,000
	Crawford, Henry J	B.A., Tor.	Class	1894	2,000
	Millar, James			1888	2,000
	Spence, Nellie	B.A., Tor.	Class., Eng., Hist.	1889	1,900
	Sinclair, John	B.A., Tor.		1898	1,450
	Watson, Erwin H. A	B.A., Tor.	Mods. and Hist.	1904	1,100
	Cosens, Absalom	M.A., Tor.	Sci.	1904	1,100
	Reid, Thomas Emerson..(Interim)	B.A., Tor.		1905	1,000
Toronto (Jarvis St.)	Manley, Frederick Fitzpayne	M.A., Tor.	Math	1875	2,900
	Chase, George A	M.A., Tor	Eng., Hist., Fr., Ger.	1889	2,000
	Gray, Robert Alexander	B.A., Tor.	Math	1900	1,650
	Shaw, George Edmund	B.A., Tor.	Eng., Hist., Fr., Ger.	1876	2,000
	Michell, William C.	B.A., Tor.	Class	1897	1,650
	Gundy, Henry Wentworth	B.A., Tor.	Class	1900	1,400
	Lehmann, Carl	B.A., Tor.	Sci	1898	1,650
	Thomas, Janie	M.A., Tor.	Eng., Hist.	1882	1,550
	Wightman, Robert	B.A., Tor.	Math	1903	1,150
	Clark, Fred Hall	B.A., Tor.	Eng., Hist., Fr., Ger.	1904	1,200
	Ivey, Thomas Jayne	M.A., Tor.	Sci.	1904	1,100
	Keillor, James	B.A., Queen's	Eng , Hist.	1905	1,050
Toronto Junction	Colbeck, Franklin Charles	B.A., Vic.	Class., Eng., Hist.	1894	1,900
	Gourlay, Richard	B.A., Tor.	Class., Math.	1893	1,500
	Charles, Henrietta	B.A., Tor.	Eng., Hist., Fr., Ger.	1900	1,200
	Johnston, Frederick James	M.A., Tor.	Sci	1904	1,100
	Barnes, Charles Lancelot (Interim)	B.A., Tor.	Class	1902	900
	[illegible] Catharine (Interim)		Commercial	1903	850
				1904	800

	Mgr, Edmund M		Math	1889	1900
	McLean Robert Alexander (Interim)	B.A., Tor	Sci	1905	800
	Trenouman, Mabel Natalie	B.A., Queen's	Class	1905	600
	Minaker, Mary E. (Interim)	B.A., Tor	Mods. and Hist	1905	600
			Commercial	1905	500
Whitby	Hogarth, George Henry	B.A., Tor			
	Denyes, James Malcolm	B.A., Queen's	Math		
	Pringle, E. Gertrude (Interim)	B.A., Tor	Fr., Ger	1900	1,150
	Scratch, Linnie May		Class	1903	850
			Sci., Commercial	1906	800
				1905	950
Windsor	Gavin, Frederick Pearce	B.A., Queen's	Sci	1892	1,600
	Bell, Frederick Henry	B.A., Tor	Eng., Hist., Fr., Ger.	1898	1,200
	Messmore, Joseph Franklin	B.A., Tor	Class	1899	1,100
	Neilson, James		Commercial	1898	1,100
	Taylor, John Gladstone	B.A., Tor	Math	1903	1,100
	Marshall, John Wells	B.A., Queen's	Class	1903	1,100
	Brunt, Robert Anthony	B.A., Tor	Sci. (Interim)	1905	1,100
	Butterworth, Isabella S. (Interim)	B.A., Tor	Fr., Ger	1905	750
Woodstock	Levan, Isaac Master	B.A., Tor	Class., Eng., Hist., Fr., Ger	1898	1,500
	Kerr, Charles Staples	B.A., Tor	Eng., Hist. (Interim), Class	1889	1,100
	Cole, James McLarty		Sci	1898	1,100
	Overholt, Arthur Milton	M.A., McMaster	Math	1904	1,100
	Elmslie, Wallace	B.A., Tor	Mods. and Hist	1904	900
	Edward, Frankland Ward (Interim)		Commercial	1905	750
	Miller, Eva Matilda (Interim)	B.A., Queen's	Mods. and Hist	1903	650
	Mercer, John S.		(Manual Training)	1905	900
High Schools.					
Alexandria	MacKay, Donald	M.A., Tor	Class	1895	1,250
	Lawlor, Richard G. (Interim)	B.A., Queen's		1904	850
	Flath, Emma S.	B.A., Queen's	Mods., Hist. (Interim)	1903	800
Almonte	Treleavan, John Wesley	B.A., Tor	Class	1902	1,100
	McPhail, Alexander C.	B.A., Queen's		1899	800
	Thompson, Margaret Jane	B.A., Queen's	Fr., Ger. (Interim), Eng., Hist.	1895	800
	Schell, Arthur William (Interim)			1905	700
Arnprior	Mabee, George Elliott	B.A., Tor	Fr., Ger	1905	1,100
	Hobbs, Thomas	B.A., Tor	Math	1904	750
	Baird, Mabel Margaret J. (Interim)	B.A., Tor	Mods. and Hist	1905	750
	Davidson, Edna (Interim)			1905	600

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1906.—*Continued.*

High Schools.	Names of Teachers.	Degrees.	Specialists.	Date of appointment.	Salary.
Arthur	Snider, Egerton E	B.A., Vic	Math	1896	1,200
	Trench, Wycliffe A. (Interim)	B.A., Tor		1905	800
	Cummer, Elvina May (Interim)			1905	450
Athens	Massey, Norman Levi	B.A., Vic	Math	1898	1,100
	Bishop, Charles Peter	B.A., Queen's	Commercial (Interim)	1895	900
	Dowsley, William Clinton	M.A., Queen's	Class., Hist., Eng	1899	900
	Williams, Albert (Interim)			1905	700
Aurora	Mulloy, Charles Wesley	B.A., Tor	Class	1896	1,000
	Rice, John			1895	650
	McBride, Sarah Mabel			1902	525
Beamsville	Myer, Albert Nicholas	M.A., Trin	Math	1898	900
	Jenkins, Myrtle Mellaney (Interim)			1905	500
Belleville	Milburn, Edward Fairfax	M.A., Trin		1893	1,200
	Knight, William W	B.A., Queen's	Math	1892	1,000
	Clarke, Henry Jellyman	B.A., Queen's	Sci	1892	1,000
	McRae, Jessie Carre			1889	625
	Whitely, Lester Robert	B.A., Tor	Mods. and Hist	1905	1,000
Bowmanville	*Allin, Elizabeth A	M.A., Tor	Fr., Ger	1902	900
	Frost, Francis Henry	B.A., Tor	Math	1896	1,000
	Thompson, John Fletcher	M.A., Tor	Class	1904	1,000
	Carpenter, Wm. Grant (Interim)	B.A., McMaster	Sci	1905	900
Bradford	Carefoot, George Andrew	B.A., Queen's	Sci	1905	1,000
	Dickson, Jean Gibson (Interim)	B.A., Tor		1905	500
	Nelson, Albert E. (Interim)			1905	700
Brampton	Fenton, William J	B.A., Tor	Class	1895	1,300
	Galbraith, William John	B.A., Trin	Fr., Ger	1887	900
	Shields, Alexander M	B.A., Tor	Eng., Hist	1902	900
	Holman, Lemon R. (Interim)	M.A., Trin	Math	1905	900

Brighton	Newman, George			1899	1,000
	Burke, Alexander			1895	750
Caledonia	Seaton, Edward T.	B.A., Queen's			
	McGarvin, Michael Jas. (Interim)	B.A., Tor	Math	1901	1,000
	Ramsay, Charles (Interim)		Mods., Hist	1905	800
	Campbell, Estella Kate (Interim)			1900	800
				1906	400
Campbellford	Hume, John Patterson	B.A., Queen's	Sci	1896	1,100
	Boyes, Robert		Math	1895	900
	Henstridge, Elizabeth	M.A., Queen's	Eng., Hist., Fr., Ger	1904	800
	McGuirl, Thomas H. (Interim)	B.A., Queen's	Commercial	1904	800
Carleton Place	Rand, Wilfrid Erle	B.A., Tor	Math	1902	1,100
	McDonald, Neil			1890	800
	McDonald, John Ford	M.A., Queen's	Class	1901	900
	Tapscott, Cora Ida	B.A., Tor		1905	750
Cayuga	Skeele, James Eton	B.A., Tor		1897	1,000
	Lick, Addie	B.A., Tor	Math	1903	700
	Robertson, John Nelson	B.A., Tor		1906	650
Chesley	Luton, James T	M. A., Tor	Class	1905	1,100
	Longman, Edwin		Math	1904	850
	McManus, Emily	M. A., Queen's	Eng., Hist	1901	600
Colborne	Bellamy, Wesley	B. A., Vic		1890	1,000
	Keefe, Reuben Daniel	B A., Tor		1903	750
Cornwall	MacLean, Allan Edmund	B. A., Queen's	Fr., Ger	1898	1,250
	Nugent, James			1884	1,000
	Crewson, Joseph W	B. A., Vic	Class	1902	950
	Fetterly, Hiram B	B. A., Queen's		1904	950
	Birchard, Alexander Fraser		Commercial (Interim)	1898	800
	Wegg, Charlotte Sophia (Interim)	B. A., Tor		1906	600
Deseronto	Smellie, William K. T	B. A., Tor	Sci	1896	1,200
	Whyte, Robert	B. A., Tor		1896	900
	Sexsmith, William Newton (Interim)	B. A., Tor		1904	750
Dundas	Saunders, William Robert	B. A., Queen's		1903	1,100
	Webb, Charles W. (Interim)	B. A., Tor		1906	800
	Armstrong, Mabel Gertrude	B. A., Tor		1905	550

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1906.—*Continued.*

High Schools.	Names of Teachers.	Degrees.	Specialists.	Date of appoint. ment.	Salary.
Dunnville.—*Continued.*	Bruels, Ira D	B. A., Queen's	Sci	1905	1,000
	Asselstine, Robert Whiting	B. A., Queen's		1905	900
	Cooke, Gertrude Agnes..(Interim)	B. A., Queen's	Class	1904	750
Dutton	Taylor, John Andrew	B. A., Queen's	Sci	1898	1,100
	Smith, John Charles....(Interim)	B. A., Queen's	Class	1905	600
	Wethey, Edmund James(Interim)	B. A., Trin		1905	700
	Buchanan,Mabel Amonde(Interim)	B. A., Queen's		1905	500
East Toronto	French, Fred. William	B. A., Tor	Class	1903	1,200
	Graham, Louis Hartley	M. A., Tor	Sci	1903	850
	Ball, Kathleen H		Fr., Ger	1905	700
Elora	MacMurchy, Norman	B. A., Tor.	Sci	1895	1,100
	Blyth, Sara.....(Interim)			1905	600
	McQueen, Rose J			1904	550
Essex	Anglin, Robert W.	M. A., Queen's	Math	1902	1,200
	Teskey, Edith A	M. A., Tor	Class	1901	900
	Fortner, Theodore G....(Interim)	B. A., Tor	Mods	1905	550
	Forbes, William Brownie		Sci	1905	900
Fergus	Freeman, John Alexander	B. A., Tor	Class	1903	1,100
	Odlum, Eleanor Dora	B. A., Trin	Mods. and Hist	1903	500
	Campbell, Alexander	B. A., Tor	Math	1905	700
	Gordon, Mary M.....(Interim)			1905	500
Forest	Barron, Robert Armour	B. A., Tor	Class., Eng., Hist., Fr., Ger.	1905	900
	Sprung, Whitfield Lyman .(Inter)	B. A., Tor	Math	1904	800
	McRae, Donella Maud. (Interim)	B. A., Queen's	Mods. and Hist	1905	650
Fort William	Pilkey, Peter Joseph	B. A., Queen's		1901	1,300
	Wood, Elmore Everton	B. A., McMaster	Math	1902	1,100
	Ogilvie, Alvin Irwin ... (Interim)			1905	700
	[illegible] Robert George	B. A., Vic	Math	1894	1,250

	Galbraith, Thomas M.			1905	925
	Folk, Henry J.	B. A., Queen's	Fr., Ger.	1905	900
	Farmer, Alfred Samuel . (Interim)	B. A., McMaster		1905	650
Georgetown	Coutts, Richard David	B. A., Tor	Class	1897	1,100
	Hagan, James W. (Interim)			1904	750
	Hutchison, Robert Alex. (Interim)	B. A., Queen's	Math	1905	750
	Mitchell, Jessie A	B. A., Tor		1906	600
Glencoe	Foucar, Walter	M. A., Tor	Eng., Hist., Fr., Ger	1905	950
	Fairchild, Austin H. (Interim)	B. A., McMaster	Math	1905	800
	Cruikshank, Libbie. (Interim)			1905	550
Gravenhurst	Keith, George Walter	B. A., Tor	Math	1904	1,100
	Filshie, Marion W. (Interim)	B. A., Tor		1905	500
	Broughton, Clara Elizabeth (Inter)			1905	400
Grimsby	Harrison, Charles W	M. A,, Vic		1894	900
	Strang, Rose Innis			1901	600
Hagersville	Elliott, Thomas Edward	B. A., Tor	Eng., Hist., Fr., Ger	1905	1,000
	Wright, Robert			1896	715
	Kidd, Truman W. (Interim)			1905	700
Harriston	MacLean, Godwin V	M. A., Tor. and Harvard	Math	1901	1,100
	Corkill, Edward J	B. A., Queen's	Sci	1902	850
	Graham, Ellen Marie. (Interim)	B. A., Tor		1905	600
	May, Annie. (Interim)	B. A., Tor	Class	1905	600
Hawkesbury	Clothier, James O	B.A., Queen's	Fr., Ger., (Interim)	1902	1,000
	Higginson, Maria Adelaide			1897	600
	Youngson, Mary A. (Interim)	B.A., Queen's		1904	600
Iroquois	Stanley, Thomas E. A	B.A., Tor	Math	1897	1,075
	Anderson, William George	B.A., Tor	Class	1901	900
	Rose, Marion H		Fr., Ger	1898	675
	McGuire, James F. (Interim)	B.A., Queen's	Sci	1905	900
Kemptville	Sexton, James Henry	M.A., Queen's	Sci	1905	1,100
	Gundry, Helen Myrtle	B.A., Tor	Class	1905	750
	Bibby, Maria Victoria. (Interim)	B.A., Tor	Mods. and Hist	1905	600
	Keegan, Joseph D. (Interim)			1905	600
	Christie, Duncan McLaren		Math. (Interim)	1906	800
Kenora	Roberts, Thomas Henry	B.A., Tor		1902	1,300

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1906.—*Continued.*

High Schools	Names of Teachers	Degrees.	Specialists.	Date of appointment.	Salary.
Kenora.—*Continued.*	Wilson, W. Ashbury	B.A., Queen's		1903	1,150
	Fife, Mary Hannah	B.A. Tor.		1906	750
Kincardine	Perry, Samuel Walter	B.A., Vic.	Class	1890	1,300
	Courtice, Samuel James	B.A., Tor.	Math.	1903	1,000
	Grainger, Horace Alex	B.A., Tor.	Sci	1902	1,000
	Teskey, Kathleen (Interim)	M.A., Queen's	Mods.	1905	700
Leamington	Elliott, John	B.A., Queen's	Eng., Hist., Math.	1896	1,100
	McCormack, Samuel G. (Interim)	M.A., Queen's		1905	800
	Closs, Frank D.		Sci	1905	750
	Norman, Ernest (Permit)	B.A., Tor.		1906	900
Listowel	Nichol, William Wallace	B.A., Tor.	Math.	1898	1,075
	Ramsay, William (Interim)	B.A., Queen's	Class	1905	950
	Clayton, Adelaide Helena	B.A., Tor.	Eng., Hist., Fr., Ger.	1905	950
Lucan	Wren, John Stewart	B.A., Tor.	Math.	1903	1,000
	Anderson, Jessie Inglis. (Interim)	B.A., Tor.	Mods. and Hist	1905	550
	Mara, Ida M. (Interim)	B.A., Tor.		1903	550
	Tuke, William H. (Permit)			1905	550
Madoc	Watson, Alexander H.	B.A., Tor.		1889	1,100
	Thackeray, Barton Earl. (Interim)	B.A., Tor.		1905	800
	Eby, Florence Mary (Interim)	B.A., Tor.		1905	500
Markham	Reed, George Henry	M.A., B.Pæd, Tor.	Class	1890	1,100
	Calvert, Joseph Fletcher. (Permit)	M.A., McMaster		1905	750
	Truscott, Samuel Alfred. (Interim)	M.A., Queen's	Math.	1906	700
	Mairs, Edith M. (Interim)	M.A., Trin.		1902	600
	Thomson, Olive M. (Interim)			1906	450
Meaford	Cornwell, John Leslie	B.A., Tor.	Math.	1900	1,300
	Dundas, Arthur A.	B.A., Tor		1897	1,000
	Francis, Annie Buchan	B.A., Tor	Mods. and Hist.	1904	800
	Baker, Albert Henry (Interim)	B.A., McMaster	Sci	1905	800

Midland	Simpson, Ernstein	B.A., Tor	Math. (Interim)	1904	1,100
	Glass, William Arthur	B.A., Tor		1904	900
	Smith, Lillias Pearl.....(Interim)	B.A., Tor		1904	600
Mitchell	Morrow, John D	B.A., Tor	Class	1905	1,075
	Ward, Clara Annie	B.A., Tor	Mods. and Hist	1905	800
	Stephens, Robert H			1902	700
Mount Forest	Brethour, John Henry	B.A., Vic	Class	1891	1,200
	Armstrong, Frank G	B.A., Tor	Math	1904	850
	Clarke, George A.....(Interim)			1905	800
Newburgh	Nesbit, David Ashton	B.A., Queen's	Eng	1893	1,100
	Millar, Frederick Gourlay	B.A., Tor		1903	700
	Hedley, William Powell (Interim)	B.A., Tor	Math	1904	700
Newcastle	Davidson, Hugh	B.A., Tor		1888	900
	Grose, Annie R.....(Interim)			1905	450
Newmarket	Coombs, Albert Ernest	M.A., B. Pæd., Tor	Class	1899	1,100
	Hollingshead, John Edwin			1884	800
	Lawr, Waldon.....(Interim)			1906	750
Niagara	Wright, William Jonathan	M.A., Tor	Class	1904	900
	Anderson LillieCatharine(Interim)			1904	450
Niagara Falls South	Fitzgerald, Eliza S	M.A., Queen's	Class	1904	1,200
	Spence, Augusta Grace. (Interim)		Mods. and Hist	1905	600
	Harvey, Martha A.....(Interim)	B.A., Tor	Math	1906	700
North Bay	McKinley, James Matthew	B.A., Tor	Class	1904	1,200
	Girdwood, Arthur Reg'd. (Interim)	B.A., McMaster	Math	1904	975
	Barr, Jean	B.A., Queen's		1903	700
	McLeay, Maude.....(Interim)			1905	600
Norwood	Davidson, John	M.A., LL.B., Vic	Class	1882	1,100
	Archer, Mary Alice	B.A., Tor		1904	700
	Leighton, Clara Edna...(Interim)			1904	650
Oakville	Lillie, John Turner	B.A., Vic	Class	1905	1,200
	Workman, James George. (Interim)	B.A., Tor	Math	1905	800
	Pierce, Ada E.....(Interim)	B.A., Queen's		1906	700
Omemee	Jardine, William Wilson	B.A., Tor		1898	850
	Harvey, William Blakely			1903	700

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1906.—*Continued.*

High Schools.	Names of Teachers.	Degrees.	Specialists.	Date of appointment.	Salary.
Orangeville	Steele, Alexander	B.A., Tor	Eng., Hist., Math	1879	1,400
	Dunkley, Albert Wesley	M.A., Queen's	Class	1901	1,000
	Somerville, Thomas C	B.A., Tor	Mods. and Hist	1904	800
	Boyd, Annie Alicia (Interim)	M.A., Queen's	Sci., Commercial	1904	700
	Hutchinson, May R			1904	600
Oshawa	Smith, Lyman C	B.A., Vic	Class., Eng	1882	1,300
	Slemon, Edward T	B.A., Vic	Math	1892	1,000
	Stevenson, Louis L	B.A., B.Sc., Vic	Math., Sci	1892	1,000
	Wilson, Mary A (Interim)	B.A., Tor	Mods. and Hist	1905	650
	Milne, Thomas Frederick (Interim)		Commercial	1906	800
Paris	Bell, Walter N	B.A., Tor	Class	1898	1,300
	Hedley, Robert Wesley	B.A., Tor	Math	1903	850
	Sanders, Charlotte Annie (Interim)	B.A., McMaster	Sci	1905	750
	McLean, Ella Alberta (Interim)	B.A., Tor		1905	600
Parkhill	McDougall, Neil	B.A., Tor	Sci	1897	1,050
	Taylor, Emma Jean	B.A., Tor		1903	625
	Guest, Emily Jane	M.A., Tor	Eng., Hist	1901	700
	Hood, Finlay (Interim)		Commercial	1904	800
Pembroke	Ross, Ralph	B.A., Tor	Class	1895	1,300
	White, Edwin Theodore	B.A., B Paed., Tor	Math	1900	1,000
	Shirreff, Robert Marshall		Fr., Ger	1895	900
Petrolea	Bell, John Johnstone	B.A., Tor		1888	1,200
	Clyde, William	M.A., Queen's		1888	1,050
	Hills, Minnie	B.A., Tor	Math	1903	1,000
	Smith, James H	B.A., Tor	Sci	1905	1,000
Picton	Dobson, Robert	B.A., Vic	Math	1880	1,200
	Dolan, John Henry	B.A., Queen's	Class	1899	1,100
	Hamilton, William John		Sci. (Interim)	1903	1,000
	Gilchrist, Dugald A (Interim)	B.A., Tor	Eng. Hist	1905	800
	Moorish, Celia Winifred (Interim)	B.A., Tor	Mods. and Hist	1905	700

[illegible]	Flinn, Joseph [illegible]	B.A., Queen's		[illegible]	1,000
	Gaboury, Valentine H. . (Interim)			[illegible]	850
Port Arthur	Howell, William B. L.	B.A., Tor	Class	1904	1,200
	McNab, George Gibbon . . (Interim)	M.A., Queen's	Math	1904	1,000
	Aitchison, Belle			1903	700
Port Dover	Liddy, William R.	B.A., Tor	Sci.	1897	850
	Stewart, Etta Murray	B.A., Tor	Fr., Ger	1906	600
Port Elgin	Clark, Joseph Campbell	B.A., Tor	Class	1905	1,050
	Innis, Alexander R.			1892	800
	Ferguson, Elma Slater . . (Interim)			1904	550
Port Hope	Kirkconnell, Thomas A.	B.A., Queen's	Math	1888	1,500
	Stoddart, Robert	B.A., Tor	Class	1905	1,000
	Morgan, John James	B.A., Tor	Sci.	1905	900
	Mills, Martha Christine	B.A., Queen's	Fr., Ger	1904	800
	Moir, Catharine Elizabeth			1896	650
Port Perry	McBride, Dugald	B.A., Vic	Class, Math	1871	1,300
	Stone, George			1883	1,000
	Smith, Annie Maria . . . . (Interim)			1904	600
	Young, Albert . . . . (Interim)	B.A., Tor		1905	500
Port Rowan	Pugsley, Edmund	B.A., Vic	Sci.	1896	900
	Shawcross, Marie Louise			1903	450
Prescott	Rose, Robert Charles	B.A., Tor	Math	1896	1,100
	McPherson, Hattie Georgina	B.A., Queen's	Mods. and Hist	1900	600
	Cameron, Archibald Rose (Interim)	B.A., Queen's	Class	1904	700
Richmond Hill	Shaw, Robert	B. A., Tor. and McMaster	Math	1902	900
	Andrews, Robert T. . . . (Interim)	B. A., Tor	Class	1904	600
	Preston, Ethel Ada . . . . (Interim)			1905	450
Rockland	Sidley, Henry Ragland	B. A., Trin	Class	1905	1,000
	Sweeney, Agnes C. . . . . (Interim)			1905	500
	Larocque, Miss V. A. . . . . (Permit)			1906	500
Sault Ste. Marie	Race, Wilfred Ballentine	B. A.. Queen's	Mods. and Hist . . . . (Interim)	1904	1,400
	Rudlen, George William	B. A., Tor	Math	1904	1,050
	Donaldson William.	B. A., Tor	Sci . . . . (Interim)	1905	1,000
Simcoe	Christie, James Douglas	B. A. Tor	Eng., Hist., Fr., Ger	1889	1,300

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1906.—*Continued.*

High Schools.	Names of Teachers.	Degrees.	Specialists.	Date of appointment.	Salary.
Simcoe.—*Continued*	Might, Lincoln	M. A., Queen's	Sci	1905	1,000
	Lingwood, Frederick H.	M. A. Trin., B. A., Lon., Eng	Class	1904	900
	Robertson, Alexander Morton	M. A. Queen's	Math	1905	850
Smith's Falls	Houston, John Arthur	M. A., Trin	Math	1887	1,300
	Stubbs, Samuel John	M. A., Tor.	Eng., Hist., Class	1897	1,000
	Smith, Thomas Corlett	B. A., Queen's		1903	900
	Lunny, Rosemary (Interim)	B. A., McGill		1904	550
Smithville	Tremeer, James	B. A., Vic	Class	1898	950
	Hill, Mary Alpena			1902	500
Stirling	Kennedy, George E.	B. A., Vic	Sci	1893	1,000
	Allen Mabel E. (Interim)	B. A., Tor.		1905	550
	Grange, Helen Aldworth. (Interim)	B. A., Tor		1904	550
Streetsville	Cameron, Aldis W.	B. A., Tor.	Eng., Hist.	1898	900
	Waddell, Mary E. G. (Permit)	M. A., Tor		1906	700
	Belfry, Effie M. (Interim)			1905	450
Sydenham	Henry, Thomas McKee	B. A., Tor.	Math	1903	1,100
	Brown, Percy William	B. A., Queen's	Sci	1903	850
	Ewing, Florence May. (Interim)	B. A., Queen's		1904	500
Thorold	Bald, William Francis	B. A., Tor., LL.B.,	Class	1898	1,200
	Smith, Margaret Hübner			1898	700
Tillsonburg	Minns, James Edward	B. A., Vic	Sci. Math	1904	1,100
	Kidd, Wm. Levingston. (Interim)			1905	750
	Hindson, Hilda Mary. (Interim)			1904	500
Toronto Technical	Pakenham, William	B.A., D.Pæd., Tor	Eng., Hist., Fr., Ger.	*1901	2,600
	Eldon, Robert H.	B.A., Queen's	Math., Com	1904	2,000
	Baird, William (Interim)		Com	1903	1,150
	Dandy, William P.	B.A., Tor.	Com	1902	1,200

	Wilson, William J. (Interim)	B.A., Tor.		1903	1,150
	McBean, John W.	B.A., Tor.		1902	1,500
	Kirkland, William S.	M.A., Queen's	Sci	1903	1,450
	Warren, James M.	B.A., Tor.	Math	1903	1,500
	Rutherford, William H.	M.A., Tor	Math	1904	1,100
	Rundle, John A.			1904	1,100
	Wood, Frank Herbert...(Interim)	B.A., Tor.	Math	1905	1,050
	MacPherson, Walter E.	B.A., Tor.	Eng., Hist., Fr., Ger.	1904	1,100
	Guillet, Cephas	B.A., Vic., Ph.D., Clark	Eng., Hist., Fr., Ger.	1904	1,100
	Tennant, Isabella Leathen	B.A., Tor.	Mods. and Hist (Interim)	1904	1,100
	Downey, Helen E.	B.A., Tor.	Mods. and Hist	1904	1,100
	Peake, Charles N.		(Instructor in Drafting)	1898	1,050
	†Barrett, A. Clarence		(Instructor in Architecture)	1899	550
	†Hahn, Gustav		(Instructor in Design).	1902	1,000
	†Banks, J. L.		(Instructor in Modelling)	1906	600
	Davidson, Margaret Mary		(Instructor in Domestic Science)	1902	1,100
	Marshall, Isabel Currie		do	1903	650
	Macmillan, Margaret		do	1903	600
	‡Maynard, Carmen M.				
	‡Currie, C. J.	B.A., Tor.			
	‡Barber, F. L.				
	‡Ronan, Gladys				
	‡Delaporte, Miss M.				
	‡Edwards, Miss E. M.				
Trenton	Ingall, Elmer Ellsworth	B.A., Tor.		1895	1,100
	Andrews, David.....(Interim)	M.A., Queen's	Math	1904	900
	Pattee, Mrs. Ada		Eng., Hist	1905	750
	Skitch, Ernest Frederick.(Interim)		Commercial	1905	650
Uxbridge	Park, Henry George.	B.A., D. Pæd., Tor	Class	1888	1,100
	Hicks, Fred Montford...(Interim)			1905	650
	Wilkie, Marion Florence.(Interim)	B.A., Tor.		1905	500
	Wilson, Ethel May.....(Interim)			1904	450
Vienna	Bonis, Harry	B.A., Tor.	Class	1905	800
	Patterson, Arnott Martin.(Interim)			1905	550
Walkerton	Morgan, Joseph.	M.A., Tor	Class	1881	1,200
	Norris, James	M.A., Queen's	Math	1903	1,000
	Day, Alfred Ernest	M.A., Queen's	Eng., Hist., Fr., Ger	1901	900
	Cheswright, Richard C.		Sci	1900	900

* Dates of appointment to the school, which became a High School in 1904.
† Part time teachers—Day and Evening School.
‡ Part time teachers—Evening School only.

IV. List of Principals and Assistants of Collegiate Institutes and High Schools, January, 1906.—*Continued.*

High Schools.	Names of Teachers.	Degrees.	Specialists.	Date of appointment.	Salary.
Wardsville	Carter, Eslie	B.A., Tor		1905	800
	Goulding, Hannah Mitchell			1902	425
Waterdown	Perry, Peter	M.A., Trin	Class	1902	950
	Delmage, Edith Rachel..(Interim)	B.A., McMaster	Math	1905	600
	McConkey, Kath'ne M.R.(Interim)	B.A., Queen's	Fr., Gr	1905	550
Waterford	Mills, John Hudson	M.A., Queen's	Class	1899	1,200
	Cowan, Samuel George .(Interim)	B.A., Queen's		1905	650
	Culver, Mabel Elida.....(Interim)	B.A., McMaster		1905	500
Watford	Potter, Charles	B.A., Tor	Math	1892	1,050
	McQueen, James M	B.A., Tor	Mods., Hist.....(Interim)	1904	800
	Johnston, Agnes..... (Interim)			1905	475
	McCaw, Hester Emma A.(Interim)			1906	450
Welland	McQuaig, Herbert M	B.A., Queen's		1891	1,100
	McNiece, James	B.A., Tor	Sci	1896	1,000
	Fortner, Theodore G....(Interim)	B.A., Tor	Mods., Hist	1906	550
	McCallum, Kathleen....(Interim)	B.A., Tor		1906	550
Weston	Kennedy, Thomas	M.A., Queen's	Math	1902	950
	Hubbard, Joseph J			1904	625
	Hawkins, Maud Mary	B.A., Tor	Eng. Hist	1904	600
Wiarton	Baines, Archibald W	M.A., Trin		1895	1,000
	Jermyn, Percy Thomas	M.A., Tor	Eng., Hist.....(Interim)	1900	825
	Keast, Walter.....(Interim)	B.A., Tor	Math	1905	800
Williamstown	McDonald, James	M.A., Queen's	Eng Hist., (Interim) Class	1898	1,200
	Witheril, Ebenezer Rufus	B.A., Queen's		1895	900
	Shepherd, Martin Ward	B.A., Tor		1903	900

SUMMARY, January, 1906.

Number of Schools, Sex of Teachers, and Percentages.

Collegiate Institutes	42
High Schools	98
Total	140
Increase for the year	2

Teachers.

Gentlemen	511
Ladies	178
Total	689
Increase for the year	28

Percentages.

January, 1906...	Gentlemen,	74.2 ;	Ladies,	25.8
January, 1905...	"	77 ;	"	23
January, 1904...	"	78.8 ;	"	21.2

Number of Teachers.

Collegiate Institutes.

Principals	42
Assistants	297
Total	339
Increase for the year	11

High Schools.

Principals	98
Assistants	252
Total	350
Increase for the year	17

Grand Total.

Principals	140
Assistants	549
Grand total	689
Increase for the year	28

Salaries.

Collegiate Institutes.

Highest salary	$3,000
Average " Principals	1,620
" " Assistants	1,055
Average Salary	$1,125
Increase for the year	29

High Schools.

Highest salary	$2,600
Average " Principals	1,117
" " Assistants	777
Average salary	$872
Increase for the year	32

Collegiate Institutes and High Schools.

Highest salary	$3,000
Average " Principals	1,270
" " Assistants	927
Average salary	$997
Increase for the year	30
Average salary, Men Assistants	$1,023
" " Women "	723
Increase for the year, Men	47
" " " Women	31

Universities, etc., of Teachers.

Collegiate Institutes and High Schools.

Toronto	340
Victoria	29
Queen's	127
Trinity	15
McGill	1
McMaster	15
British	1
Interim Certificates	151
Specialists	397
Interim Specialists	91
D. Pæd	4
B. Pæd	6
Graduates	527
Non-Graduates	162
Permits	6
Percentage of Graduates	76.49
Percentage of Non-graduates	23.51
Percentage of Specialists and Interim Specialists	70.8
Percentage of Non-specialists	29.2

Education and Industrial Efficiency

REPORT

OF

ALBERT H. LEAKE,

Inspector of Technical Education,

To the Minister of Education

ON

RECENT DEVELOPMENTS IN THE SCHOOLS OF THE EASTERN STATES.

ISSUED AS AN APPENDIX TO THE REPORT OF THE MINISTER OF EDUCATION FOR THE YEAR 1905[1]

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
Printed and Published by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1906

WARWICK BRO'S & RUTTER, Limited, Printers.
TORONTO

LIST OF SCHOOLS VISITED.

1. Technical High School, Springfield.
2. Mechanic Arts High School, Boston.
3. Rindge Manual Training High School, Cambridge.
4. Manual Training High School, Brooklyn.
5. Stuyvesant High School, New York.
6. Girls' Technical High School, New York.
7. Manhattan Trade School for Girls, New York.
8. Pratt Institute, Brooklyn.
9. New York Trade School, New York.
10. North-East Manual Training High School, Philadelphia.
11. Central Manual Training High School, Philadelphia.
12. Commercial High School for Girls, Philadelphia.
13. Spring Garden Institute, Philadelphia.
14. James Forten Elementary Manual Training School, Philadelphia
15. Textile School and School of Industrial Art, Philadelphia.
16. Free School of Mechanical Trades, Williamston.

To the Honourable R. A. Pyne, M.D., Minister of Education:

SIR—Owing to the necessity of a reorganization of the Technical High School in the City of Toronto a committee of the Board of Education was appointed to visit certain towns and cities in the Eastern States to make investigation into the question of the most suitable buildings and other matters connected with Technical Education.

On the invitation of this committee, and by your direction, I accompanied the deputation, and, on the completion of their work, pursued the investigation alone for a week longer.

During the two weeks' tour I visited and examined carefully sixteen schools of various types. The main facts gathered are here set forth. Use has also been made of the catalogues issued by these schools. Much information was gathered respecting buildings, equipment, courses of study, methods of teaching and general organization which cannot here be dealt with but which will be brought to the notice of teachers and trustees as necessity arises and occasion offers.

1.—TECHNICAL HIGH SCHOOL, SPRINGFIELD, MASS.

Springfield is a city with a population of 73,450 and a tax rate of 15.2 mills on an assessed valuation of $81,000,000. One-third of the total amount received

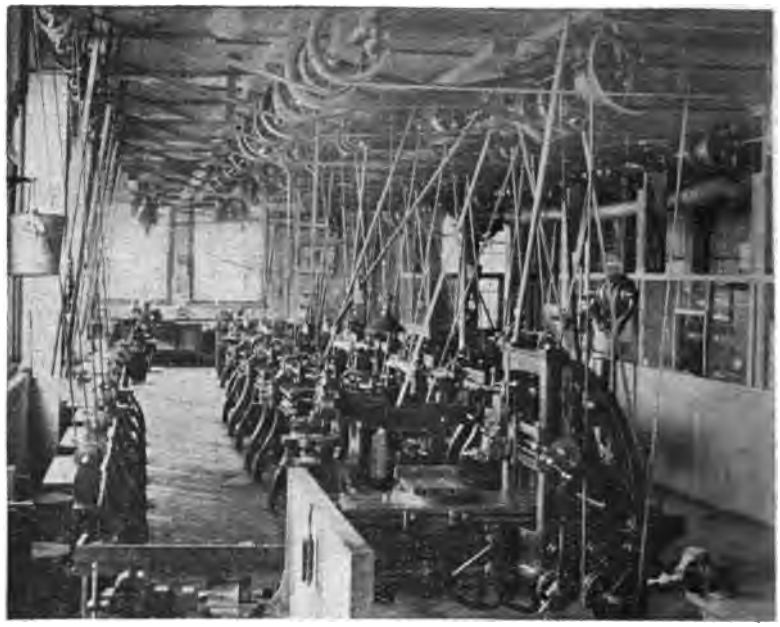
Technical High School, Springfield.

from taxation is spent for educational purposes. A new Technical High School is being erected, part of which is occupied.

When completed this is expected to cost, inclusive of site and equipment, in the neighbourhood of $350,000, and this in a town not one quarter the size of Toronto. It is at present a school for boys only, though provision is now being

made for girls. The school was organized as a separate institution in 1898 with an enrollment of 18. The attendance is now 225, and the completed building will provide accommodation for from 900 to 1,000. As in most American High Schools the session is a long one—from 8.30 to 2, with half an hour's break for lunch, which is provided in the building by a caterer. Voluntary work is carried on in the shops in the afternoon.

The site covers 30,000 square feet and the building, it is claimed, will be when completed the largest and best equipped high school of this type in New England. It is 238 feet long by 214 deep. There are 22 class rooms in the main building accommodating from 24 to 80 pupils each. There are besides eight rooms on the top floor for physics and chemistry. In this particular the provision seemed to me to be more elaborate than is either advisable or necessary. Four large rooms on this floor are also available for Household Science and other technical work for girls. In the basement there is a gymnasium 76 feet long



Machine Shop Practice and Tool Making, Springfield.

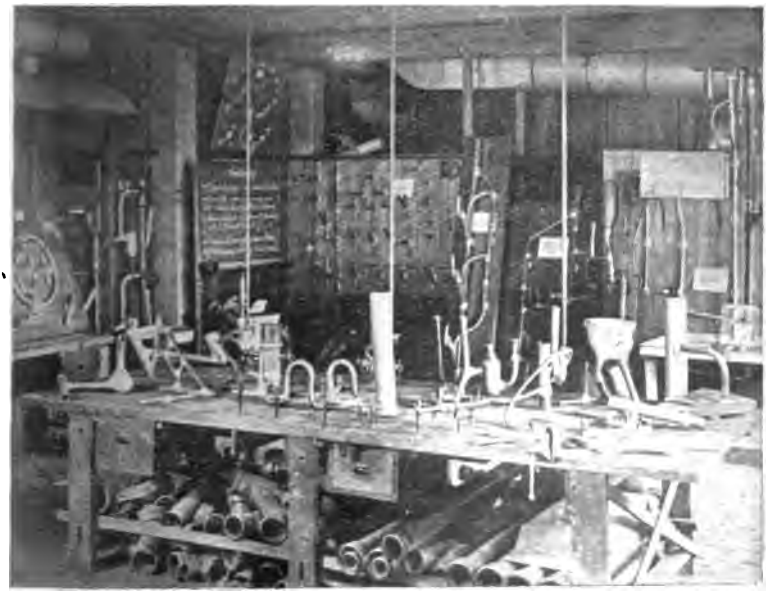
and 57 feet wide, a running track, corridors, lockers, baths, and four other rooms for athletic purposes. The lunch room is also in the basement. Above this on the second floor is the assembly hall. The principals of all the schools visited were very emphatic as to the necessity of such a hall and advanced many arguments in support of their views. The mechanical wing in the rear of the main building is of peculiar design and construction. In the basement of this wing is the forge shop 67 feet square. On one side of the forge shop is the boiler and engine rooms and on the other the foundry and wood turning shops. The basement also contains two rooms for the plumbing classes and the necessary locker rooms. On the first floor of the mechanical wing are three rooms designed for machine shop work and three for joinery and pattern making.

The rear of this wing is carried up two stories higher than the main part. The first of these contains rooms for electrical work, wood finishing and freehand drawing. The top floor of this elevated portion is to be entirely given up

mechanical drawing and is divided into two large drawing rooms, a lecture room and several accessory rooms. The building is of ordinary red brick with Indi-

Wood Turning and Pattern Making, Springfield.

ana limestone trimmings. The central portion around the entrance is built entirely of Indiana limestone. The school offers strong courses in English language

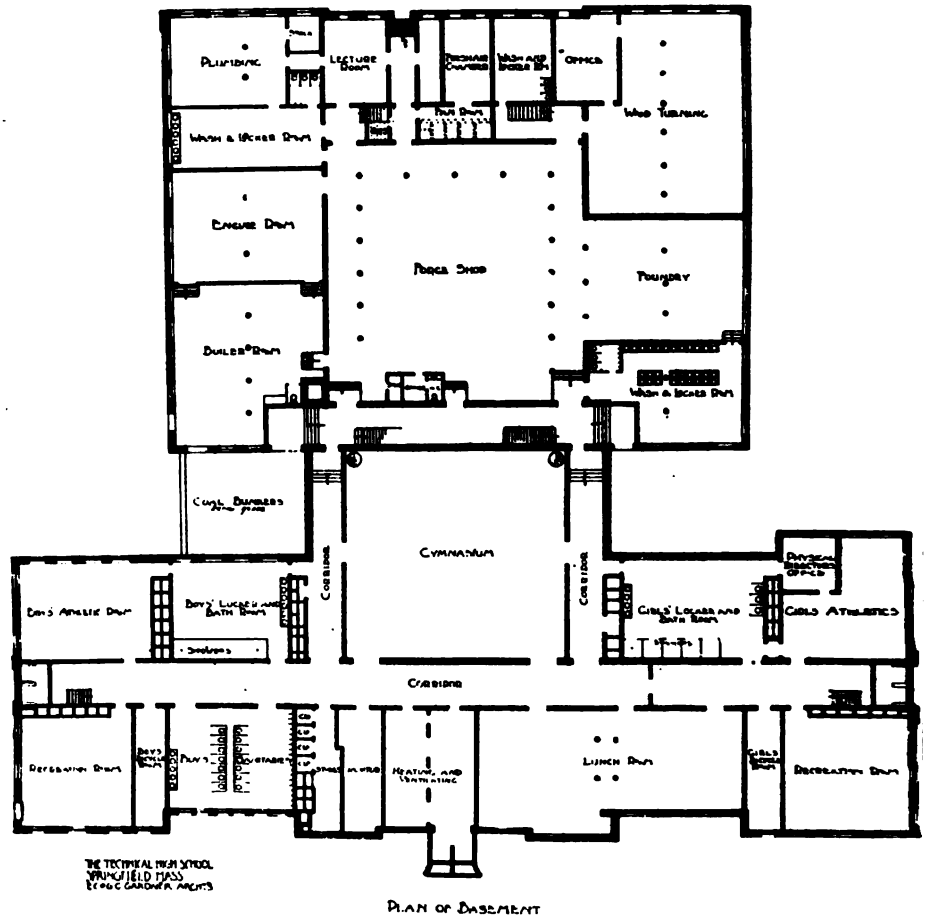


Plumbing Department, Springfield.

and literature, French, freehand and mechanical drawing, history, mathematics and science. The distinctive feature of the school is that it requires of every stu-

dent four years of varied practice in the use of hand and machine tools. The run ning expenses of the school during 1905 were $29,257. Three distinct course are offered :—

1. A preparatory course for schools of technology based upon the require ments for admission to various technical and scientific schools of colleg grade. Students who take this course are enabled to save from one yea to a year and a-half of equivalent work in the higher technical school



PLAN OF BASEMENT

Such a course as this should, in the case of our own schools, prepare admission to the School of Practical Science and the School of Mines

2. A general scientific course, in which it is claimed that the acade work is fully equivalent to that of the general course in the best H Schools; and in addition, a thorough course in drawing and the eleme of the mechanic arts is given. The experience of the school shows t boys who have taken this course have readily found employment desirable positions in which their scientific and manual training pro to be of great service.
3. A course in which extra shop practice is allowed. This is designed boys who are not able to do the literary and mathematical w demanded by the other two courses. It offers, however, good work English, history, physics and mathematics. In the third and fo

years of this course, students are allowed to specialize in the work of of the drawing-room and the shops.

The subjects taught in the mechanic arts department are as follows :—

First Year :—Drawing, joinery, wood-turning, metal work.

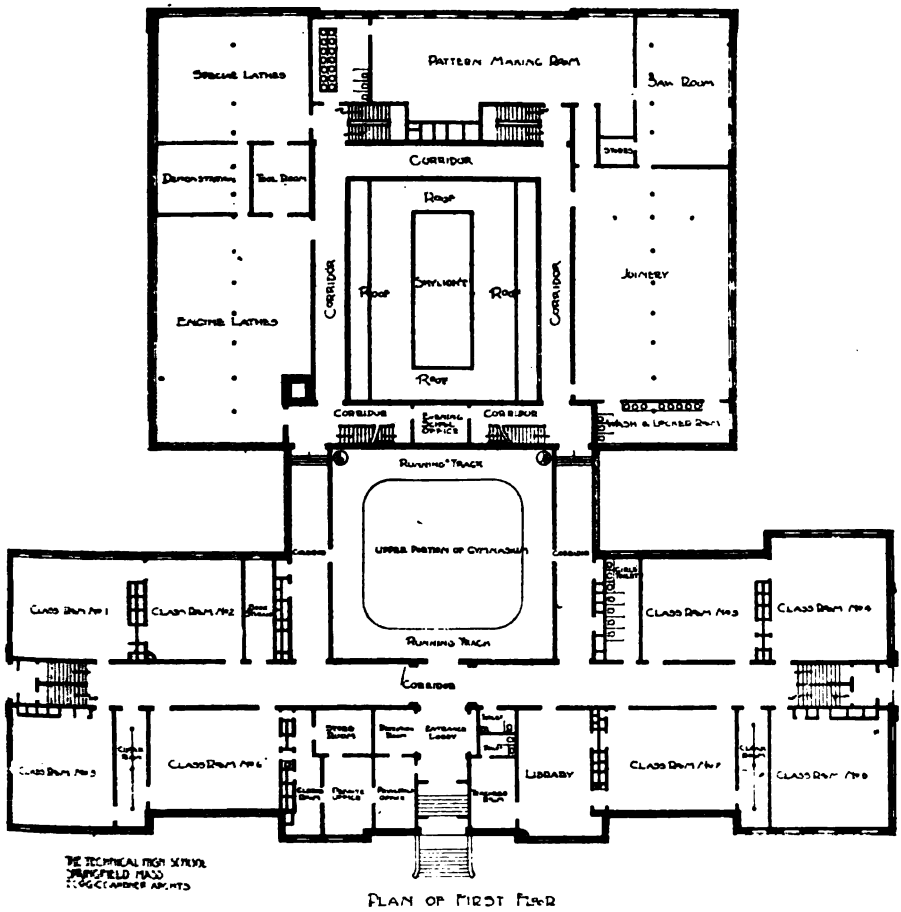
Second Year :—Drawing, pattern-making, molding, vise work, forging.

Third Year :—Drawing, machine shop practice.

Fourth Year :—Machine shop practice, machine drawing, tool making, cabinet making.

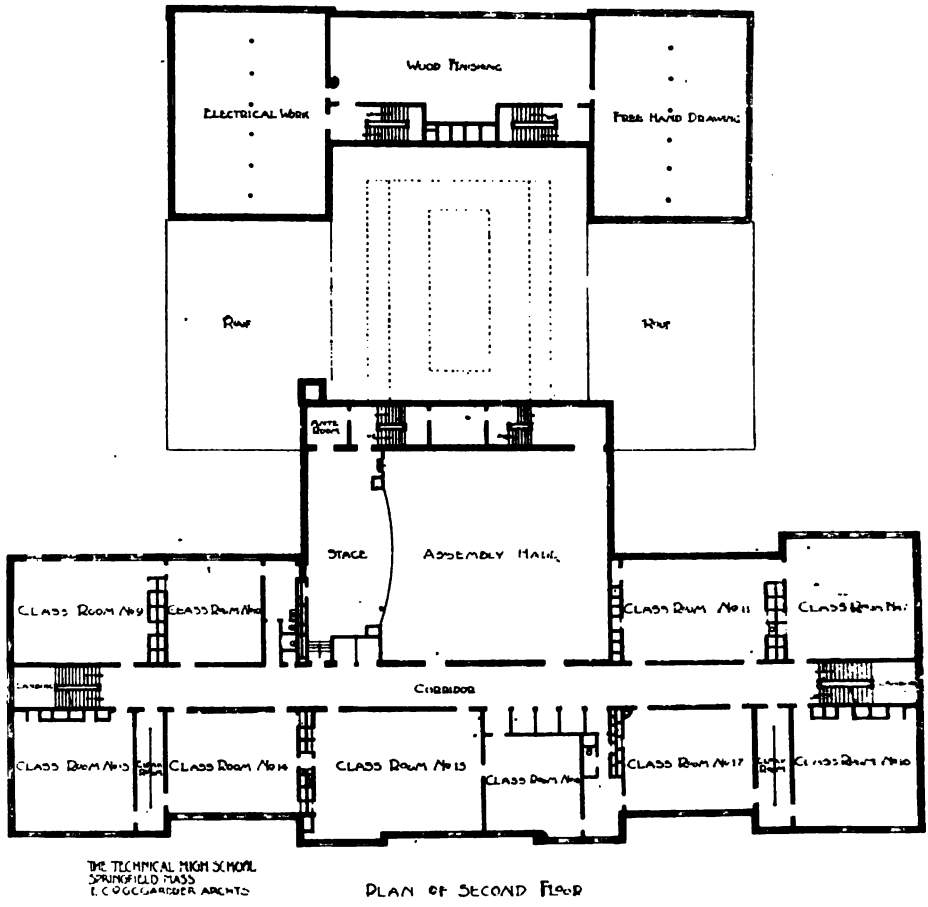
The following table shows, in periods per week, the time spent in academic and mechanical work in the three courses.

	Academic.			Mechanic Arts.		
	1	2	3	1	2	3
1....	17	16	13	13	13	17
2....	15	15	12	15	15	15
3....	20	16	9	10	10	16
4....	20	17	12	10	10	18



PLAN OF FIRST FLOOR

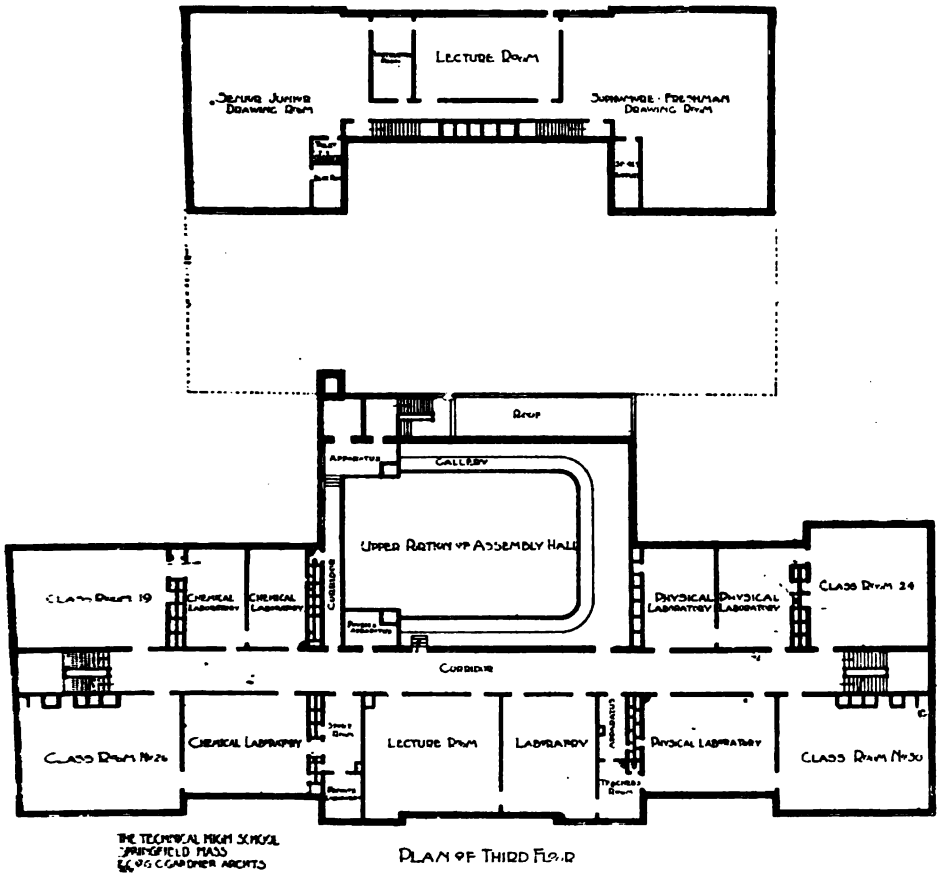
The school is admirably planned and laid out. Boys are admitted from the grammar (public) schools without examination. The equipment of the shops is of the highest character. A feature of the shops here, as in most of the other schools visited, is a demonstration gallery. In front of this gallery are placed appliances such as are used by the student in that particular shop. Before any exercise or piece of work is attempted the teacher gives a demonstration of the processes involved and the tools used. All through the grades of the Public Schools constructive work is taken and manual training is taken in the sixth, seventh, eighth and ninth grades so that the boys who enter the Technical School have some elementary knowledge of mechanical processes and the use of tools.



PLAN OF SECOND FLOOR

A unique feature of the school is the Evening Trade School, held in the same building and using the same equipment. This was organized in 1898, and was the first attempt made in the United States to teach trades at the public expense. The first classes were for tool making and plumbing, meeting for three evenings per week, and lasting for a period of five months for three years. Classes are now held in machine shop practice, tool making, wood turning and pattern-making, plumbing, mathematics and electricity. It is the opinion of all in Springfield that this development of the educational system is the most successful and far-reaching effort that has yet been made to make education and

life synonymous terms. The attendance is now 500 and is remarkably constant' a percentage of 84.4 being reached. Tuition is free and preference is given to those actually engaged in the trades. The certificates granted by the school have a recognized value in the community. The opinion was expressed that in no part of the school system does a dollar go so far as here. Altogether this school in its building, equipment, organization, and general method of work offers a very good model for the City of Toronto to adopt and *adapt* for both evening and day school work. Plans of the general arrangement are attached.

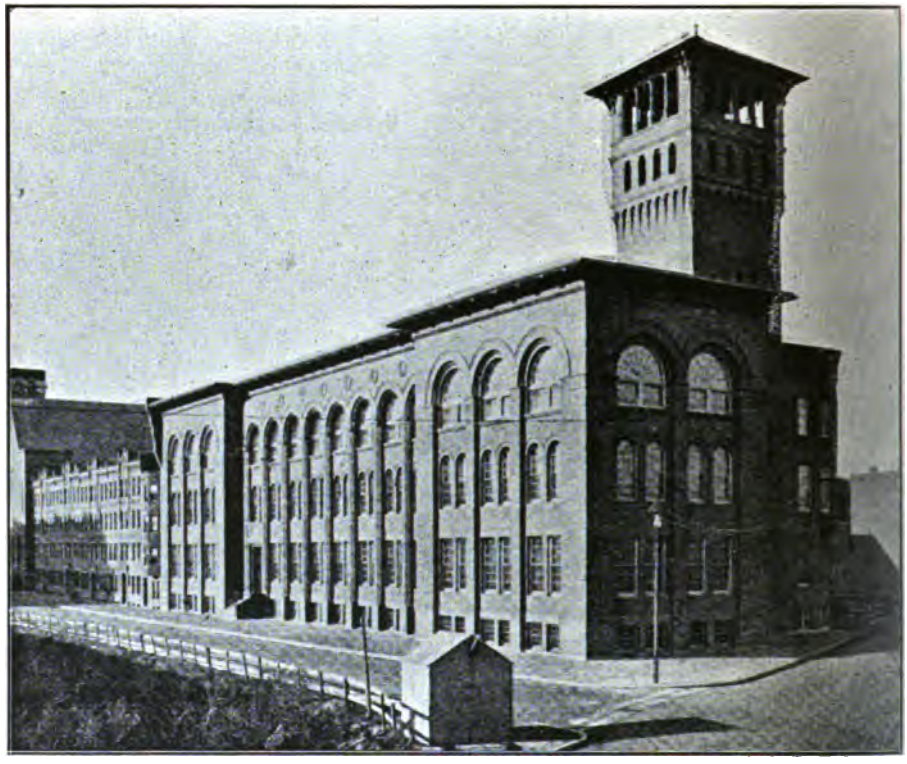


2.—THE MECHANIC ARTS HIGH SCHOOL, BOSTON.

This school was not in session but we were carefully shown over the building and equipment, and gathered much useful information from our inspection.

The usual practice is followed of admitting boys from the Public Schools without examination. The school is so crowded that it is necessary to reject all applications from non-residents. The courses are three and four years in length, and very few electives are offered, owing to the necessity of keeping the entire equipments of the mechanical departments in constant use. The mechanical subjects embrace the following: Drawing, carpentry, joinery, wood carving, wood turning, pattern making, forging of iron and steel, chipping, filing, fitting, and machinist's work with hand and machine tools.

For each department a carefully graduated series of models, the construction of which illustrates every fundamental principle or process, has been chosen. These are made by all the members of a class, while a series of supplementary models are undertaken by those who have completed the class work. Round the walls of the corridors and rooms are displayed the various courses worked in the different shops. In the mechanical departments the students are carefully taught how to judge and criticize their own work. The school is overcrowded, shows a constant growth and has a large waiting list, showing that it is providing a kind of education that is in demand. A large addition has been planned which it is hoped by the authorities of the school will soon be commenced. An analysis of



Mechanic Arts High School, Boston.

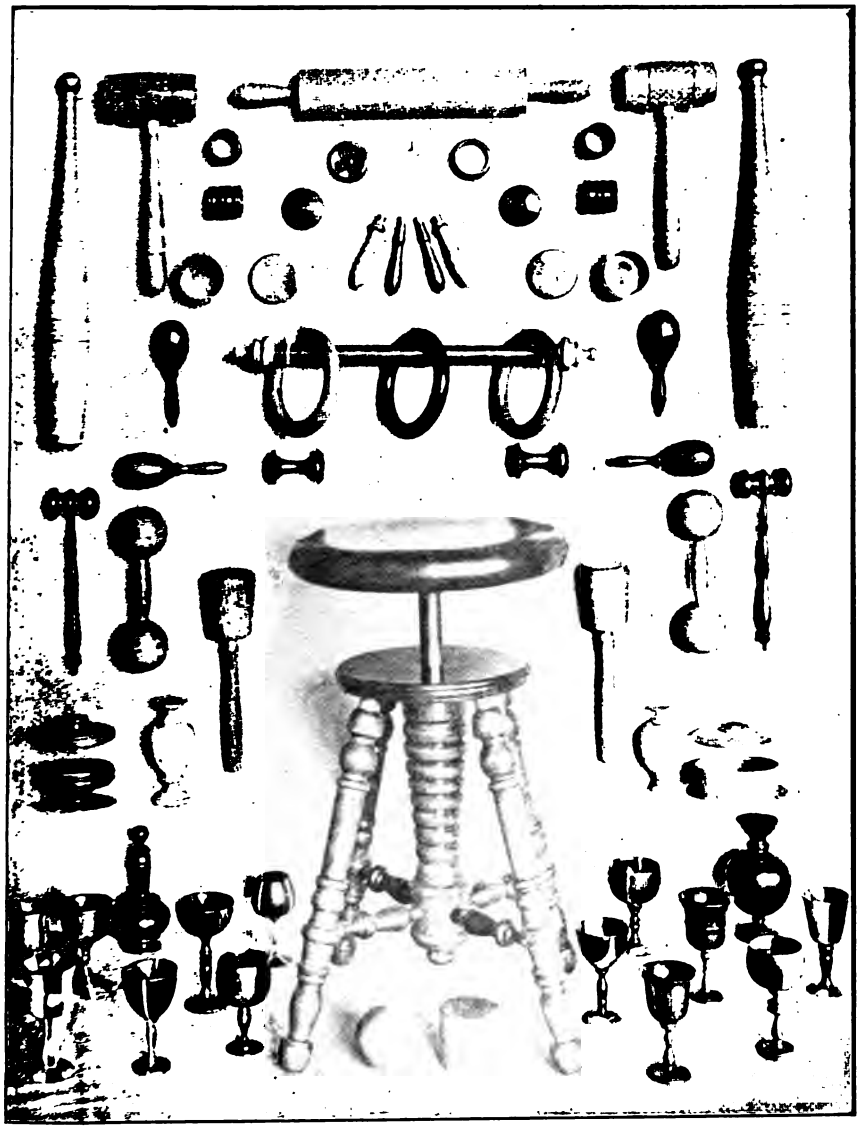
the course of study shows the following comparison of the time spent upon academical and mechanical work in hours per year:

	Academic.	Mechanical.
1	400.	600.
2	600.	500.
3	700.	300.
4	600.	500.

An evening trade school was established in this building in September, 1904 the subjects taught being machine drawing, elementary and advanced wood

working, forging and machine shop practice. The cost of the present building, site and equipment was about $320,000.

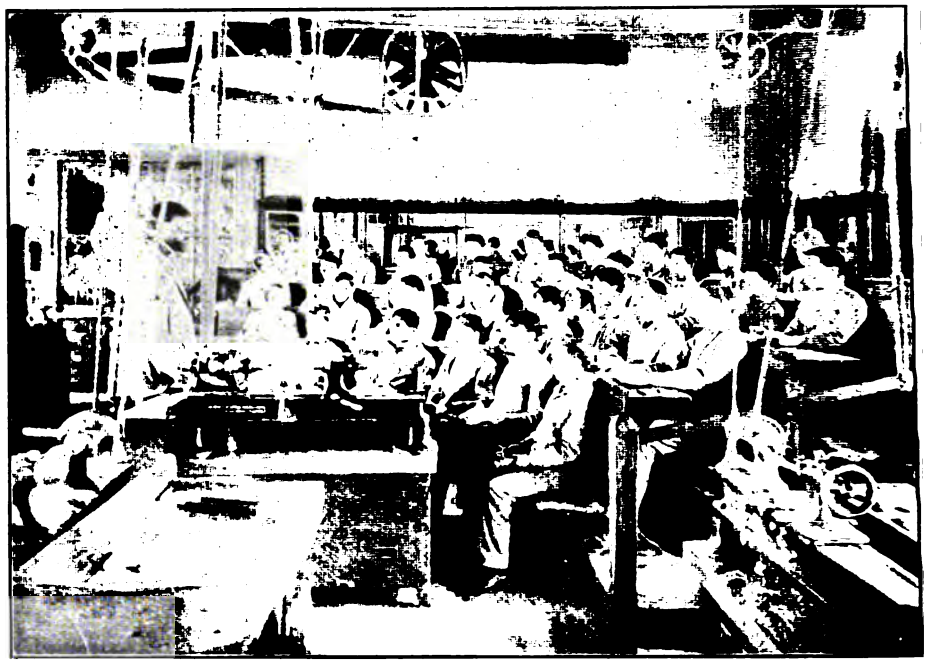
In addition to the Mechanic Arts equipment in this school, an up-to-date wood working equipment is being installed in every academic high school. In



Wood Turning. Mechanic Arts High School, Boston.

addition to this 90% of the boys in the three upper grades of the grammar (public) schools are also provided with educational woodwork in 43 specially fitted rooms, while those in the lower grades are given work in clay, cardboard, etc., so that handwork forms an integral part of the curriculum from the kindergarten to the end of the High School period. An order of the Board passed July, 1904, provides, "that the course of study for High Schools be amended by

adding the subject of Manual Training to the elective studies; provided, that not more than fifteen points for drawing, household science and arts and manual training combined be allowed to count towards a diploma."



Wood Turning Demonstration Lesson. Mechanic Arts High School, Boston.

Proposed extension of Mechanic Arts High School.

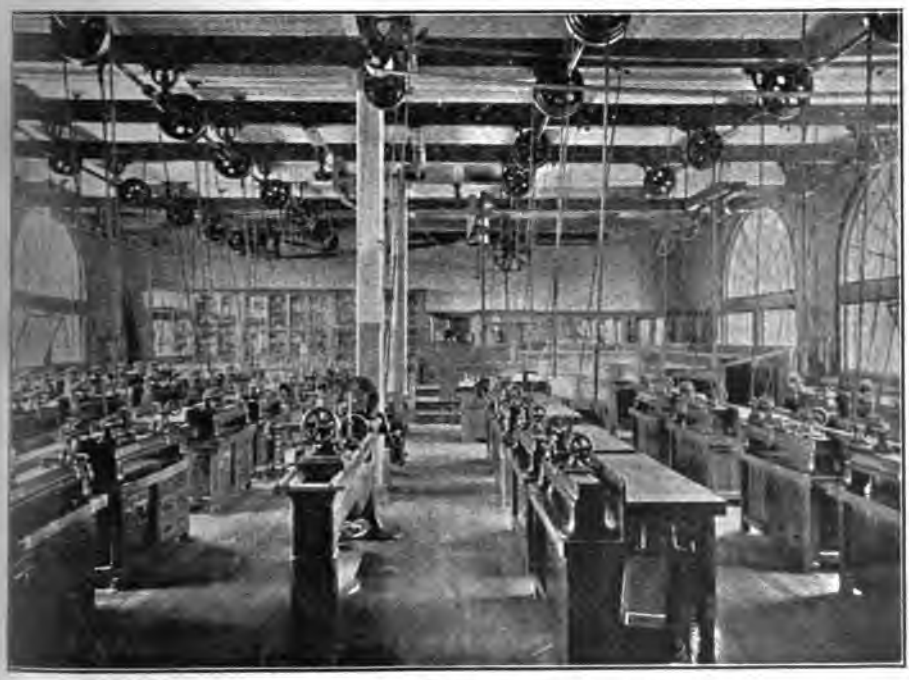
3.—RINDGE MANUAL TRAINING HIGH SCHOOL, CAMBRIDGE, MA

This School was founded and supported for ten years by the gentleman wh name it bears but is now a municipal school in affiliation with Harvard Univers Two buildings are occupied, one for the academic work and the other for

mechanical departments. The average age of admission is fourteen or fifteen. The building devoted to mechanic arts has two wings. One of these contains the two departments of wood working and the other two departments of iron working. These rooms measure 55 by 60 feet. In the main part of the building are the offices, a tool room, 34 by 70 feet, the boiler room and a room for moulding which was being fitted up. The second story of this main part contains rooms for drawing. In the basement there is a spacious lunch room in which are served hot lunches. About one-third of the time of each student is devoted to the manual arts and the remainder to the subjects usually taught in the High School with the exception of Latin and Greek.

4.—THE MANUAL TRAINING HIGH SCHOOL, BROOKLYN.

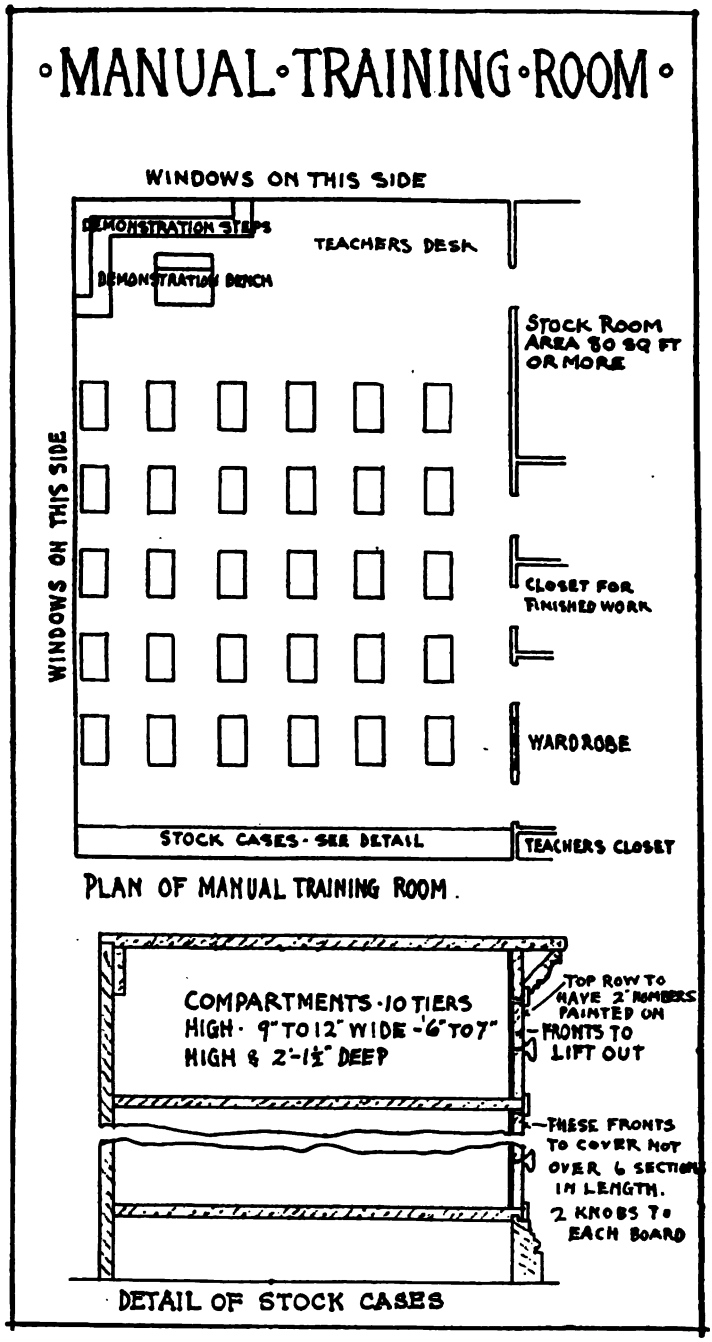
This school is one of the latest of this particular type as well as one of the largest. The lot is 200 by 300 feet and the building itself,



Turning and Pattern Making Shop, Brooklyn.

200 by 215 feet, built in the form of a hollow square, and five stories high including the basement which is entirely above the ground. There are now 2,200 students on the roll, of which number two-thirds are girls. The class unit is 30. There are four freehand drawing rooms, four mechanical drafting rooms, a large auditorium having accomodation for 1530 people, and a gymnasium having a floor space of 84 by 66 feet. The apparatus is so arranged that the whole floor can be easily and quickly cleared. In the basement are three laboratories—a steam engine and dynamo laboratory, an electric testing laboratory and an assay and analytical laboratory. There are four joinery shops each fitted with thirty benches, band saw, turning lathe, grindstone, teacher's bench, demonstration gallery, a tool room, five or six hand basins, and 150 lockers for students. The benches are four feet long and twenty inches wide fitted with a Towles quick action vise, and have a large

drawer for general tools and six small ones for individual students. The pattern shop is fitted similarly to the joinery shop but each bench is also fitted



Public School Manual Training Room, Boston.

with a Reed lathe. The sheet metal shop has long benches to accommod thirty students and tools for tinsmithing, repoussé and Venetian iron wo

The school has also a printing room properly equipped. The blacksmith shop has 16 down draft Buffalo forges and 32 anvils, electric blower and exhaust. This and the machine shops are placed on the top story which is unusual. The machine shop has 30 lathes, drills, grindstones, power hack, saw, universal miller, one plane miller, one gas forge, universal grinder, planer etc. Each lathe,

Rindge Manual Training High School, Cambridge.

e, is driven by an individual motor attached to the machine. The household science department consists of four sewing rooms, laundry, two kitchens, pantry, dining rooms, and bed room. The rooms are numbered in such a way that the number locates the room instantly e. g. room 236 means second floor third corridor and sixth room on that corridor. In connection there is an Evening

Trade and Technical School which opened with 1600 and closed with 2000 students. The total cost of the building will be somewhere in the neighborhood of $850,000. Outside the principal's room was noticed a box for the reception of suggestions from the students for the improvement of the school. The salaries paid to the heads of the mechanical departments are $2,400. The school attracts all classess. The principal stated that some reach the school in $5000 automobiles and some on foot. A unique feature of the chemical labratories is that no racks are placed on the tables, all chemicals being provided for in a drawer of peculiar construction. The course is four years in length, academic and mechanical work being divided as follows:—

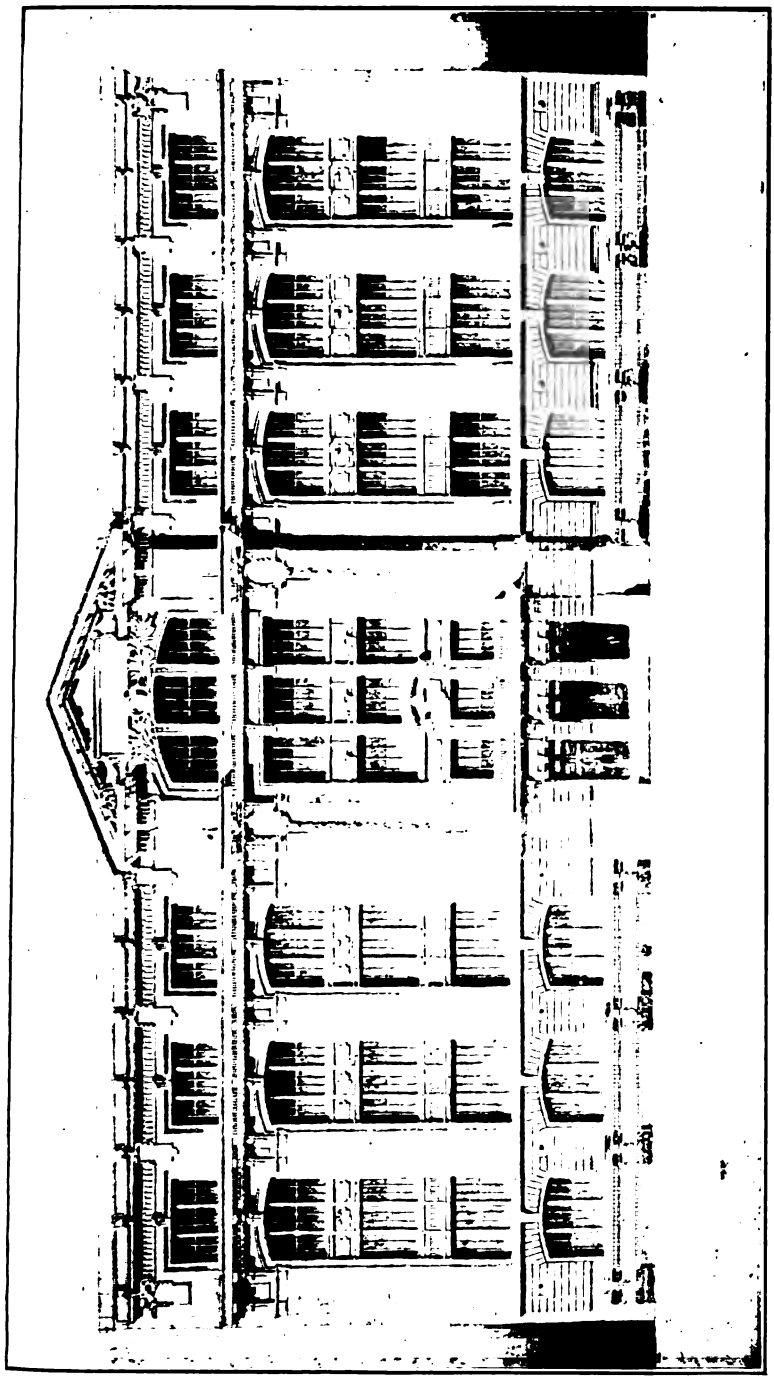
	Academic.	Mechanical.
1.....	15	10
2.....	12	10
3.....	16	8
4.....	11	8

In order to graduate from this school a student must have studied at least one foreign language for at least three years, have accomplished satisfactorily all the other work required, and have taken a sufficient number of elective studies so that the total amount of required and elective studies shall equal 2,500 periods of work requiring preparation and 1,000 periods of drawing and shop work, and shall extend over not less than three years nor more than six years.

5.—THE STUYVESANT HIGH SCHOOL, NEW YORK.

This is a Manual Training High School for boys held at present in crowded and unsuitable quarters, but there is on the point of completion a new building which has a frontage of two hundred and ten feet on Fifteenth Street and extends through the whole block, two hundred and six feet, to Sixteenth Street. It will contain fifty-three classrooms, three physical laboratories, three chemical laboratories, three lecture-rooms, a library, an auditorium with a seating capacity of about 1,600, a gymnasium with elevated running track and gallery, a lunch room, bath and locker rooms, eight joinery laboratories, four wood-turning and pattern-making laboratories, one foundry, two forge rooms, one mechanical testing laboratory, and nine draughting rooms. The building is a modification of the letter H type, affording the maximum amount of light and air with the greatest economy of floor space. The site contains almost exactly an acre of ground, and, as the building is to be five stories high with a basement, it will contain an actual floor area of about five acres. The side of the "H" toward Fifteenth Street contains the rooms for the ordinary academic work; the crossbar of the letter is occupied by science laboratories and lecture-rooms, and the northern side of the building is devoted to draughting rooms and shops for carpentry, wood-turning and pattern-making, foundry work, blacksmithing, and machine-shop work.

On the first floor are laboratories for advanced chemistry, the shop for more advanced forge work, the foundry, and two draughting rooms. On the second floor are the machine shop, mechanical laboratory, pattern-making shops, physical laboratories and lecture-room, draughting rooms, classrooms and administrative offices. On the third floor are the library, elementary chemical and physical laboratories and lecture-room, blacksmith shop, construction and milling room, wood-turning shops, and classrooms. The fourth and



Stuyvesant Manual Training High School, N.Y.

...floors are occupied by classrooms, draughting rooms, general lecture-room ...d the carpenter shops for first year work. The basement contains the ...mnasium with bath and locker rooms adjacent, the lunch room, and the ...ditorium. The basement also contains the lighting, heating, ventilating, and ...wer plant.

Special accommodation has been provided for the classes of an evening trade school, for evening lectures, and for evening exhibitions and demonstrations of the regular work of the day school. It is expected that the school will be an educational centre for the city during the hours of the evening.

The building is of fireproof construction, thoroughly ventilated, provided with ample stairways, elevators, internal telephones, electric time service, and all the equipment of a modern office building.

The cost will be, when completely equipped, over $1,200,000. A feature that strikes one on a visit to this school is the skill and ingenuity that the principal has shown in overcoming the difficulties encountered owing to the limitations of the present building. The course of study is the same as the Brooklyn school. This is a boys' school accommodating at present 500. Fifty-two per cent. of the boys are in the first year, twenty-six per cent. in the second year, thirteen per cent. in the third year, and nine per cent. in the fourth year. The arrangement of power is somewhat different from the individual motors in use at the Brooklyn school. Machines that are used only occasionally are run by individual motors, and lines of lathes are run by separate motors, thus reducing expense and not lessening efficiency. In the shops all the boys were wearing overalls and jumpers and were intensely interested and workmanlike. In the mechanical drawing department was noticed a complete apparatus for blue printing by electric light. A visit to this school under the guidance of its expert and far-seeing principal is an education and a revelation of the possibilities, the future and the place of a wisely combined scheme of academic and mechanical work in any system of education

6.—GIRLS TECHNICAL HIGH SCHOOL, NEW YORK.

This school is held in one central building with three annexes in the immediate neighbourhood. The quarters cannot be considered palatial by any means as they have been described over and over again by newspaper reporters visiting the school as a disgrace to the city, and all visitors will agree that this is putting it mildly. The number of pupils on the register is 2,500. A large number of elective courses are offered. The total number of school periods per week is thirty. Separate courses suitable for stenographers, and typewriters, dressmakers and embroiderers, milliners, designers, printers, bookbinders and library assistants are provided. Each of these courses takes up nineteen periods per week, the remaining eleven being given to ordinary academic subjects including German, French, Latin or Spanish. The principal of the school is Mr. W. McAndrew. The first thing seen on entering is a string of mottoes extending across the hall "Welcome, Wilkommen. Bienvenue, Benvenido, Salve, Xaipe." Every morning before nine o'clock the principal receives three or four girls sent from each class bringing specimens of the best work done during the preceding day. In this way he gets to know other than the troublesome pupils. Beginning with 338 students in 1902 the school has grown to its present membership. A more definite training for the occupations and responsibilities of life is given than in schools of the older type as it prepares girls to earn their living at an early age while contributing largely to their physical and mental culture. That prejudice against this form of education exists even in the democratic States is shown by the fact that the girls attending the traditional form of High School have named this institution "The Academy for Sales Ladies." In all practical work considerable attention is paid to speed, the time taken by each object or exercise being clearly marked upon the finished article. This school was started under difficulties, but the way they were overcome shows the iniative, self-reliance and pluck of the teachers. For instance

he cooking classes had nothing to work with and no money to buy utensils. One of the teachers went to a large department store and the manager lent bowls, spoons and dishes. Empty wooden boxes were sent to serve as seats, chairs being lacking. The gas company lent stoves and for months the girls worked as best they could and did good work, too. The school employs eighty teachers. Full academic courses are offered, but even the girls who elect to take them are choosing in addition the housekeeping course.

Class at Dressmaking at Pratt Institute, Brooklyn.

7.—THE MANHATTAN TRADE SCHOOL FOR GIRLS, NEW YORK.

This is probably the most interesting and successful effort that has been made in Educational practice in the New World. This was my second visit to the school and proved even more useful than the first. It depends for its support entirely on voluntary contributions. In 1905

it expended nearly $30,000. Its aim is to fit girls for the actua needs of trade. The departments are based on the use of the needle, the sewin machine, and the paste brush. Three hundred and fifty students are in attend ance. A new building has been purchased at a cost of $120.000. The cours generally lasts for one year, and whenever a girl has acquired some degree c skill she is sent for a month into some business house to prove her efficienc

Class in Costume Designing, Pratt Institute, Brooklyn.

She returns to the school with the comments of her employer, and these as the faculty in deciding whether or not she is approaching the demands of trade. The Director of the school is Professor Mary Scheneck Woolm Director of Domestic Art, Teachers' College, Columbia University, and ne before has such a close connection been made and maintained between educat and practical life as is to be seen here. Every one of the teachers has b

actually engaged in the trade she is teaching, and conversations with them and inspection of their methods show that they have a thorough grasp of the requirements of their students. Academic work and physical culture are properly attended to. It is the aim of the school to make the training given, an enlightened apprenticeship. Trade work is taken at regular market prices, and in 1905 orders to the amount of $2,387.76 were filled. The practice work is not sold but

Drawing from the Model, Pratt Institute, Brooklyn.

the seconds (work just below the trade standard) are disposed of to the children or their families at prices slightly above the cost of materials. A remunerative position is found for every girl who successfully accomplishes the work given. The tuition is entirely free, and where wages are an absolute necessity to the family, aid is given to enable a girl to attend the school. In every case the wage earning power of the girls has been materially increased. That the in-

struction given is of the right kind is shown by the fact that the demand for its workers is greater than the supply, and those firms which have tried them even offer a premium for obtaining more. The possibilities of a school of this type seem almost endless, and the work being done here is receiving much attention from every part of the world.

Wood-Turning and Pattern Making, Pratt Institute, Brooklyn.

8.—PRATT INSTITUTE, BROOKLYN,

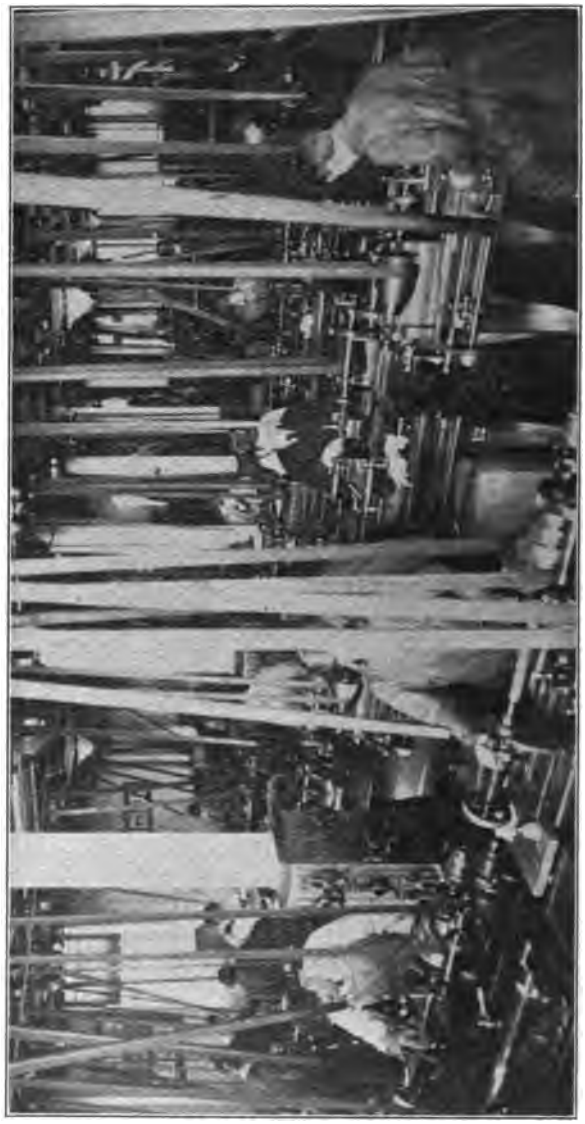
Is a private institution established in 1887. The main building is 100 feet by 86 feet, and six stories high. A trades school building recently erected is 32 feet by 110 feet and four stories high. Under the present plan of organization the work of the institute is divided among the following departments: High School, Fine Arts, Domestic Art, Domestic Science

Science and Technology, Kindergarten, Libraries and Physical Training. The Domestic Science Department differs from Drexel and other institutions of the same type in being much plainer, and the authorities contend more useful. It is the opinion of the Director of this Department that it is a mistake to equip with luxurious apparatus that is not found in the average kitchen. The department of Science and Technology takes in all the courses especially fitted

Household Science, Pratt Institute.

r men. These are divided into three classes. First, the day school provides chnical courses in mechanical and electrical work, which cover a period of o years. Second, evening technical courses in physics, chemistry, applied ectricity, mechanical drawing and machine design, steam and the steam engine, d strength of materials. Third, evening trade classes in carpentry, pattern

making machine work, mechanical drawing, plumbing, sign painting and fresco painting. Most of the instructors are graduates of colleges or scientific schools and many of the Technical instructors were educated in the Institute. In the trade work the teachers are men who have gained prominence in their several trades, and are for the most part self-educated or were trained in the Insti-



Machine Shop, Pratt Institute.

tute. Space will not allow of any further description. Suffice it to say th here and at the Drexel Institute, Philadelphia, which was visited on a previo occasion, may be seen almost every department of practical education whi has ever found a place in educational systems, and each repays prolong investigation.

9.—THE NEW YORK TRADE SCHOOL.

This was the second of the three purely trade schools visited. It was founded in 1881 for the purpose of providing young men, who have a bent for mechanics, the opportunity of acquiring the knowledge of some trade that will be to its possessor a means of livelihood. The work given is such as will be met with in actual practice at the trade. The teachers are all mechanics who have gained their knowledge in the shops. The plan of the building is unique and so arranged as to secure large floor space and ample light and ventilation. The plan attached shows the general arrangement. Day and evening classes are provided in the following trades: plumbing, house painting, fresco painting, sign painting, brick-laying plastering, steam fitting and electrical work, carpentry and cabinet making Amongst the students in the session just closed were youths from New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland, Ontario and Quebec. The school year extends from October to April. Though 800 students were

New York Trade School.

trained last year only about one-fourth of the applicants could be received. The land, buildings and equipment cost $300,000, and the school is supported by fees and an endowment fund.

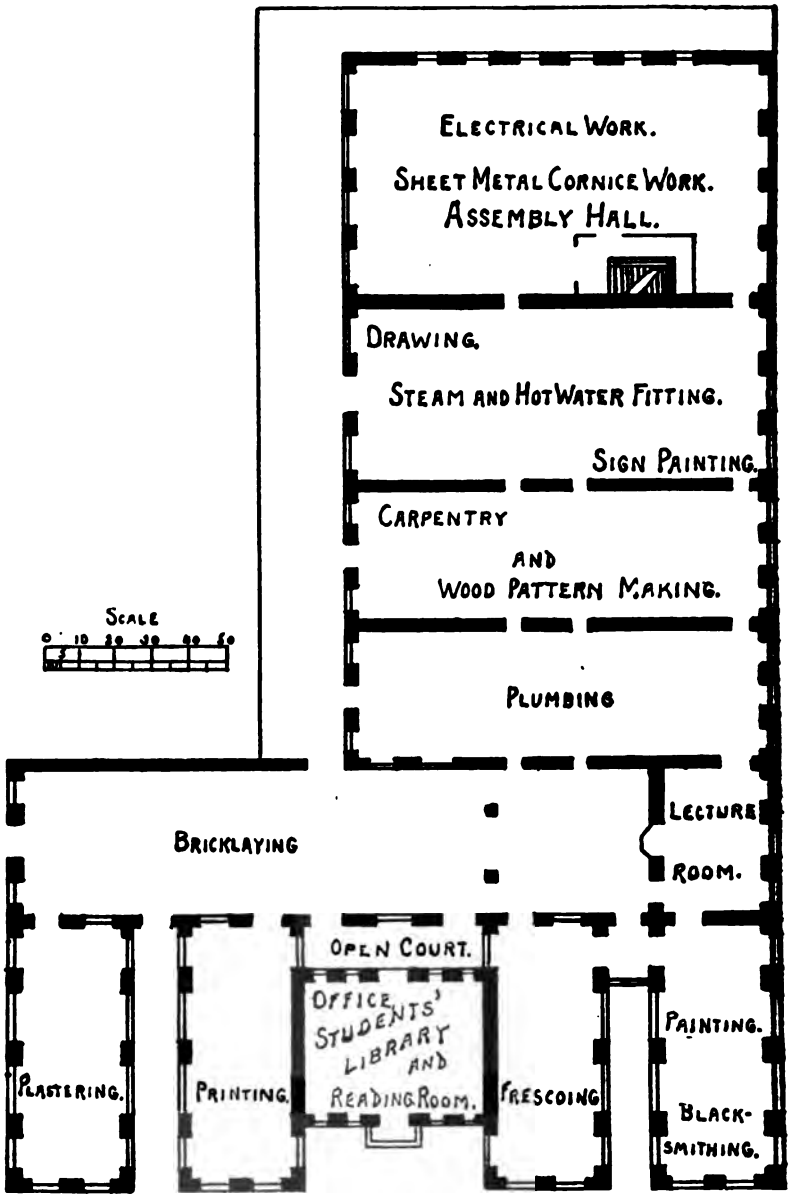
10.—NORTH-EAST MANUAL TRAINING HIGH SCHOOL, PHILADELPHIA.

This school occupies a new building costing about $467,000 and I had the honour of being presented with the first copy of the prospectus ever sent out. The course given lasts for a period of three years. The auditorium is a feature of the school with its pipe organ, costing $3,000, raised by private subscription. On the library table I counted sixteen technical magazines relating to the various branches taught in the school, and they bore every evidence of much use. The head of each department receives a salary of $2,500. The curriculum is based upon the usual High School courses in English literature and language, German, French, Spanish, history, mathematics, science and drawing. To these are added courses in the use of tools for working wood and metal. An average of one period per day is given to drawing, two periods to work in the manual department, and three periods to the academic studies. The tool instruction includes joinery, pattern making, wood turning, wood carving, forging, soldering, ornamental iron work, moulding, casting, vise work, sheet metal work and steam engineering.

11.—THE CENTRAL MANUAL TRAINING HIGH SCHOOL, PHILADELPHIA,

Impressed me as being one of the best organized schools of its class I have ever seen. The purpose of the school as expressed by the Principal is " to bring thought and labour together to make the thinker a worker and the worker a thinker." Provision has been made that the boy shall be trained in

1. Practical English—The language of clear and forcible expression.
2. Practical Government—The basis of good citizenship.
3. Practical Mathematics—For business, construction, engineering.

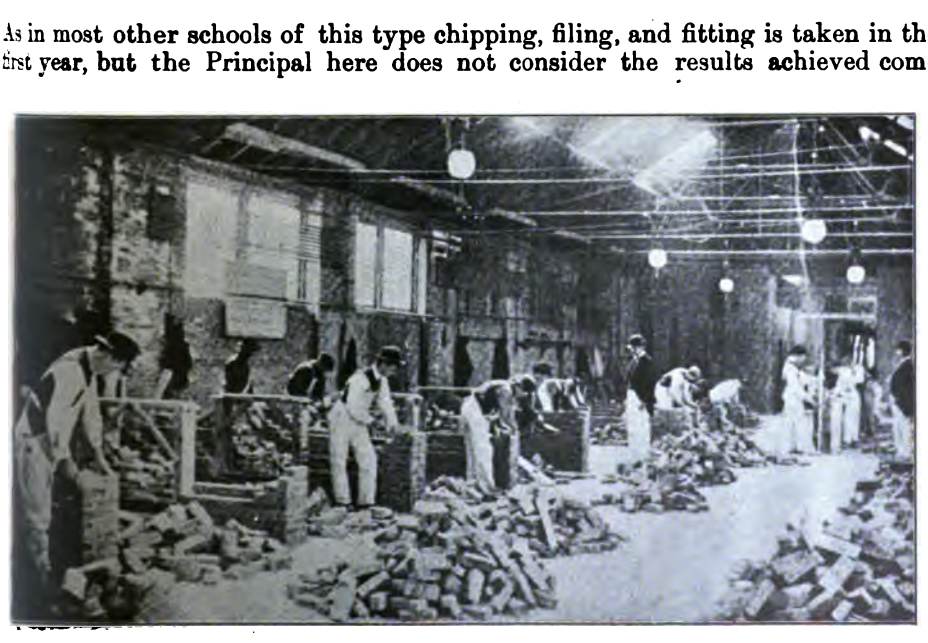


New York Trade School.

4. Practical Science—The active working knowledge of the facts and forces of nature.
5. Practical Hand Culture.

Plastering Department—Students at Work, New York Trade School.

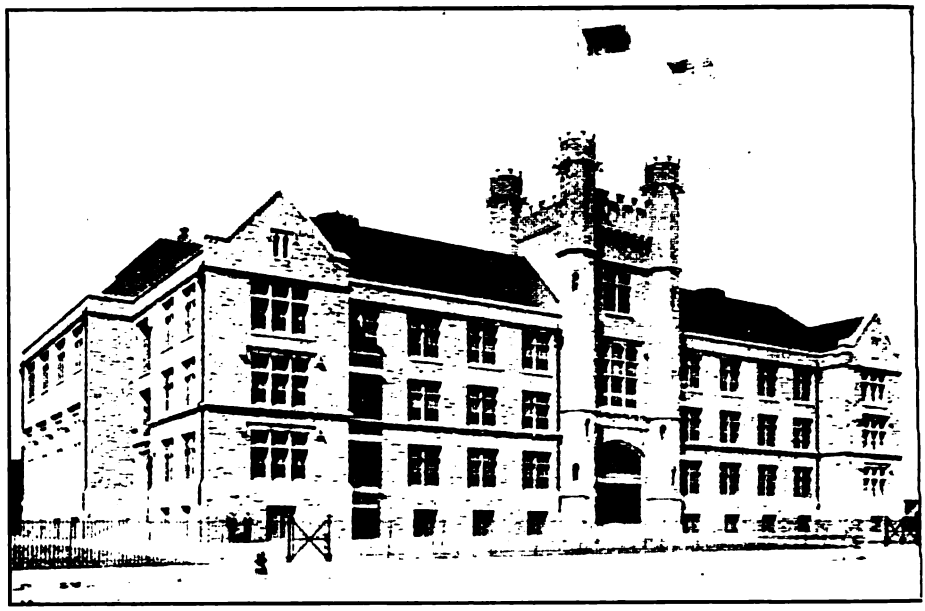
As in most other schools of this type chipping, filing, and fitting is taken in the first year, but the Principal here does not consider the results achieved com-



Brick-laying Department—Students at Work, New York Trade School.

mensurate with the time spent and intends transferring it to the third year. The connection between art and manual training is very closely kept up. The

drawing comes first, then the object is modelled in clay, then in wood, and sometimes in iron and if time allowed the principal is of opinion that much good



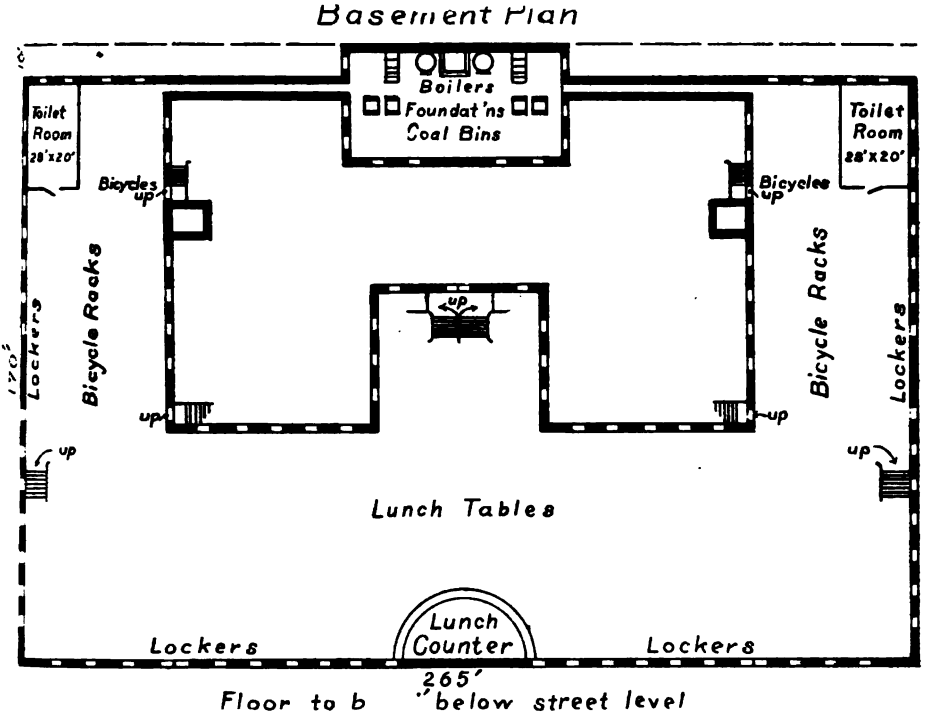
North East Manual Training High School, Philadelphia.

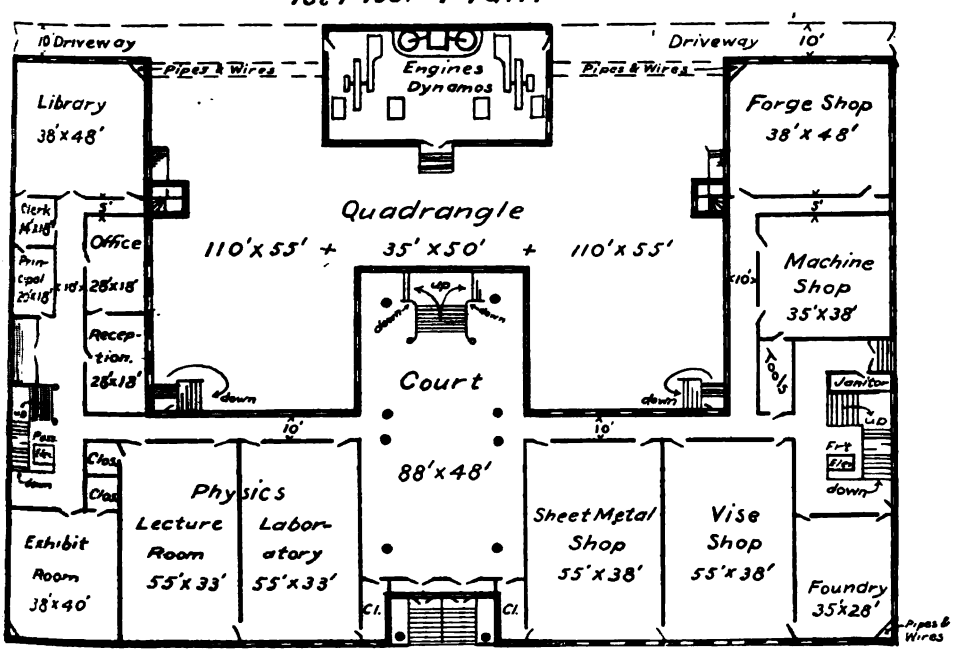
would result by a continuance of the study in stone and marble. The buildings in which the school is held are old and unsuitable. The criticism canno

Wood-working Department, North East Manual Training High School, Philadelphia.

be brought that money has been spent in bricks and not brains. The excelle work that is being accomplished is owing to the ability, enthusiasm, and orga

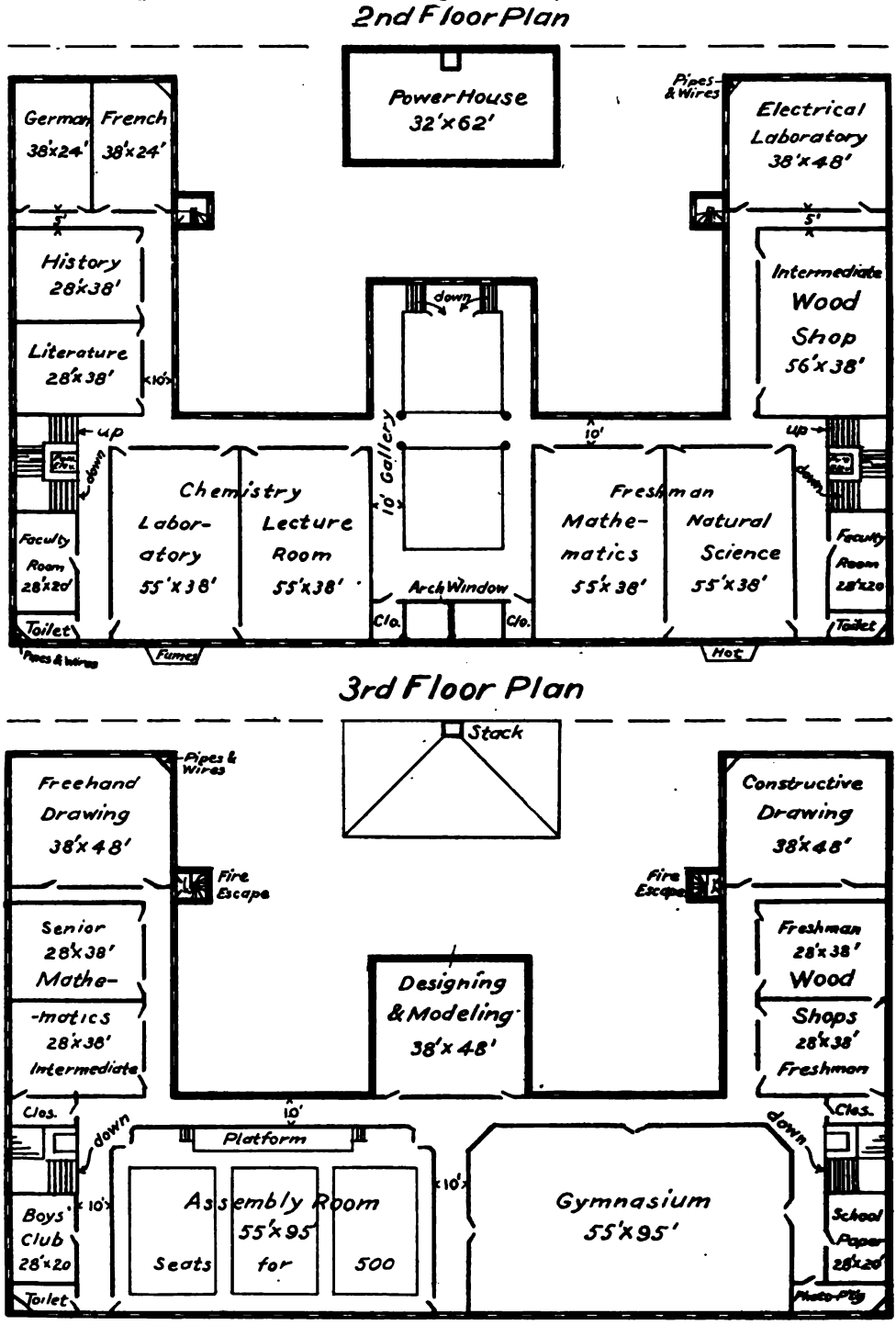
ization of the principal and the staff, and not to any facilities offered by the building. All kinds of ingenious expedients are resorted to, to overcome diffi-





Proposed Manual Training High School, Philadelphia.

culties, *e. g.*, in one of the wood-working shops the benches can be converted into wood-turning lathes in half an hour. A particularly efficient mechanical drawing



Proposed Manual Training High School, Philadelphia.

table designed by one of the staff, is in use. The ornamental iron work done by the boys is particularly good and is accomplished with very simple appliances. The third year boys take a course in practical surveying. Another distinct feature is the course given in mechanical construction. This is worked out in tin plate and the various mechanical appliances applied to construction in building and engineering are demonstrated by the manufacture of working models. In the wood-working departments much stress is laid upon the boy understanding the mechanical principle of every tool used. The teacher here has many original ideas, and unique and effective ways of carrying them out. Plans which are attached have been prepared for a new building.

12.—GIRLS' COMMERCIAL HIGH SCHOOL, PHILADELPHIA.

The North East and Central Manual Training High Schools (10 and 11) are for boys only. The girls are provided for in a separate building under separate management, as far as commercial education is concerned. This school is held in three separate buildings and has an enrollment of 1300 girls from fourteen to eighteen years of age. The course of study is four years in length. Students are admitted from the grammar schools without examination. The Principal and faculty of the school are much pleased at advertisements that have recently appeared in the local papers stating, "Commercial High School graduates preferred."

13.—SPRING GARDEN INSTITUTE. PHILADELPHIA,

s an art, mechanical and electrical school supported by fees and endowment.)ay schools are maintained in the three departments and each department has ight classes for apprentices, boys learning trades, and boys and girls still attend-

ing the public schools. The courses are three years in length in both day and evening classes. In the mechanical and electrical departments the students spend eight hours a day in the shops.

14.—JAMES FORTEN ELEMENTARY MANUAL TRAINING SCHOOL, PHILADELPHIA,

Is situated in one of the slum districts of the city. It was originally a school for coloured children, but owing to the character of the locality changing it is now essentially a Jewish school. I visited it on a Jewish holiday but was shown through the building, had a long conversation with the principal and saw several voluntary classes at work. Each child spends some portion of the day at hand work of various kinds, varying from the kindergarten to advanced woodwork. There are nine hundred children in attendance. Sewing is provided for girls all the way through, with household science for the girls of the upper grades. In the third grade the sewing consists in making a set of doll's clothing on just the same principles as would be followed in making a set for a grown-up person. The cookery room and the woodworking room are also used for classes from neighbouring schools. An experiment is being tried in drawing toys. Each child is provided with a toy as a model and this is drawn and coloured. Some of the results I saw were very creditable. The character of the district is shown by the popularity of a certain model in the wood work course—a shine box. that is a box in which is contained materials for shoe polishing, that being the method by which a large number of the boys earn their living at an early age, The school is particularly fortunate in its principal, Miss Hannah Ashley Fox, a woman of high enthusiasm, excellent judgment, admirable tact, and special training in managing children of unfortunate home influence.

15.—TEXTILE SCHOOL AND SCHOOL OF INDUSTRIAL ART, PHILADELPHIA.

Textile schools in the United States owe their beginning to the Philadelphia Textile Association. Last year this school was attended by 1018 students, of whom 637 were men and 381 women. Since my last visit to the school a kiln has been added, so that now all modelling done in the school is fired on the premises by the students. The present organization of the school is as follows:

1. *School of Applied Art*: Drawing, applied, design, normal art instruction, wood work and wood carving, decorative painting, illustration, decorative sculpture, architectural drawing and design, metal work, pottery.

2. *Textile School*: Fabric structure and design, cotton, wool, worsted and silk, warp preparation and weaving, colour harmony and figure design, chemistry, dyeing and printing, wool yarn manufacture, worsted yarn manufacture, cotton yarn manufacture, hosiery knitting, finishing.

3. *School of Modern Languages.*

The quarters in which this school is housed are palatial and the equipment installed to carry out the curriculum above specified, consists of the most modern machinery in every department and no expense has been spared. The school is supported by grants from the State Legislature, by a liberal endowment, and the fees of the students. The museum attached to the school, enriched by many priceless specimens of the arts and industries taught, is invaluable for the purpose of study.

16.—WILLIAMSON FREE SCHOOL OF MECHANICAL TRADES.

This was the last school visited. It is situated about sixteen miles out of Philadelphia. Its aim is to teach certain trades, and the authorities claim that the school can make a better mechanic in three years than could possibly be done in the shops. The problem of trade instruction

Administration Building and Campus.

seems to be to get boys at the proper age and to keep them long enough. This school solves the difficulty by taking them at sixteen or seventeen and feeding and clothing them for a period of three years, the pupils being bound by articles of apprenticeship. As showing the efficiency of

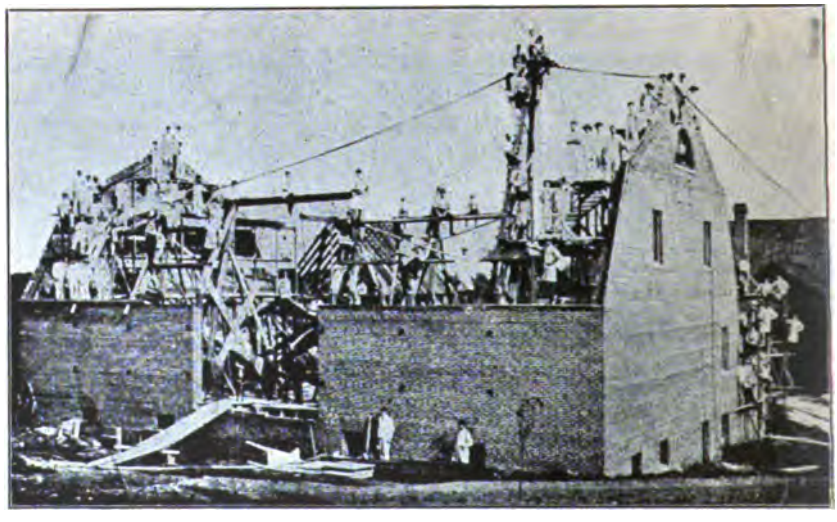
Instruction in Carpentry.

he instruction given, the Pennsylvania Railway Company takes one-third of he product of the school. Seventy-five per cent. of the boys graduated follow echanical employments. The teachers of the academic work are ladies. Only ne applicant in five can be accepted. There are about 300 boys in the school

divided into families of twenty-five, each presided over by a matron. The discipline is excellent. An accidental ringing of the bell in the dining hall brought instant response. The trades taught are as follows: Carpentering, bricklaying, including range, furnace and boiler setting, etc., machine trade in all its usual

Instruction in Machine Work.

details, pattern making, steam and electrical engineering, steam fitting, et Each pupil takes but one of the trades named, and his instruction in mechanic and freehand drawing tends in the general direction of his particular trad The courses are systematic and thorough. Three-quarters of the expense



School Barn Erected by Students.

incurred in housing the boys. The grounds are 230 acres in extent, occupied twenty-four buildings. The class unit is twenty-five. The founder is bur under the school. The capital consists of $2,160,000 in securities. The pl cost $500,000 and by the trust deed only 80% of the income is allowed to

spent annually. The machine shop is fitted with various types of machines so that students may gain varied experience. The school has its own water and power plant. The city of Philadelphia has just appropriated a large sum of money for the establishment of a trade school as part of its general educational system, and the tendency in the United States seems to be more and more in the direction of definite trade teaching.

I shall be glad to answer any questions that this necessarily brief report may suggest.

Your obedient servant,

ALBERT H. LEAKE,
Inspector of Technical Education.

Annual

Archæological Report

1905

BEING PART OF

Appendix to the Report of The Minister of Education Ontario

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY

TORONTO
Printed and Published by L. K. CAMERON
Printer to the King's Most Excellent Majesty
1906

WARWICK BRO'S & RUTTER, Limited, Printers
TORONTO

CONTENTS.

PRESENTATION.

THE HONORABLE R. A. PYNE, M.D.,
Minister of Education, Toronto.

SIR,—In presenting you with the accompanying Archæological Report for 1905, permit me to direct your attention to the fact that although the list of additions to the museum is considerably smaller than during any other year since its establishment, this is not indicative of any diminution in interest on the part of the public. It arises rather from the facts that press of office work during the last twelve months has prevented me from doing very much in the field, and also that many of the most intelligent collectors throughout the province have already, and very generously, presented to us the results of their work. We can scarcely expect much longer to receive many such extensive and valuable gifts as have come to us from Lieut.-Col. George E. Laidlaw, Dr. T. W. Beeman, Mr. W. J. Wintemberg, Mr. F. W. Waugh, Rev. Dr. John Maclean, Dr. W. L. T. Addison, Messrs. W. and D. Melville, Mr. Cyrenius Bearss, Mr. James Dickson, D.L.S., Dr. S. H. Collins, Lawrenceburg, Ind.; Dr. T. E. Craig, Lawrenceburg, Ind.; Dr. G. S. Ramsay, Mr. A. F. Hunter, M.A., Mr. T. F. Milne, Messrs. A. and R. Lougheed, Mr. Angus Buie, Mr. James S. Cairnduff, Mr. Hugh Nicol, Mr. Clarence B. Moore, Mrs. John Currie, Mr. James Dwyer, Mr. Frederick Birch, Mr. Frederick W. Storry, Mr. W. G. Wright, Rev. Dr. Annand, Mr. R. D. Darbishire, Manchester, England, and Rev. R. Ashington Bullen, F.R.S., Woking, Eng., although we have yet reason to anticipate the reception of several valuable personal contributions.

With the additional assistance you have provided for clerical and other work in the museum, the archæological curator will be at liberty to do more by way of research in the field than has been possible for some years.

The present report contains a number of excellent papers from ethnologists who have made special studies of the various peoples in British America, and as, with your consent, a copy of the report will be presented to each of the delegates attending the International Congress of Americanists in the city of Quebec next September, such a knowledge of the Canadian aborigines will thus be presented as has not hithereto been available, and the subject is one regarding which there has always existed much confusion of ideas, and not a little general haziness.

An apology is due to readers for the late appearance of this report. The copy was in the hands of the King's Printer last Dec., but the proof began to come in only this spring, just at our busiest time. Not only did this prevent us from making arrangements affecting our field-work, but it necessitated the writing of numerous letters to correspondents inquiring about why their copies had not been received.

I have the honor to be,
Yours respectfully,
DAVID BOYLE.

PROVINCIAL MUSEUM, Feb. 7, 1906.

ADDITIONS TO THE MUSEUM.

27,024.—Red (and somewhat imperfect) argillite gouge, six inches long and chamfered on two back corners. Head's farm, Chaffey township, Muskoka. Mr. Fred. Jarrat, Huntsville.

27,025.—Bird amulet, imperfect, bears evidence of secondary work after breakage. Lowell Robinson, north half of northeast quarter of section 4, township of Roxand, Eaton county, Mich. C. V. Fuller, Grand Ledge, Mich.

27,026.—4 bone heads. Walker farm, Brantford township. W. M. Dick, Brantford.

27,027.—6 red stone beads. Walker farm, Brantford township. W. M. Dick, Brantford.

27,028.—14 glass beads. Walker farm, Brantford township. W. M. Dick, Brantford.

27,029.—Bits of skin and bark (worked). Grave on Walker farm, Brantford township, Brant county. W. M. Dick, Brantford.

27,030.—Very old black dance mask (Seneca) with crooked nose, bent to the right. Tin plates, with three-cornered holes, now placed over eye cavities. Mouth very large, with only small circular opening. Jacob Hess, Six Nations, Ont.

27,031.—Red dance mask, eagle-like nose, small mouth, retracted lips, showing teeth. Jacob Hess, Six Nations, Ont.

27,032.—Red mask, vulture-like nose, large mouth, and enormously projecting lips. Jacob Hess, Six Nations, Ont.

27,033.—Flute, cedar—native make (Seneca) six holes. Jacob Hess, Six Nations, Ont.

27,034.—One pair of leggings, beaded. Austin Bill, Saw-gaw-wis, Six Nations, Ont.

27,035.—One big skin coat, fringed. Austin Bill, Six Nations, Ont.

27,036.—One beaded belt. Austin Bill, Six Nations, Ont.

27,037.—One long beaded pouch, worked with porcupine quills. Austin Bill, Six Nations, Ont.

27,038.—String of beads and cows' teeth. Austin Bill, Six Nations, Ont.

27,039.—Old bow, bone-mounted at the ends. Austin Bill, Six Nations, Ont.

27,040.—Beaded head dress. Austin Bill, Six Nations, Ont.

27,041.—Woman's rattle with ermine skin and feathers. Austin Bill, Six Nations, Ont.

27,042-3.—Two stone-headed clubs. Austin Bill, Six Nations, Ont.

27,044.—One small wooden club. Austin Bill, Six Nations, Ont.

27,045.—One bone knife. Austin Bill, Six Nations, Ont.

27,046.—One bone-headed arrow. Austin Bill, Six Nations, Ont.

27,047.—One bone and steel scraper. Austin Bill, Six Nations, Ont.

27,048.—Iron tomahawk. Austin Bill, Six Nations, Ont.

27,049.—Stone pipe (recent). Austin Bill, Six Nations, Ont.

27,050.—Iron spiked war club. Austin Bill, Six Nations, Ont.

27,051-2.—Two pairs of snow shoes. Austin Bill, Six Nations, Ont.

27,053.—Small beaded and fringed pouch. Austin Bill, Six Nations.

27,054.—One medium-sized, beaded and fringed pouch. Austin Bill, Saw-gaw-wis, Six Nations.

27,055.—Bird amulet, nearly perfect, 7 inches long, River St. Lawrence shore near Mallorytown. Dr. T. A. Beeman.

27,056.—Pendant (Huronian slate) near Mallorytown. Dr. T. W. Beeman.

27,057.—Small stone gouge (Rideau Lake, Squaw Point) Lanark Co., Ont., North Elmsley township. Dr. T. W. Beeman.

27,058.—Rough gouge, much weathered, Squaw Point, Rideau Lake, North Elmsley township, Lanark county, Ont. Dr. T. W. Beeman.

27,059.—Chert arrowhead, peculiar longitudinal flaking. Dr. T. W. Beeman.

27,060.—Obsidian arrowhead (small), Arizona. Dr. T. W. Beeman.

27,061.—Small and roughly made axe, locality not known (probably near Elora.) W. C. Thomson, Toronto.

27,062.—Palæolith, Thennes, Thezy, Somme Valley, France. Sir John Evans, Aug. 20, 1897 (mislaid and found Aug. 3, 1905).

27,063-4.—Arrow heads, peat bog near Lough Foyle, Ireland. Collected by M. J. Thompson, presented by Miss Margaret Thompson, May 1, 1904 (per Rev. S. Dempster).

27,065.—Unfinished Huronian slate axe. Lot 19, con. 3, Blenheim township. W. J. Wintemberg.

27,066.—Huronian slate, large chip, worked. Lot 19, con. 13, Blenheim township, Oxford county, Ont. W. J. Wintemberg, Toronto.

27,067.—Valve of large unio shell, much worn as if it had been used as a polisher. Lot 9, con. 3, Blenheim township. W. J. Wintemberg.

27,068.—Piece of meteoric (?) iron. Elliott village-site. Dumfries township, Waterloo. W. J. Wintemberg.

27,069.—Model of Cahokia Mound, near E. St. Louis, Illinois, scale 1 inch equal to 100 ft. Gift of Dr. C. A. Peterson, President Missouri Historical Society, St. Louis, Mo.

27,070.—Model of Cahokia Mound as it appears to-day. Dr. C. A. Peterson, St. Louis, Mo.

27,071.—Clay vessel almost perfect, 6 inches high, Orillia. Mr. J. H. Willey, Orillia. This is in an unusually good condition.

27,072.—Roughly made stone disc, Ryerson farm, South Orillia. Per J. H. Hammond, Orillia.

27,073.—Stone disc, unfinished, two and a quarter inches in diameter. Ryerson farm, South Orillia. Per J. H. Hammond.

27,074.—Stone disc, thick and not well made, inch and a half in diameter. Ryerson farm, South Orillia.

27,075.—Clay pipe, human face, ears pierced as if for rings, chin long and pointed, stem broken. It is peculiarly attached to the head, as may be seen by reference to the illustration, fig. 22. W. O. Mercer.

27,076.—Clay pipe, widely flared lips. The bowl hole is half an inch in diameter, diameter of rim two and one-eighth inches; under side of the flared lip very neatly lined diagonally in a pattern. Southwest quarter of lot —, con. 1, South Orillia. Hugh Johnston, Orillia, per J. H. Hammond.

27,077.—Small plain clay pipe, short, sharply tapering stem, southeast part of west half of lot 4, con. 8, North Orillia. Isaac Reid, Orillia, per J. H. Hammond.

27,078.—Very small clay pipe, stem broken, bowl ornamented with three horizontal bands, under which there are seven circular depressions neatly made. Southwest part west half lot 4, con. 6, North Orillia. Wesley Brennan, Orillia, per J. H. Hammond.

27,079.—Fragment of pottery very well made, and accurately ornamented, west half lot w. 1/2 4 con. 6, N Orillia. Wesley Brennan, Orillia, Ont., per J. H. Hammond.

27,080.—Human face pipe bowl, perforated ears, prominent features of face destroyed. Lot 209, Mississaga Street, South Orillia, near town. Daniel Bowie, Orillia.

27,081.—Large inverted cone-shaped clay pipe. Southwest half of north half of lot 6, con. 2, South Orillia.

27,082.—Piece of hematite, used as paint. Shore of Lake St. John, Rama.

27,083.—Human skull, lot 6, North Mississaga Street, town of Orillia. J. H. Hammond, Orillia.

27,084.—Two small beads of clay found among gravel. W. G. Richardson, John Street, Orillia.

27,085.—Single specimen of black wampum (mowhackee) near Mt. Slaven school house. J. H. Hammond, Orillia.

27,086.—Small arrow head, Coleman township.

27,087.—Small and very well made stone axe, five and a half inches long. Lot 6, con. 1, South Orillia. John R. Harvey, Orillia.

27,088.—Clay pipe, imperfect, ornamented with three large slots at nearly equal distances. J. H. Hammond.

27,089.—Piece of limestone having at one end what seems to be a deeply-cut imitation of a square, bastioned fort. It was found by Mr. John Cuppage, of Orillia, many years ago, on the bank of the Saskatchewan river at a place he thinks is now known as Oxbow.

27,090.—Arrowhead or knife, found near confluence of Lake Lady Evelyn waters with Montreal River in 1890, by Mr. James Mowatt, per Mr. Wm. Brodie.

27,091.—Buffalo robe, fig. 40, bearing numerous pictographs in black, red and green, including two stories. Bought by E. M. Chadwick, Esq., from a daughter-in-law of John S. Baxter, who was in the service of Catlin during the latter's travels among the Indians (1832-1840). E. M. Chadwick, Toronto.

27,092.—Fragment of pottery, incised lines on both sides, southwest half lot 3, con. 2, South Orillia. Leighton Hammond, Orillia.

27,093.—Seems to be a child's attempt at making a clay pipe. Only the outside form has been moulded. Southeast quarter lot 2, con. 5, North Orillia. Leighton Hammond.

27,094-5.—Two bone "chippers." These are supposed to be examples of the tools employed by the Mandans in the flaking of flints. E. R. Steinbrueck, Mandan, N.D. (Exchange).

27,096.—Bone knife-handle. This is made from a piece of rib (buffalo's probably), and has at each end and on the edge an incision about three-eighths of an inch deep, apparently made to receive a short thin blade, about two inches long. E. R. Steinbrueck, Mandan, N.D. (Exchange).

27,097.—Bone arrow-straightener or gouge, eight and three-eighths inches long, rib. One hole is perfect, and the bone is broken at one end where there has been another hole. E. R. Steinbrueck, Mandan, N.D. (Exchange).

27,098.—Hide-scraper (?) seven and a half inches long, and three inches wide, made from a piece of Buffalo skull and horn firmly attached, naturally. E. R. Steinbrueck, Mandan, N. D. (Exchange).

27,099.—Hide-scraper (?) six and three-fourths inches long and four and a half inches wide, made from the shoulder blade of a buffalo, lower third. E. R. Steinbrueck, Mandan, N. D. (Exchange).

27,100.—Bone hoe made from whole shoulder blade of buffalo, cutting edge broken, twelve and a half inches long and five and a half inches wide at lower end. E. R. Steinbrueck, Mandan, N.D. (Exchange).

The last three preceding specimens are entered in accordance with the beliefs of the people where the specimens were found. The ascribed uses may be correct, but notwithstanding some differences, mainly in size, there does not seem to be any reason why the implements were not employed for both purposes, or for either purpose. A sharpened hoe would make an excellent scraper, and even a dull scraper would make a good hoe, whether attached to a handle, or held directly in the hand.

27,101-50.—Fifty typical fragments of pottery, mostly bearing string impression patterns, from North Dakota. E. R. Steinbreuck, Mandan, N.D. (Exchange).

27,151.—Waterworm or weathered stone, nine inches long by four and a half wide, and resembling an axe or hammer of unusual form, found near Port Dover. Geo. A. Waterbury, Selkirk, Ont. See p. 26, present report.

27,152-5.—Four flints found near Niagara Falls, Welland county, Ontario. William Poole, Toronto.

NOTES ON SOME SPECIMENS.

Flints.

To Mr. Wm. Welsh of Amberley we are indebted for the very fine flint specimen of which figure 1 is a drawing. It was found by him on lot 18, concession A, Huron township, county of Bruce, a locality from which much might be very naturally expected, but which has scarcely produced anything, if the Museum cases are taken in evidence. Figure 1 is as nearly symmetrical as it may be possible even to imagine work of this kind to be, on such material. Exactly four inches long, it seems too big for use with a bow, and was more probably employed as a spear, and still more likely as a knife—one for either scalping or skinning, or for both, as the two operations differ only in degree.

It is this kind of implement that should be known as a "skinning stone," yet all our farmer friends, and many others, insist on applying this term to celts, or stone axes, some of which are too unwieldy,

some quite too small, and all incapable of taking an edge sharp enough for such a purpose. A single flint or chert flake, however small, if only it could be held between the thumb and finger, would be immensely superior, by way of cutting adherences between hide and flesh, to any celt-like tool of softer stone.

Perhaps the most northerly Ontario aboriginal relic in the Museum is the one of which figure 2 is a drawing. It is five inches and a quarter long, well formed, and, though neckless, the lower edge is

Fig. 1 (19801). Full size.

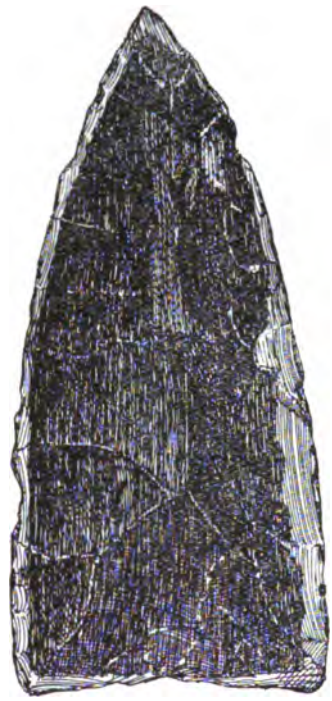


Fig. 2 (19830). Two-thirds size.

thinned just as the others are, as if the intention was to wedge it tightly into a cleft handle. The tool is, however, large enough to be used in doing various kinds of work when held directly in the hand. As a fish-cleaner (if fish were ever so treated when this knife was made) it might have been used with good effect. It is thoroughly weathered to a dirty white, stained with what looks like iron rust, on the side not shown, and as the weathering extends a little over the side as well. it has aparently lain on the surface for a very long time.

We procured this specimen from Mr. Aubrey White, Deputy Minister of Crown Lands, who brought it from Lake Temagami, Nipissing District.

The original of figure 3 is peculiar in shape as well as in the way it has been flaked. Two large chips—one on each side—have been struck from the lower end upwards, leaving well-marked hollows, from the base of which the curved barbs extend.

Found near Strathroy, by Mr. Joseph Stewart.

Many curiously formed "flints" have been found in the County of Middlesex. Figure 4 shows what one of these is like. It may have been a saw, or a knife, but scarcely an arrow. It was picked up on or near the Old Fort—the Shaw Wood estate, a few miles from the city of London.

Fig. 3 (19800). Full size.

Fig. 4 (25410). Full size.

Clay Pipes.

For simplicity, it would not be easy to find any equal to figure 5 among clay pipes. This specimen, judging from the appearance of the hole in the bowl, seems to have been moulded on the end of a little finger. A single line badly made, a little below the lip, shows almost the only decorative effort. It was found near Eglinton, a short distance from Toronto.

Nothing more ornate in clay has come into our possession than the pipe-head shown here (figure 6). Although the specimen is imperfect, enough remains to show that an ancient artist once lived in

Fig. 5 (7303). Half dia.

Fig. 6. Full size.

the township of Bexley, not very far from where a much more recent artist has produced excellent articles of original design in wood.

Laidlaw collection.

Figure 7 is from a drawing of an excellent cast, the original of which belongs to Mr. Henry Smith. It was found in the north of the township of Wilmot, in Waterloo county. It is very gracefully formed, and quite destitute of ornamentation, with the exception of the slight curvature on the lip.

One of the most slenderly and otherwise gracefully formed clay pipes in the Museum is that which is here figured (figure 8). It is peculiar also in the markings that form the pattern on the under side

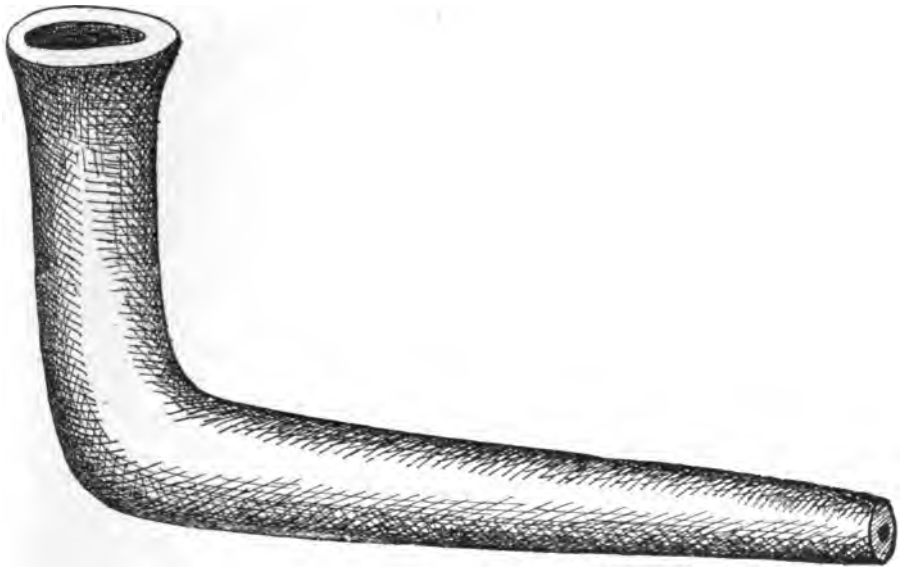


Fig. 7 (16461). Full size.

of the flared lip of the bowl. The design formed by these is quite different from any other pottery, in our collection, and the incised lines are made with much more accuracy than usual.

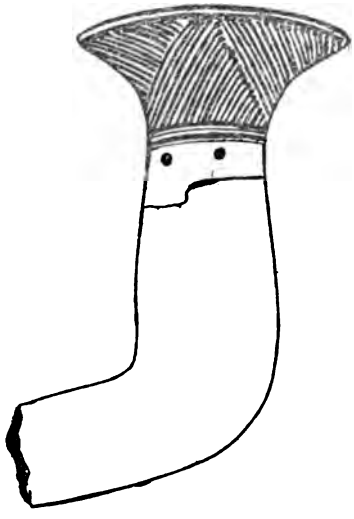


Fig. 8 (27076). Two-thirds dia.

Fig. 9 (17126). Half dia.

This pipe was found in the township of South Orillia, on the farm of Mr. Hugh Johnston, by whom it was presented to the Museum, by courtesy of Mr. J. Hugh Hammond, of the town of Orillia.

The ancient home of the Hurons continues to give up some of its relics. Miss Susie Nelson contributes a boldly formed clay pipe-bowl found in Fair Valley, Medonte township. The heavy collar that forms the rim is strongly incised with a plain pattern of straight lines, very roughly made, as, indeed, is every part of the bowl. (Figure 9.)

From lot 23, concession 1, the farm of Mr. A. Ferguson, in Fenelon township, comes to us, in the Laidlaw collection, the somewhat

Fig. 10 (22950). Full size.

oddly shaped pipe. (Figure 10.) It is quite flat on the right and left sides, as well as on the front side, and base—the upper side being slightly rounded, and this pattern, including the arrangement of the decorative lines, is something quite uncommon. The stem is nearly as long as when made.

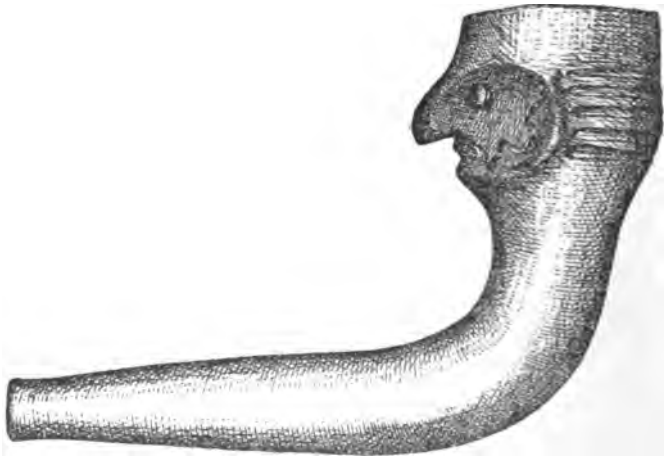


Fig. 11 (25552). Five-eighths dia.

Although the proofs are not so plain on this pipe as on the one figured by 22 that the face portion is meant to represent a dance-mask, yet some of its characteristics point this way. From the base of the nose to the back of the face the cheeks are quite flat; the eyes are prominences, not depressions; what may stand for ears are slightly

perforated, and slightly depressed, irregularly waved lines cross both cheeks. The prominent nose is also suggestive of a mask. This clay pipe is absolutely without a flaw, except where worn by being held in the teeth.

Of the numerous clay pipes found a few years ago by Mr. Dick on the Walker farm, Brantford township, the one shown by means of figure 12 is somewhat odd, as the maker of it was at some pains to show the teeth in the animal head, which, looked at from the front,

Fig. 12 (25549). Full size.

closely resembles that of a bat. The clay does not appear to be tempered at all, and the pipe, both inside and outside, is glossy black, probably the result of greasing and holding over a fire, as is said to have been the method employed to produce this effect.

From the Huron country comes the pipe, a full-sized picture of which is shown by figure 13. Without the complete head, it is impossible to be sure whether the creature imitated was a mammal or a

Fig. 13 (17132). Full size.

bird, but probably the latter—the well-marked crest suggesting the partridge or ruffed grouse. It was found on the farm of Mr. Brown, near Vesey, in Tay township, and was presented to us per Mr. T. F. Milne, along with a large number of other specimens, forming the Milne collection.

Somewhat similar in style to the former specimen (figure 13) is the one shown here, but the bird intended in the latter case was clearly some bird of prey. This is the only attempt I have ever seen to model

Fig. 14 (26944). Full size.

the wings in strong relief. In figure 14 the ends of both are broken. There has been a hole bored near the tips of these. Wilbert Greer, lot 2, concession 5, Orillia township.

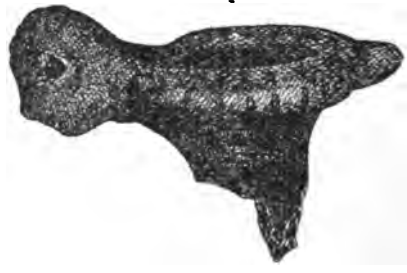


Fig. 15. Two-thirds size.

Another form of bird pipe from the Laidlaw collection is shown by figure 15. It came from near Bolsover in Eldon township, where it was found by Mr. James McGirr.

Fig. 16. Full size.

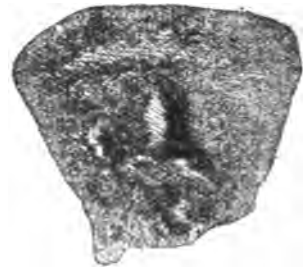


Fig. 17. Full size.

Figure 16 represents all that is left of a two-faced pipe. The one shown in the cut to the reader's right is evidently meant to stand for

a human face, but the other is almost as certainly meant to imitate the face of an owl. Figure 17 gives a front view of the former. Bexley township, Victoria county. Laidlaw collection.

Figure 18 is a picture of a wolf, fox, or dog head, from the bowl rim of a clay pipe, and is shown here mainly on account of its large size for such a purpose. The fracture at the neck gives this specimen,

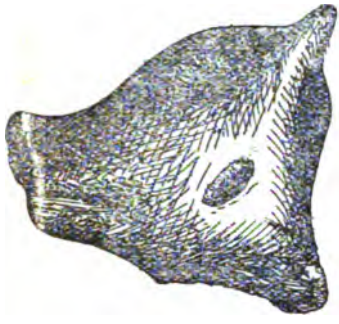


Fig. 18 (2600). Full size.

Fig. 19 (17126). Half dia.

as here drawn, an appearance of symmetry it does not possess. The lower, shaded oval simply marks an ornamental depression. It was found on the Portage road, Eldon township, by Mr. James Laidlaw, and forms part of the Laidlaw collection. It is much larger and heavier than is usual as a pipe ornament.

As the pipe-head illustrated here (figure 19) possesses some rather unusual features, it is unfortunate to find it so much mutilated. The nose and ears have been very prominent, the depressions, representing the jaws, unusually deep, and the dots outlining the jaws quite peculiar.

Fig. 20 (9807). Full size.

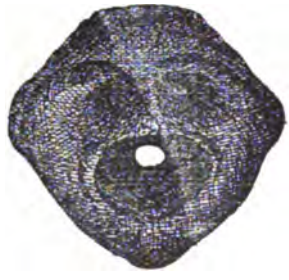


Fig. 21 (26217). Two-thirds dia.

Its last owner must have valued it, for after the original stem was broken, he bored a hole close under the chin for the insertion of a wooden substitute. This pipe was found on the farm of Mr. Brown, near Vasey, Tay township, and is part of the collection presented to the Museum by Mr. T. F. Milne.

This somewhat pretty little pipe (figure 20) seems to be suggestive of the white man as well as of the Indian, perhaps of the former because it is not only made of clay which was burned white, but the

accuracy of the workmanship is such as to attract attention. The brimmed hat, too, leads one's thoughts along the same line. A full-face view of this pipe gives a much better idea of the style and finish of it than one gets from a side view, as in the cut. The ears have been pierced by a very fine tool.

From Mr. W. G. Wright, Collingwood.

In figure 21 there is a strong resemblance to another pipe (6,864) which was described and figured in a former report. Both are from the same township, Nottawasaga, the seat of the Tobacco Nation. For the one figured here we are indebted to Mr. Frederick Storry of lot 12, concession 7, in the township named.

The conceit of making the open mouth to form a bowl is as odd as it is rare. We have no record of any such pipe from any other part of America. One of stone on similar lines is described elsewhere.

There are several peculiarities about the pipe illustrated by diagram 22. Looked at full-face, one of the deeply impressed eyes is very much higher than the other, and of all the clay pipes we have, this one shows the most clearly marked attempt to bring out the high

Fig. 22 (27075). Full size.

cheek-bones and oval shape, which are so characteristic of so many Indian faces. About the damaged nose, nothing can be said, but the chin is so unusually long and sharp as to suggest the intention to imitate a Vandyke beard, and the wing of the ear is perforated horizontally, in the middle. Perhaps it would be better to say there is no ear, for the depression where the ear ought to be seems to have been made purely for the purpose of providing a place to make the hole, and as the complete face was almost certainly intended to represent a dance-mask, such a tying-hole was needed to complete the imitation, and if this supposition be correct, the pipe is almost the only one of its kind among the several hundreds in the Museum. The stem hole (little more than one-fourth of an inch in diameter) is much less than such holes usually are, while the cavity of the bowl is an inch and one-

eighth across. The ornamental lines behind the face form the common diagonal pattern. The pipe was found in the township of South Orillia, and is the gift of Mr. W. O. Mercer.

Stone Pipes.

The asertion that tubes of this kind were used as tobacco pipes has never met with any favor in this quarter. It is not doubted that the earliest form of pipes was that of a straight tube, and it may be that some of these are occasionally found, but there would appear to have been tubes and tubes, and scarcely anything can be more certain than that most, if not all, objects of this kind found in Ontario were made for some totally different purpose. We have specimens of various sizes and dimensions; from little more than two to nearly twelve inches long; oval as well as cylindrical in cross section; with holes almost uniform in size throughout, and with holes an inch or more in diameter at one end, tapering to only three-eighths of an inch at the other.

Fig. 23 (2086). Two-thirds dia.

Fig. 24 (22118). Full size.

Fig. 25. Full size.

Figure 23 illustrates what may have been a smoking-pipe. The hole at the upper end is an inch in diameter, descreasing to less than three-eighths of an inch. If used for smoking, this tube must have been supplemented with some sort of mouth-piece, as the smaller end is seven-eighths of an inch thick. This specimen was found in Tuscarora township by Chief Dek-a-non-re-nah, a Mohawk, or, as the Mohawks prefer to be called, a Canienga.

A large number of the catlinite pipes one sees in museums, as well as in private collections, are freak-forms, made for barter, and highly prized by the purchasers as calumets, or pipes of peace, formerly the property of Sitting Bull, or Standing Bear, or Dark Cloud, or The Man with a Little Limp (!), but figure 24 shows us the appear-

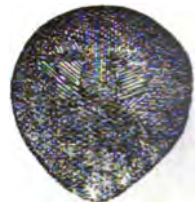
ance of an old-fashioned utility Cree pipe, such a one as any of the forementioned bloodily disposed sachems could smoke with comfort, and, when done, attach to his scalp lock, or fasten to his belt with a thong, feeling that after all life was worth living, that is, his life.

Mr. Harry Laidlaw got this pipe from a Cree, at Portage la Prairie, Manitoba.

If the specimen illustrated by figure 25 was not meant to be a pipe, it is not easy to make another guess. The surface bears scarcely any evidence of tool-marks, otherwise than appears in the general form, except that to the touch there are slight flatnesses on the body of the stone, indicating that rubbing or smoothing had been done by moving it lengthwise over another surface. Although simple in form, the outline is graceful. The material seems to be a close-grained sand stone. The object was found in Eldon township, Victoria county, and belongs to the George E. Laidlaw collection.

Of similar design, workmanship and material, and from the same locality as the preceding specimen, is the one here shown, figure 26, and in all probability, it, too, was intended to be a pipe, notwithstanding its hammer-like look. As in the former case also, there is

Fig. 26. Half dia.



Figs. 27-28 (22038). Two-thirds dia.

the beginning of a bowl-hole. The style of workmanship is so nearly alike in both as to suggest that they were made by the same man. As a pipe head, it would have proved very cumbersome, but we have some much heavier specimens of this kind in the Provincial Museum.

The object in question forms part of the Laidlaw collection.

In figures 27 and 28 we have illustrated a stone pipe, the upturned face of which shows an open mouth forming a pipe-bowl—the only example we have of such a whim in stone. The material is veined, and resembles the dark quality of marble commonly known in this province as "Arnprior." The face is very crudely shaped, merely suggesting eyes and nose. The flat base is notched slightly all the way round, and there is an attachment hole, as seen in the cut, The stem hole is straight below the chin.

This pipe was presented to the Provincial Museum by Mr. Alex. J. Blair, who found it on lot 27, concession 6, Luther township, Wellington county, a county which, although very extensive, has yielded comparatively little archæologically.

The stone pipe of which a cut is shown by figure 29 was found in Eldon township, by Lieut.-Col. Laidlaw. It is of a type not at all common, but more characteristic of that neighborhood than of any other in this province. Already, a good many of them have been

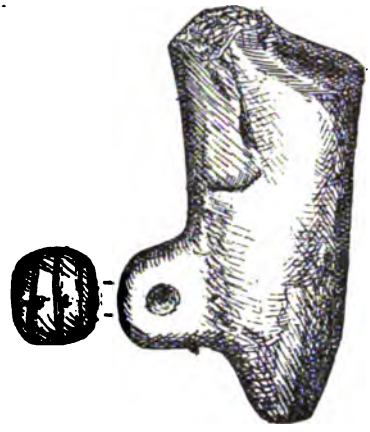


Fig. 29 (16239). Full size.

figured and described in our reports. Without having seen perfect specimens one would scarcely suppose the pipe to have represented a bird, but of this there can not be a doubt, as the front view of the holed projection shows a somewhat conventionalised imitation of talons—not an unusual device—as if the bird was in a state of rest, and grasping a branch. The use of such projections for the boring

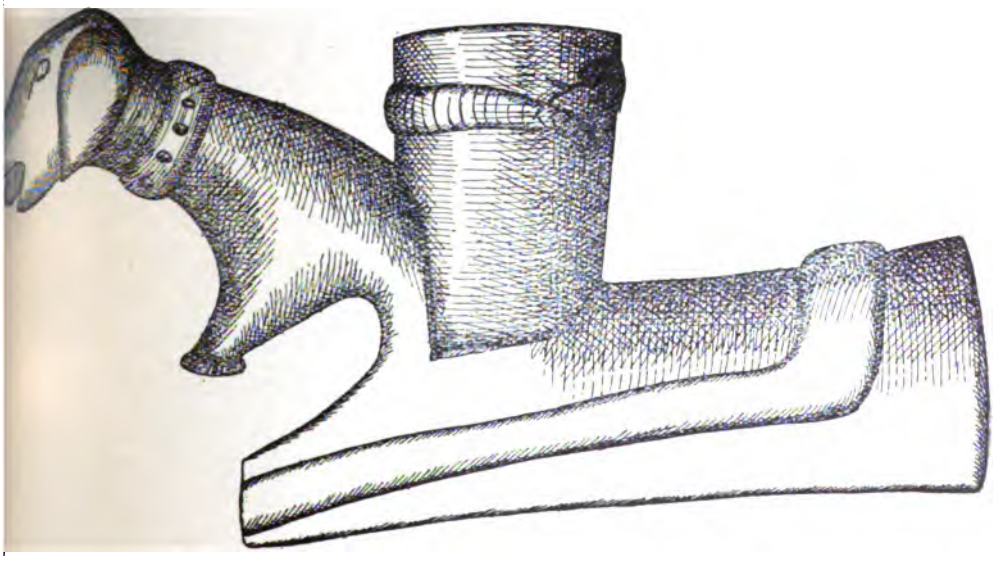


Fig. 30 (22035). Two-thirds dia.

of attachment-holes was probably an afterthought. As a rule, pipes of this kind were made either of limestone or of soapstone.

Figure 30 does not by any means represent an archæological object, but it serves to illustrate the mechanical skill of our present-day Indian, as well as to mark his fondness for manifesting it chiefly in

the making of stone pipes. This one was made by Indian Jim, of Fort McLeod, Alta., and was presented to the Provincial Museum by Mr. W. C. Perry, a generous contributor, now of Winnipeg.

The material is a fine-grained, gray limestone, and the pipe has been carved from a block which must have exceeded eight inches in length, four inches in depth, and two inches in thickness. The outside end of the stem-hole is five-eighths of an inch in diameter, and the bowl hole is nearly an inch. The work is very well done—few white men could do it as well, and it is quite evident that Jim made no attempt to pass it off as an "antique," notwithstanding its Indianness. The collar on the dog's neck, and the snake encircling the bowl, have significances pointing to a mingling of the white man's notions and those of the Indian.

Figure 31 represents the largest stone pipe of its type now in our cases. It was procured from Mr. John Bay, who lives in Anglesea

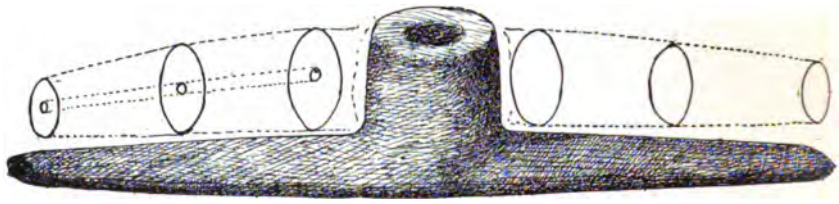


Fig. 31 (27262). A little more than one-third dia.

township, Addington county. In length it measures exactly eleven inches. The material seems to be a coarse steatite.

A much more primitive form of pipe than the preceding one is shown by figure 32 from the same neighborhood, and supplied by the same gentleman. For archæological purposes, too, its very rude-

Fig. 32 (27263). Full size.

ness of form and finish suggests it as a prototypic design. Some years ago we had a similar crude but suggestive form of pipe presented by Public School Inspector Kidd, of Kingston, and found by him in Pittsburgh township, on the St. Lawrence.

Large Soapstone Bead.

It is not quite clear from the appearance of this form (figure 33) whether it is an improved natural shape or one that has been specially made, but probably the latter, as it is of soapstone, and pebbles of this material, with or without weathered holes, are seldom or never found. This was picked up from an ash-heap on a village site near Balsam lake, Bexley township; Laidlaw collection.

Since the close of this report for 1905 we have received from Mr. John Bay, a Mohawk of Anglesea township, county of Addington, a somewhat similar specimen, but the hole is only one-third the size of that in figure 33, and is deeply and widely countersunk. John suggests that it is "an Indian button." No doubt he could use it as such now, but this idea of fastening, simple as it is, does not seem to have occurred to his remote ancestors.

Soapstone Pendant. (?)

The specimen shown by figure 34 may have been part of a pipe-stem which, becoming broken, has been transformed into a bead or other ornament. The stone is steatite, and is of light color. From

Fig. 33 (21723). Full size.

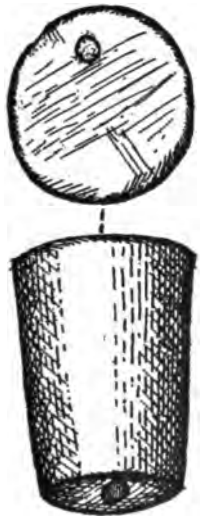


Fig. 34 (19053). Full size.

Fig. 35. Full size.

the end view, shown above, it will be seen that the perforation is very eccentric, a not common thing in the boring of stone pipe-stems. Specimens of various kinds are not infrequently found which at some time formed parts of something else. Even sections of clay pipe-stems have in this way been made into beads, and fragments of pottery are ground into the form of discs, supposed to have been used for gambling.

Perhaps the most interesting particular in this specimen is the hole which, although quite round at the larger end, is far from being true at the other. From lot 5, concession 1, Bexley township, Laidlaw collection.

Small Toy Clay Pot.

One of the smallest clay vessels in the Museum, perhaps merely a child's plaything, is here figured. It was found near the Portage Road between Balsam Lake and the Talbot River, and is in the Laidlaw collection. This tiny cup (figure 35) was apparently moulded on the tip of a finger.

The Willey Clay Pot.

Perfect clay vessels are seldom found in graves in this province. Hitherto, those most nearly so have been discovered on ledges of rock with overhead protection from the weather, like those from Messrs. E. T. White, Clarksburg; Freeman Britton, Gananoque; and J. M. Irwin, Peterboro, although fairly well preserved specimens have come to us which were taken out of the earth by Messrs. Cyrenius Bearse, Dr. T. A. Beeman, and James Cairnduff.

Fig. 36 (27071). Half dia.

The one represented by figure 36 is the gift of Mr. J. H. Willey, of the town of Orillia. Mr. Willey came upon this rather well-shaped vessel when digging the foundation of his house. It lay at a depth of nearly four feet from the surface, in a bed of sandy loam. It is six inches high, and almost correspondingly wide, and its plainness is relieved by only very simple attempts at ornamentation—shallow notches mark the four prominences on the lip, while the body itself bears a roughly-made criss-cross pattern in the form of a band nearly two inches wide. The shaded parts seem to have been produced by smoke, although the vessel as a whole does not seem to have been very much used.

Large Curved Copper Tool, or Weapon.

The kind of copper thing—tool, utensil, weapon, or merely ceremonial object, the shape of which is shown here (figure 37) is one of two in the Museum. One, already described in the Archæological Report for 1900-1, was found near the town of Midland, Simcoe county (a Huron habitat), while this specimen was taken from beneath a large pine stump on block 3, township of Bexley, and is in the collection presented by Lieut.-Col. G. E. Laidlaw.

Fig. 37 (18225). Half dia.

Fig. 38 (27097). Two-thirds dia.

It is, presumably of native metal, but as it is without visible evidence of silver, and lacking a chemical analysis, it is impossible to be sure.

The curator would be greatly obliged to hear from any reader who knows of similar specimens in any other collection, private or public.

Mandan Arrow-Straightener.

Among a few interesting specimens procured by exchange from Mr. E. R. Steinbrueck, of Mandan, N.D., is one of bone (figure 38) the peculiar form of hole in which, is suggestive that the object is what, in Ontario, some call an arrow-straightener. Those found here are made from antlers.

Mr. Steinbrueck suggests that such objects may also have been used as gauges, in the shaping of arrow-shafts.

This specimen was supposedly, and probably, a tool of the Mandan people, and is made from a buffalo-rib.

Not an Indian Tool.

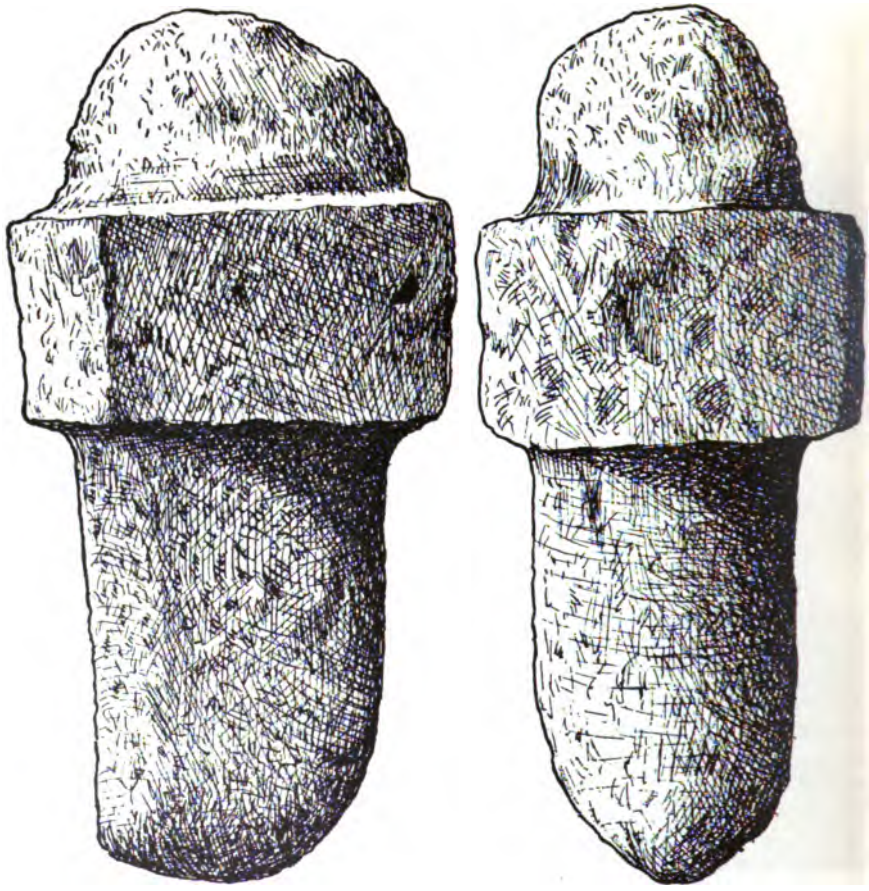


Fig. 39 (27151). Half diameter.

We are greatly obliged to Mr. Geo. L. Waterbury, of Selkirk, for the extremely artificial looking specimen here figured (39) from good drawings made by Mr. W. B. Waterbury, St. Thomas. It was found a great many years ago (fifty or sixty perhaps) near Port Dover, on Lake Erie, and seems to have been carefully preserved in the family

of the old lady (now deceased) who gave it to Mr. George L. Waterbury. Speaking at random, it may be readily supposed that during the half century or more that has passed since the stone was picked up, it has been regarded as a genuine and unique example of Indian handicraft, and has, no doubt, been wonderingly gazed upon by the neighbors in that light. Nor need this be thought at all strange, for many undoubted examples of aboriginal workmanship resemble naturally formed objects much more closely, or look much less artificial than this one does. It is only when we examine the nature of the material that doubts are at once removed, for it is composed of two kinds of stone that differ from one another in color, as well as in quality. The parts corresponding to the pole and the blade of an axe are of gray gneiss, while the squarely projecting portion is a light colored and finely grained granite. Exposed to the action of the weather, or even to the action of water alone, the gneiss has become worn, while the harder, eruptive material still stands out squarely.

It may be stated here that weathered or water-worn stones frequently resemble whole organisms or portions of organisms very closely. One, of limestone, in the Museum, looks much like a human foot, with instep, sole and heel in graceful curves; while another looks like a small hand in a mitten, with a free thumb. Two more were brought here as good examples of large pestles or mullers with widely expanded grinding surfaces. Specimens like these are valuable negatively, in archæological collections, by way of placing young students on their guard, and in assisting to correct wrong impressions that are sometimes formed by older people respecting such simulations.

The stone represented by figure 39 is nine inches long and four inches and a half wide.

Pictograph on Buffalo Hide.

Even picture writing marks a long stride towards "the higher life," but as a method of making records, it is most uncertain as to signification, without the help of the artist-author, or of those who know about the events he represented.

An illiterate person will, most undoubtedly, see much more in a pictograph than in a page of print, but he will still be unable to arrive at anything like a true interpretation of the pictured story, without direct assistance from the aboriginal historiographer himself. Even at second hand telling, incorrect details will creep in, and frequent repetition does not improve the recital in so far as fact is concerned, especially when the repetition comes from the author's successors, whether family or official. There were not many rules followed by Indian peoples in the performance of this kind of work, and apart from the general use of particular signs to represent rain, lightning, clouds and animal life, a "red man" would have just as much difficulty in forming a connected and correct story by means of pictographs as a white man would.

Purely gratuitous as these remarks will, no doubt, prove to many, it would seem necessary to disabuse the minds of not a few, of their belief in the power of an Indian, or of anyone learned in Indian lore to read aright a pictographic record, merely from a knowledge of what the individual pictures represent.

For the buffalo-skin bearing the drawings represented by figure 40 we are under obligation to Mr. E. M. Chadwick, barrister, of this city, who writes:—

"The old pictured buffalo robe, which has been the subject of some correspondence between us, was procured by me some years ago from the family of John S. Baxter, an old man who had been in the employment of Catlin, the artist and author. Baxter himself being dead, I could only get second-hand information about it, and that so

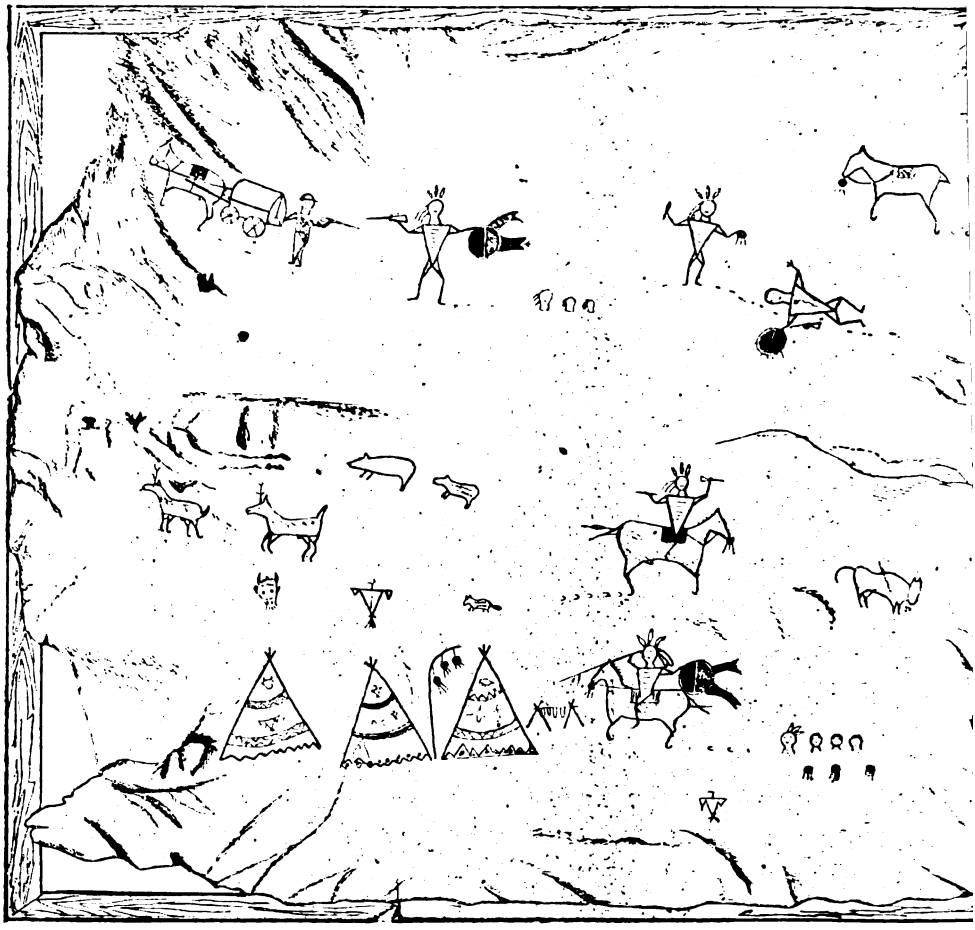


Fig. 40. Pictograph on Buffalo Hide.

indefinite as to be quite unreliable. It was stated to have come from the Canadian Northwest, but the "prairie schooner" which appears on it indicates at least that the hero whose exploits it narrates performed some of these south of the boundary line.* I am not able to explain much of the picture writing—perhaps, indeed, no more than is obvious; but as you desire me to do so, I will note such points as I think should be brought to the attention of any persons of whom you may expect to be able to get some opinion of value. The series of

*Why should this be implied? Surely wheeled vehicles were used by the white explorer in our North-west at quite an early period.

incidents depicted seems to begin at the Buffalo's tail; here there is a snake, probably a totem. The name Sioux is, I believe, a corruption or abbreviation of the name given by the French to that nation. Nadowessioux, meaning rattlesnakes; why so called? Perhaps their tribal totem may have been a snake. I have been inclined to think that the robe came from the Sioux. The first picture shews an Indian slain and scalped by the hero. The vanquished has a shield which may be heraldically described as "per pale gules and vert," (i.e., bisected, and coloured half red and half green) and adorned with a lambrequin of feathers; this shield the victor precisely, as was the custom of medieval European Chivalry, appropriates, and subsequently carries throughout the rest of his career. In this first picture a horse appears with a scalp attached to his bridle; and the accompanying little figures indicate that the owner of this horse—victor or vanquished?—was one of a mounted party of four. The next scene is an attack upon a "prairie schooner," in which three white persons are slain. Little dots or short lines inform us that the hero was here accompanied by four others. Less gruesome are the following which are hunting scenes, in one of which the hero, one of a mounted party of five, kills a buffalo under (I suppose) such circumstances as to render this exploit a notable one—one worthy of special record. The lower part of the robe is a little more difficult to understand, and is such that a good explanation of it would be interesting. There are three tepees, each of which is marked by a totem over it, and in each case the same totem appears on the upper part of the tepee as well. These are, first, a Buffalo's head "cabossed," i.e., shewing the front of the head, without any part of the neck appearing; the next is an eagle "displayed" in the conventional manner customary among many Indian nations, and this totem appears also in the lower part of the first tepee; the last is a beaver (?) Between two of the tepees is a slender rod from which depend three scalps waving in the wind. From a cross piece carried by two pairs of stakes depend several small objects not easily decipherable.* And here now appears the hero, mounted and seeming to be in all his war-paint and glory, armed with a spear and carrying the shield above mentioned. He is followed by three others, mounted, as three little horse-shoe shaped figures tell us; and they seem to have come from an expedition in which an Indian was slain and three whites slain and scalped—possibly those whose scalps adorn the encampment. It may be also that the scalp which decorates the bridle of the horse is that of the vanquished in the first scene. Lastly, it is to be observed that the eagle displayed appears under the last appearance of the hero, perhaps it may be his personal or family totem, and that the tepee on which it appears is his abode; but, if so, whose are the two others?"

I wrote to the Rev. Dr. John Maclean, of Halifax, a gentleman who spent some of the best years of his life among the Blood Indians in our Northwest, and who made a special study of their ethnology, asking his opinion with respect to the drawings on the skin. The following is his reply:—

"I am afraid to attempt a translation of the story on the buffalo hide, as it requires an expert, and should be placed in the hands of an Indian who will not be influenced in any way by a white man. Let

*Probably strips of buffalo flesh, being dried for preservation as pemmican. —D. B.

me suggest that you send a copy to: 1. The Indian Agent, Blackfoot Reserve, Gleichen, Alta.; 2. The Indian Agent, Blood Reserve, Macleod, Alta. Ask these gentlemen to have a translation made by one of the Indians, and sent to you. You may use my name, as these are personal friends of mine. Here, however, is my guess, which I would like to see compared with what the Indians say themselves:

I think it is an Indian warrior's autobiography, and noting the marks on the enclosed copy, there appear to be four events, or chapters.

1st. The Indian has alone attacked three lodges, whose totems are seen on the lodges, and he slew three men, taking their scalps.

2nd. Is an account of a hunting trip, where the hunter passed through a wooded district, and there was an abundance of antelope and other game, and he was successful in a buffalo hunt.

3rd. Is a record of battle with white men, where he was the victor in the fray, and slew three of his enemies.

4th. Is a battle with an Indian, whom he slew.

The name of the hero appears to be "The Snake."

My friend, the reverend doctor, modestly admonishes me to refrain from making known his translation, because, as he has said, "It requires an Indian free from the white man's influence to do the pictograph justice," but I have ventured to violate this request for the reason that it will not be easy to find an Indian of the required kind. But to compensate for this breach of honor, I have complied with his suggestion, that I should correspond with the two Indian agents whose addresses he supplies.

I have also asked that the Rev. Egerton R. Young, who spent many years among the prairie Indians, would be good enough to give us what he thinks the story might be, for there are few white men better qualified to do so than he is. He writes thus:—

"The pictograph is not a very ancient one, as the presence of the guns indicates. However, as there is a scalping scene, it is, perhaps, fifty or sixty years old.

The picture is a complete one, and represents the hard times for the Indians which came with the almost complete disappearance of the buffalo, as is seen in the fact that only one is left, and, in order to secure him, the hunter, after wounding him with an arrow, is obliged to use both gun and lance. Their lack of food is also represented by the lone prairie chicken in the right hand corner.

To read the story fully we must begin at the first wigwam in the left hand corner. This wigwam represents that the Indians were reduced almost to starvation, that is, they are only able to get prairie chickens, represented by the picture of one on the tent, and berries the sasketoomenah-nah-menisuck (blueberries) as shown by the bush outside the tent, have called in the Conjurer or medicine man, whose totem is the buffalo head, drawn on the tent, and also duplicated by the artist over it.

The second and third wigwams both indicate almost starvation, as the drawings on them are of birds or small animals, as in the case of the first wigwam the bird and prairie dog, or even gopher, are drawn over each tent to make it more emphatic.

Higher up we see two elks and two bears retreating from the prairies to the mountains beyond the reach of the hunters, as the prairie Indians do not go to the mountains. Thus the whole lower

half of the picture represents that these Indians are reduced to destitution.

The presence of the Conjuror is, doubtless, to encourage reprisals on the pale faces, whose invasion of the country, the Indians believe, has brought about such a sad state of affairs.

Vengeance is now to be taken. The snake with open mouth, the emblem of Indian war, secret and unexpected, shows that a warrior is on the war path. He is alone. He finds at last some white men. One white man was riding a horse. The other men had the covered waggon. That they were white men he discovered by the tracks of the horses as they were shod with iron shoes, as the tracks indicate. The warrior first kills the man on horse back and scalps him. He then makes an attack on the waggon and party, and succeeds in getting two more scalps, and drives the rest of the pale faces into the mountains.

Then, with the captured horse and scalps, he returns in triumph. On his way he kills the buffalo, to which we have referred. He first shows the scalps to the people. They are then hung up in triumph on a pole, while the buffalo meat is strung up on a framework near the wigwam to dry.

That it is the same warrior returning is shown by the fact that the great war shield is the same when the attack is made on the waggon as when the warrior is returning in triumph."

The following from Mr. W. Murison, Indian agent, Kutawa, Sask., is also interesting.

The work is, undoubtedly, of Sioux origin. I have shown the diagram to a number of the old Cree and Saulteaux Indians in this Agency, and they cannot give me any assistance in explaining the painting.

I worked for eight years amongst the Assiniboines, who are a branch of the Dakota or Sioux nations, and know that they are very fond of portraying interesting experiences in their lives in this manner, and from interpretations which have been given me of similar paintings I should think that the painting represents some experience of the Indian who did the work.

This Indian has, evidently, killed three persons, one of which was a white man, and, as the white man has a covered waggon, I should judge that he had his wife along with him.

Each feather on the Indian's head represents a scalp taken. Upon the arrival of the Indian at his Teepee he hangs the scalps on a pole to show that he is a great warrior.

The animals shown in the picture represent the results of his hunt, viz.: Two bears, two deer, a beaver and a buffalo.

The two crotched sticks support a pole upon which the meat is dried for future use. I note the picture of a rattlesnake. This represents a danger which presented itself while the Indian was out on the hunt. The Indians tell me that they had to keep a keen lookout for snakes while in camp. The snakes, they say, were attracted to the camp by the smell of the cooking meat. The smell from the intestines while being cooked would attract rattlesnakes from a considerable distance.

The fact of a white man being shown as a victim of the Indian prowess points strongly to its being of Sioux origin, as the Cree and Saulteaux do not boast of their fights with the white man.

Trusting that the foregoing may be of some assistance to you.

Yours truly,

Wm. Murison, I.A.

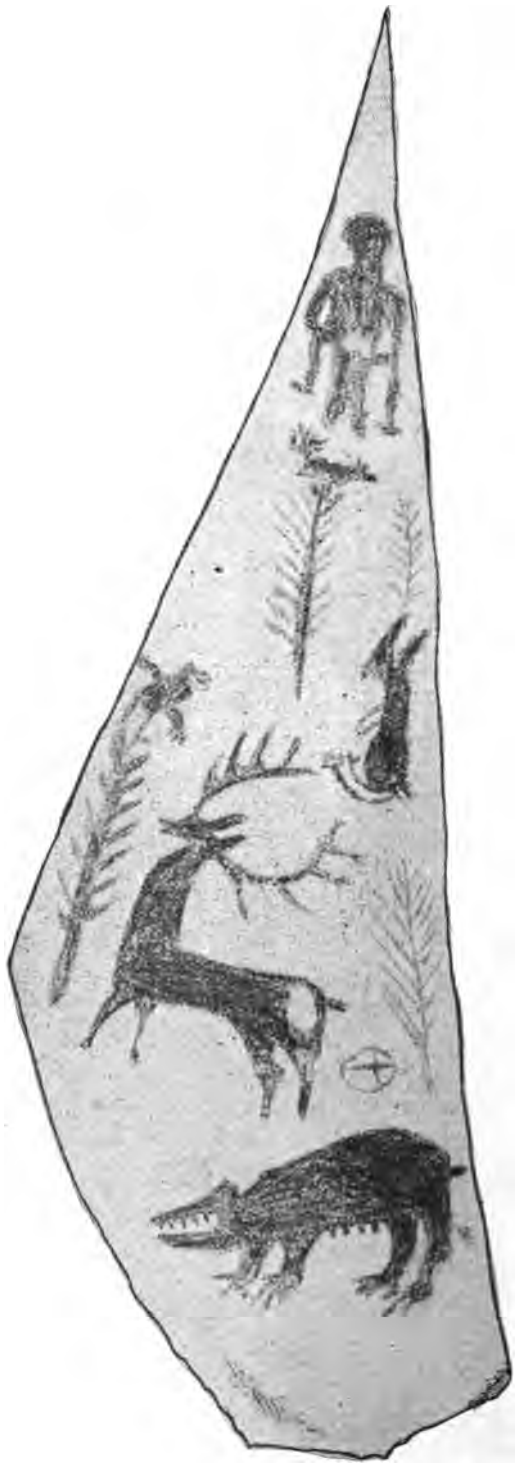


Fig. 41 (17810). Two-thirds size.

Figure 41 is a copy of Blood Indian (Northwest Territory) drawing on raw-hide.

Man, deer and bear seem to be the principal animals represented, along with some nondescripts, two of which may have been meant for birds on tree-tops. At first look these drawings might be taken for mere diversions, but further examination would appear to show a purpose—especially noticeable in the world-sign—the crossed lines within the circle.

The original drawings were made either with a black lead pencil or more probably a piece of crude graphite.

This specimen was presented to the Provincial Museum by the Rev. Dr. John Maclean, now editor of "The Wesleyan," Halifax, Nova Scotia.

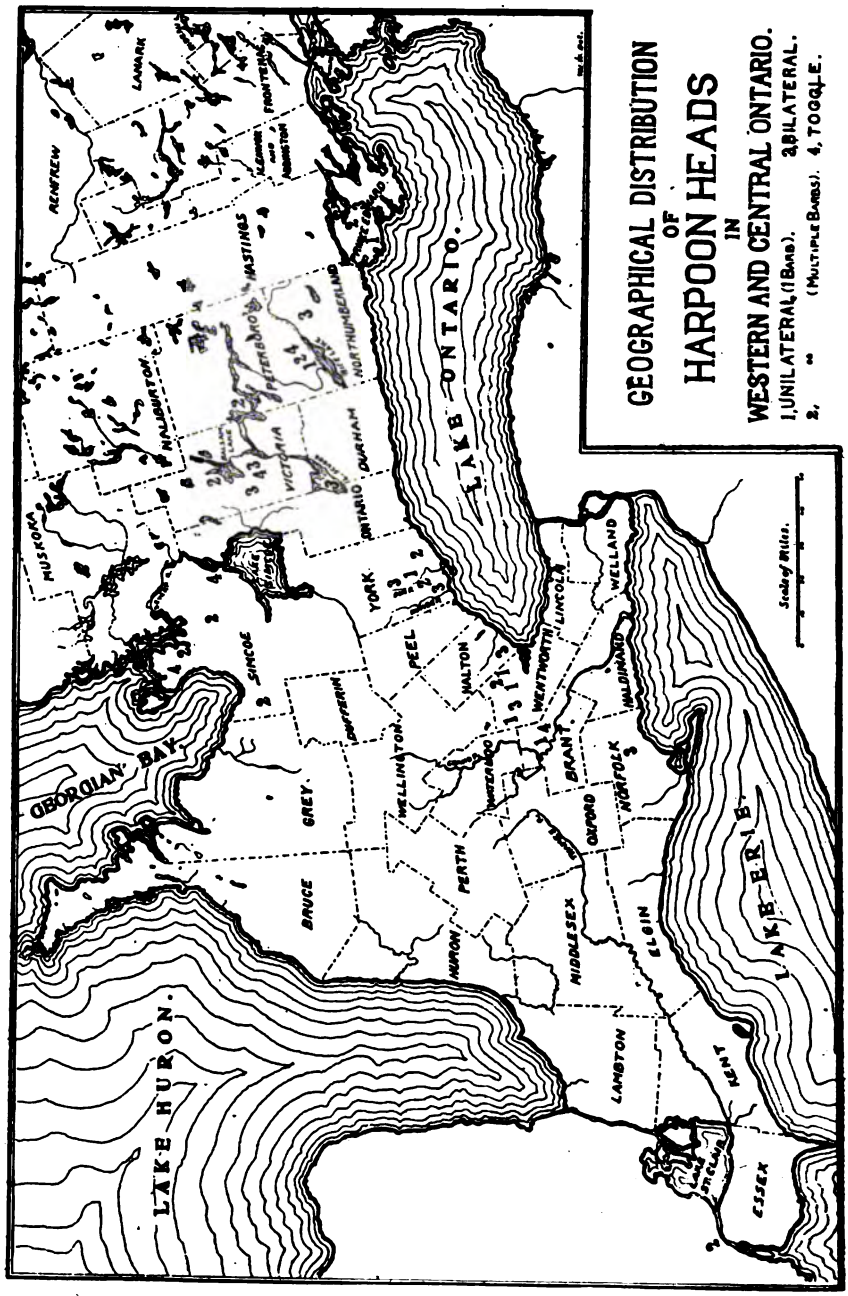
BONE AND HORN HARPOON HEADS OF THE ONTARIO INDIANS.

W. J. WINTEMBERG.

Introductory.

The fish-spear, or harpoon, was extensively used by many of the aboriginal inhabitants of North America. The first European colonists were astonished to see the abundance of fish in the rivers and lakes, and they found that the natives captured them in various ways —with hook and line, nets, weirs and harpoons. In the accounts given by these early colonists and travellers, we find numerous references to the use of the latter implement. Captain John Smith said: "They of Accawmack use staves like unto javelins, headed with bone; with these they dart fish swimming in the water" (p. 36). In his "Account of Two Voyages to New England," John Josselyn gave a very similar description: "The *Bass* and *Blew-fish* they take in harbours and at the mouth of barr'd Rivers being in their *Canows*, striking them with a fisgig, a kind of dart or staff, to the lower end whereof they fasten a sharp jagged bone (since they make them of Iron) with a string fastened to it, as soon as the fish is struck they pull away the staff, leaving the bony head in the fishes body, and fasten the other end of the string to the *Canow*. Thus they will hale after them to shore half a dozen or half a score great fishes" (p. 140). According to Roger Williams, "The Natives venture one or two in a Canow, and with an harping Iron, or such like Instrument, sticke this fish, and so hale it into their Canow" (p. 102). Loskiel, in speaking of the Delawares and Iroquois, said: "The Indians always carry hooks and small harpoons with them whenever they are on a hunting party" (Part I., p. 94). The Montagnais, we are informed by Sagard (p. 685), captured fish in two ways—"with a wicker basket or with a harpoon during night by the light of fire." The sturgeon harpoon of the Iroquois, as described by Charlevoix (p. 87) was secured to the canoe by a long cord. Le Jeune* describes the harpoon for spearing eels as "an instrument consisting of a long stick, of the thickness of three fingers, to the end of which they fasten an iron spike, which

*Relation de ce qvi, s'est passé en la Novvella France svr le grand Flevve de S. Lavrens en l'année, 1634; Relation des Jésuites, etc Vol. I, p. 44.



they arm on each side with a curved prong, both coming nearly together at the end of the iron point.* In striking an eel with this

*An Eskimo specimen in our Museum is very much like the harpoon here described. It consists of a wooden shaft, about two feet long, pointed with an iron spike, on each side of which there are two thin flexible pieces of bone, armed with iron prongs. These prongs curve downwards, their points almost meeting and coming close to the point of the iron spike. Dr. Boas in his "Central Eskimo" (6th Ann. Rep. Bureau of Ethnology) figures two very similar specimens (fig. 453 a, b).

harpoon, they drive the iron into it, and the two prongs, yielding to the force of the thrust, let in the eel, after which they contract again by themselves (having opened merely by the shock of the stroke) and prevent the speared eel from escaping. Perceiving an eel [the Indian] darts his harpoon without losing hold of it, pierces the eel as stated, and then throws it into his canoe. Some will catch three hundred, and many more, in a single night, but very few at other times."*

It was among the Eskimo, however, that the harpoon reached its highest development, calling into existence numerous accessories which were unknown to the Indians; but for detailed information about Eskimo harpoons, and also those used by the West Coast and Southern Indians, the reader must be referred to the books mentioned in the list of works consulted, the limits of this article not permitting the writer to quote any more of the numerous extant descriptions.

One is struck with the remarkable similarity between harpoons from Europe and America. As Sir J. W. Dawson said in his "Fossil Men," "The visitor to the British Museum may see bone harpoons from the caves of the Reindeer folk of France, so like those in the same collection from Greenland and Terra del Fuego, that all might have come from the same workshop." Mr. W. Boyd Dawkins, in his "Early Man in Britain" (p. 233) suggests that the Eskimo might be the descendants of the ancient cave men of France, and he bases his conclusions mainly upon the similarity between the carved weapons and implements and other art products of the two peoples. The resemblance between American and European harpoon heads would, perhaps, also tend to strengthen Prof. Dawkins' hypothesis. He says "there are no savage tribes known which use the same set of implements without being connected by blood;" but then, if this similarity, in so far as harpoons are concerned, is suggestive of racial affinity, how would we account for the resemblance of the Fuegian to Eskimoan and European forms, for they are all similar in form and function? His conclusions regarding the Eskimo and cave men, however, seem plausible.

It will be observed that many of the harpoon heads figured in this article resemble Eskimo specimens, and this similarity is strongly suggestive of Eskimo influence. In his "Notes on Primitive Man in Ontario," Mr. Boyle says: "On account of the extensive use of bone by the Eskimo, there is a strong temptation to refer many of our specimens of this kind to Innuit origin, especially as the resemblance of ours to theirs is often very marked. But, in this respect, there does not appear to be any more reason for so doing than there is for attributing the same origin to flints, vessels of soap-stone and some other things. Still, when we take into account the Huron-Iroquois tradition as to the former abiding place of the nation on the north shore of the gulf of St. Lawrence, we may at once concede the probability of strong Eskimo influences affecting the work of our Indians.† That bands of these people habitually found their way south and west of the Ottawa is extremely improbable, and it has not been shown that they ever resided here before the advent of our Indians. Anything, therefore, indicative of Eskimo influence may be accounted for as already mentioned, by the old-time contiguity of the peoples 'down

*Father Dablon said, "Some take as many as a thousand in a single night."

†According to William E. Connelley the Wyandots "claim to have known the Eskimo." Ont. Archæological Report for 1899; p. 93.

by the sea,' if, indeed, not the workmanship of the Montagnais-Nascopies, who, it seems clear, occupied a large portion of eastern Ontario at some distance back from the St. Lawrence."* But may not the Eskimo at one time have occupied Ontario, and even New York? It has been "claimed that the Northmen encountered the Eskimo in New England nine hundred years ago."† "From evidence based upon investigations by Doctor Rink, and the archæological indications noted by Mr. Dall and others," said the late Dr. W. J. Hoffman, "the Eskimo are believed to have become a littoral people in America by expulsion from some interior regions of North America, such expulsion having been brought about through the northward expansion of the Athabascan tribes toward the northwest, and the Algonkian tribes toward the northeast. Even within historic times the Eskimo occupied a more extensive coast line southward on the Atlantic than at present, and it is impossible to conjecture what may not have been the southern limits, in prehistoric times."‡

Among other evidences of Eskimo influence and contact, we have the semi-lunar knives of slate (of which there are several in the Provincial Museum) which are very much like the Eskimo "woman's knives." Our Indians also seem to have had a knowledge of the Eskimo toggle-joint. Several articles made of walrus horn have been found on New York Indian village sites, and there is a walrus horn§ from Balsam lake in our own Museum. These were no doubt obtained by bartering with the Eskimo or Nascopies.

"As for the fishes found in the rivers and lakes in the country of our Hurons, and particularly in the fresh-water sea," Sagard tells us, "the principal are the Assihendo . . . and trout, called Ahouyoche by them, which are mostly of extraordinary size, insomuch that I have not seen there any that were not bigger than the largest we have on this side. . . . The pike, called Soruissan, which they catch here also with the sturgeon, called Hixrahon, astonish people, for some are of marvellous size." (Vol. III., p. 693.) Pike of large size are frequently caught in many of the inland waters of Ontario, and sturgeon have been captured in the Grand River, as far north as Brantford, in recent years. Judging from the number of large veretebræ found on many Indian village sites throughout the Province, the salmon trout was also abundant. Ample use for harpoons, therefore, was to be found in the localities where harpoon heads have been discovered.

Most of our harpoon heads were no doubt fastened to the shaft in the same way as are those of the Eskimo. Figure 1 shows the barbed head of an Eskimo harpoon,¶ and a portion of the foreshaft and the connecting line. The wooden shaft and the foreshaft, a cylindrical piece of fossil ivory, are fastened together by a tenon joint, re-inforced by a whipping of thong. A plug consisting of two pieces of willow wood (B), with a small hollow in each, into which the tang of the bone head fits loosely, is inserted into the socket hole of the

*P. 72.

†"Southern Visits of the Eskimo," by Rev. W. M. Beauchamp; Proc. of Amer. Ass'n, 1894; Vol. 43, pp. 344-5.

‡"Graphic Art of the Eskimo." Report of the U. S. National Museum, 1895, p. 765.

§The walrus is known to have frequented the coast of Prince Edward Island within historic times, so it is also possible that the Ontario and New York Indians obtained their material from the Micmacs.

¶From Herschel island, at the mouth of McKenzie river, where it was collected by Rt. Rev. I. O. Stringer.

Fig. (1).

Fig. (2).

Fig. (3).

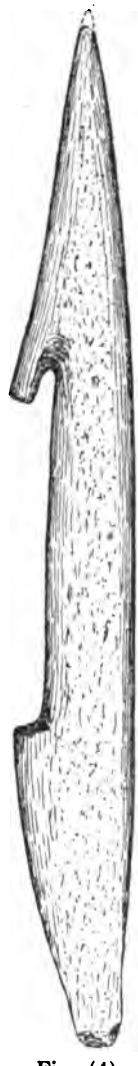


Fig. (4).

Fig. (5).
Half size.

Fig. (6).
Full size.

Fig. (7).

NOTE.—Figs. 5 and 6 are after Rau.

foreshaft (A). But if they were parts of retrieving harpoons, our specimens would have been fitted directly to the wooden shaft, in the same way as the Fuegian examples and the "fisgig" described by Josselyn, for nothing corresponding to the foreshaft has ever been found in the Province. The heads of all Eskimo retrieving harpoons are detachable, but here in Ontario, such an arrangement would, perhaps, not have been required, as it was unnecessary to let the harpoon leave the hand: the fish could have been captured in the way described by Williams, by sticking them, and then hauling them into the canoe or to the shore. The toggle-head harpoon, however, was intended to be thrown, and if our Indians used the more ingenious toggle-head, they would also have employed the simpler harpoon with detachable head; for the toggle-head type, it seems, is an outgrowth of the latter.

The eel spear described by LeJeune was unlike anything figured in this article, unless some of our unilateral specimens were fastened together to a shaft, as are two Eskimo examples shown in Nilsson's "Primitive Inhabitants of Scandinavia" (Plate IV., figures 75 and 76). While excavating on the Sealey farm, Brant county, a farmer found two unilateral harpoons lying so close together—the barbs facing—as to suggest the idea that they had both, perhaps, been fastened to a single shaft.

There are three types of harpoon heads. We will describe the specimens belonging to each type separately.

I. Unilaterally Barbed.

The simplest form of harpoon head is the unilateral with barbs along one side only. Specimens of this type have been found over a wide area in North America—in the following States and Provinces: California, British Columbia, Alaska, Alberta, Manitoba, Minnesota, Wisconsin, Michigan, Ohio, New York, Massachusetts, Maine and Nova Scotia. Heads of this type were also used by the natives of Tierra del Fuego, some of them being over fifteen inches long. Many of the Eskimo specimens are unilateral. A large number are found in New York, but very few in Ohio and Michigan. The Ohio specimens are mainly from near Columbus and Madisonville. Those from the former place were found in mounds. Some of the Wisconsin heads are made of copper. The Nova Scotian harpoons differ from ours in having strongly shouldered barbs. A five-barbed specimen from Lunenburg county, in the Provincial Museum, Halifax, of which Mr. H. Piers, the Director, kindly supplied me with a sketch, has all the barbs shouldered.* Figure 27*d*, in Dawson's "Fossil Men," shows a Micmac example from Nova Scotia, which has the notches, forming the barbs, cut out square, and in addition the edge is serrated for about three-quarters of the distance between each barb.

It is a matter for conjecture why these harpoon points should be barbed on the one side only. One would think that this might deflect the course of the harpoon during its passage through the air or water. M. Broca, the well-known French anthropologist, was struck with this feature, and in describing the harpoon of the cave men, said, "The use of its barbs was to catch and retain "the fish after it was struck;

* A harpoon head (fig. 239 in Rau's "Prehistoric Fishing") found in a grave at Fort Wayne, near Detroit, Michigan, very close to our western borders, resembles this specimen, the barbs all being shouldered; and this is the case with another Michigan specimen shown by Rau in his fig. 231.

but why," he asks, "were they all upon one side? To diminish the width of the dart so that it might penetrate more readily? I cannot say." And in a foot-note he adds: "One of my colleagues of the French Association, M. Lecoq de Boisbaudran, in a communication to the anthropological section, makes some very interesting remarks upon the mode of action of the unilateral barbs. While passing through the air, these barbs do not cause the harpoon to deviate perceptibly, but as soon as it enters the water, the unequal resistance it encounters must necessarily change its direction. It would seem, then, that the fisherman who aimed straight for the fish would miss it.* Now, it is well known that a straight stick appears to be broken [or bent] when plunged obliquely in water; in like manner, in consequence of the refraction of the luminous rays, the image of the fish is displaced, and if direct aim were taken at the image, it would also be missed. Here are, then, two causes of error. Now, it is evident that if they can be brought to act in opposite directions, they will counteract each other, and M. Lecoq shows, that when the barbed side is turned downward, the harpoon will reach its destination. This arrangement of the harpoon was then intended to rectify its course, which indicates great sagacity of observation in our troglodytes."†

The unilaterally barbed heads might be conveniently divided into two sub-types—those with a single barb and those with multiple barbs.

Single Barbed.

Figure 2 (14,806)‡ shows the most crude example in the Museum. It seems to have been made from a splinter of elk horn. With the exception of pointing it and forming the barb, very little work has been expended on it, the basal portion being left in its original condition. The tip and the barb are both broken as the result of decay. This specimen is 4 inches long. It was found by Mr. Boyle in the large Miller mound, near the mouth of the Otonabee river, Peterboro' county.

The specimen shown in figure 3 (20,032) is made from a fragment of elk horn, and is only partly completed, the reverse side being still in the rough state. Considerable cutting has been done to reduce the thickest portion, but much remains to be cut away. The base has been whittled until it is slightly rounded. There is a deep notch on one side, and about midway between the barb and the base there is another, but not quite so deep. Perhaps it was the intention of the workman to reduce the thickness between the barb and the notch so as to conform with others of the same type. Length, 5 inches. It comes from the Sealey farm, Brant county.

A fine specimen of horn, from the Sealey farm, is represented in figure 4 (25,513). It has one large prominent barb which is broken or cut off square. The tip is fractured, but otherwise it is a very well

*A friend, who has had some experience in spearing fish, informs the writer that if one aims directly at the fish he will miss it, but by aiming at a point some distance from where it appears to be (the distance, of course, varying according to the depth), the spear will not fail to pierce the fish. The Southern Indians also seem to have been acquainted with this fact, for Adair tells us that "If they shoot at fish not deep in the water, either with an arrow or bullet, they aim at the lower part of the belly, if they are near; and lower, in like manner, according to the distance, which seldom fails of killing." (Pp. 402-403.)

†The Troglodytes, p. 329.

‡The numbers enclosed in parenthesis are those in the Museum catalogue.

preserved specimen. It is 8 3-16 inches long and a little over one-half inch thick. One particular feature of this, as well as figures 7, 8, and 9, is the shouldered projection on the basal portion, which was no doubt intended to retain the cord by which it was fastened to the shaft. This is no uncommon feature on European specimens. We give figures of two well-known examples for comparison, figure 5 showing one from the rock-shelter of Bruniquel, France, which, although otherwise dissimilar, resembles figure 4 very much. It will be observed that the other, figure 6, from Kent's Cavern, Devonshire, England, is provided with an almost similar projection, but it is not so strongly shouldered. Figure 224 in Rau's "Prehistoric Fishing" shows one from Unalashka island, which also resembles figure 4 very closely, and some from British Columbia shell-heaps possess this feature.

The example shown in figure 7 (628) is also from Brant county. This specimen is made of elk horn and is 7⅜ inches long. It is perfect with the exception of the tip. The base is slightly beveled or wedge-shaped. It is flat on one side and rounded on the other. This head was no doubt fastened to the shaft in the same way as figure 4, the function of the more angular shoulder being the same as the projection.

Figure 8 (7,088) shows an unfinished harpoon head from York county. It is made of elk horn, and retains the cellular structure on the reverse side. The barb and point are quite sharp. The base is worked thin until it is wedge-shaped—no doubt so that it could be easily inserted in the socket hole of the shaft. This specimen is 5 inches long.

A large number of unfinished harpoon heads come from the Sealey farm, Brant county. The one represented in figure 9 (20,034), from this place, is of the same type as the preceding specimens. It has been very roughly cut out and reduced to shape with a hatchet or other sharp metal tool. Many of the cuts could have been made with an iron axe only, as they are long and deep, and clear cut. In forming the base, a deep cut was made on each side, and the undesirable portion of the material broken off. After the horn had been hacked into some resemblance to a harpoon, it appears to have been "shaved" or whittled with a knife until it assumed the desired form. Figure 9 shows all these successive stages, and is very interesting and instructive on this account. The barbed portion of these unfinished specimens is always completed, but in this example the cuts made with the knife have not been smoothed. The shaft near the base is somewhat gibbous, but this undoubtedly would have been partly reduced by the smoothing or polishing process. It is hard to say whether it was the intention of the workman to provide this one with a hole or not. Considering the stubborness of the material, it is really astonishing how much endurance was displayed in the manufacture of these implements. The length of this specimen is 8¾ inches. It is cellular on the reverse side.

Figure 10 (25,521) is another unfinished specimen of this type made of horn. It is 5 7-8 inches long and comes from the Sealey farm. The barb is broken.

In the specimen shown in figure 11 (20,033) we have a slight departure from the preceding forms, this one being shouldered on both sides, the shoulder extending across the cancellated side shown

in the figure. The other side is smooth. It is 8¾ inches long, and a little more than ¾ thick, thinning down to less than ¼ inch at the base. Like all the large harpoon heads, it is made of elk horn. It was found on the Sealey farm.

Fig. (8).

Fig. (10).

Fig. (9).

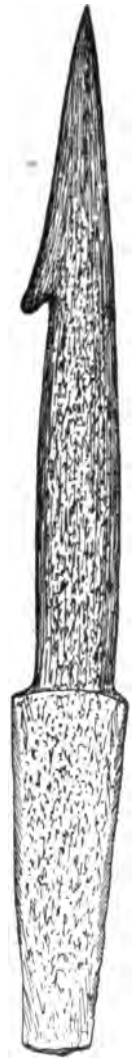


Fig. (11).

Fig. (12).

Figure 12 (25,514) shows a large, heavy, unfinished specimen of elk horn, 9½ inches long. It is from the Sealey farm. The illustration shows the rude state in which the specimen was left, the side shown still retaining the rippled or corrugated appearance character-

istic of deer and elk horns. The other side is cellular. The barb is well made, sharp in the axil, and has a moderately sharp point. The

Fig. (13).

Fig. (14).

Fig. (15).

Fig. (16).

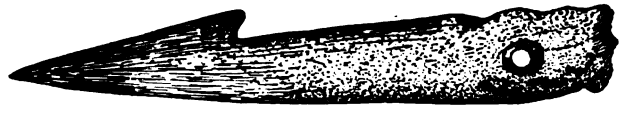


Fig. (17).

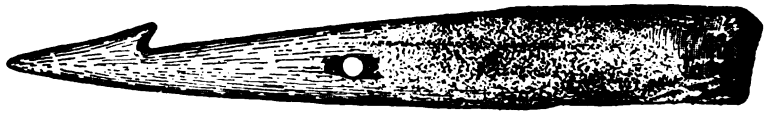


Fig. (18).

base is abruptly expanded. Perhaps it was the intention of the maker to have a hole through this expanded portion, as in many

others of this type. In his "Horn and Bone Implements of the New York Indians," Dr. Beauchamp figures two specimens (242 and 245) resembling this one, although the bases of his are not so expanded.

Another unfinished harpoon head is given in figure 13 (20,035). It is 9 inches long. The head or barbed portion is the only part that is finished. This specimen was found on the Sealey farm .

In figure 14 (25,601) is shown another specimen from the Sealey farm, and this is of the same, single barbed type. It is 7 3-8 inches long. As may be seen in the illustration, it is unfinished. The reverse side is flat. The basal portion gradually decreases in thickness toward the end. The point is obtuse, but the barb is quite sharp.

An elk horn specimen, 7 1-8 inches long, from York county, is shown in figure 15 (8,101). With the exception of the basal portion, which appears to be unfinished, this specimen is well made. The base has had some cutting down to reduce its thickness. The side figured shows the natural roundness of the horn, the lower one is flat. This specimen differs from the ones previously described in having a hole in the expanding lower part. It has been roughly gouged out on both sides, and is more diamond-shaped than round. The axil of the barb is acute and the point is quite sharp. The tip is broken.

The well made specimen of elk horn, of which an illustration is given in figure 16 (8,132) comes from Beverly township, Wentworth county. The basal end is considerably flattened and thinner than the shafted portion, and is strongly shouldered. The hole was made by two conical perforations meeting in the middle. The tip is broken. The axil of the barb is not very acutely angled, and the point of the barb is obtuse. Length nearly 8 inches.

A very simple form is shown in figure 17 (20,036). It comes from the Sealey farm. The hole has been drilled from both sides, the perforations meeting in the middle. The base has been slightly beveled on the side shown in the illustration, but otherwise this end of the implement is still in the rough state. It retains the natural corrugated surface of the horn, and the under side is cellular or cancellated. The barb is moderately sharp and the tip acute. On one of the edges, near the hole, are three shallow notches; and these undoubtedly facilitated the fastening of the line, or of the head to the shaft. The length of this specimen is $6\frac{3}{4}$ inches.

The specimen represented in figure 18 (629) is from Brant county, and is interesting on account of the position of the hole, which is at some distance from the base. It was drilled entirely through, and not from both sides, as is usually the case. In addition to the drilling of the hole, pieces of the horn have been gouged out on either side of the perforation. The base was cut with an axe and no further work has been expended on it, except, perhaps, a little whittling to reduce the thickness. The cut, as may be seen in the figure, is sharply beveled. The lower side of this specimen is flat. The barb is well made. Length 7 inches. Figure 232, in Rau's "Prehistoric Fishing" shows a very similar specimen from Madisonville, Ohio, but the hole is much nearer the base.

What may originally have been a head with two barbs is shown in figure 19 (7,895). It is from Lansing, in York county. This specimen is of deer's horn and is very crude. The base is much decayed and may have been much longer. The barb is broken and the tip is very blunt. There is an irregularly shaped hole near the base. The reverse side is slightly hollow. It is 4 5-16 inches long.

Fig. (19).

Fig. (20).

Fig. (21).

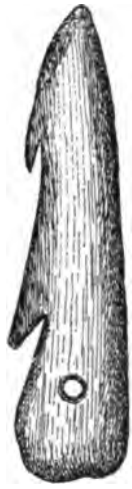


Fig. (22).

(Fig. 23).

Fig. (24).

Fig. (25).

Fig (26).

Fig. (27).

Fig. (28).

Figure 20 (20,145) shows a specimen from the Baldwin farm near Brantford. It may have had more than one barb, as a considerable portion is broken away. It is of horn and retains the natural hollow on one side. The hole is very near the edge and also close to the barb. The base is somewhat decayed, and it is difficult to say whether it originally was much longer or not. It is 6½ inches long.

Multiple Barbed.

The small specimen shown in figure 21 (14,805) is from the large Miller Mound, Otonabee river, Peterboro' county. It is of horn, and is a little over 3¾ inches long and about ¼ thick.

Figure 22 (16,743) shows an unusually squat form, made of elk horn, from Waverly, Simcoe county. It is 4½ inches long. The tip of this specimen is much decayed and the last barb is also quite blunt as the result of decay. There is a round hole through the basal portion.

The very nicely finished specimen of deer horn shown in figure 23 (17,983) was collected by Lieutenant Geo. E. Laidlaw in Bexley township, Victoria county. It retains the spongy or cancellated structure on one side, which is now somewhat flattened. The base has been brought to a rounded point so as to fit into the socket hole in the shaft. The hole is very roughly drilled. The barbs and their axils are quite acute, but the tip is obtuse. The length of this specimen is 5 5-16 inches.

The fragmentary specimen of bone represented in figure 24 (14,794) was found in the Miller mound, Peterboro' county, by Mr. Boyle. It retains the natural hollow of the bone on one side near the fractured end. The barb is unlike that of any other specimen in the museum. It resembles those on a specimen from Maine, shown by figure 237 in Dr. Rau's "Prehistoric Fishing." The axil of this barb is not sharp, but rounded, and the point does not project far beyond the edge. This fragment is a little over 2¾ inches long.

Figure 25 (18,043) shows a specimen from lot 1, North Portage Road, Bexley township, Victoria county, which was collected by Lieutenant Laidlaw. It seems to have been made from a portion of a deer's tibia, part of the articular end still remaining and forming the base of the specimen. Some rubbing has been done to make this end much thinner. Advantage has been taken of the natural depression on the side of the bone to form an irregular, oblong hole. The barbs are all somewhat rounded, and the tip is obtuse. A portion of the narrow cavity remains on the reverse side. The length of this specimen is 3¾ inches.

The smallest harpoon head (it is only 2¾ inches long) in the Provincial Museum is represented by figure 26 (22,017). It is perfect, and a very well made specimen indeed. All the barbs except one are acute, and the axils are rounded. The tip is quite sharp. The eye-hole is a little more than ⅛ in. in diameter. This specimen is made of deer horn and comes from lot 13, concession 2, East York township, York county.

In many respects the specimen, from Victoria county, shown in figure 27 (8,091) is similar to the one last described, although it is very much larger. This is a fine specimen, and, with the exception of two breaks, it is perfect. It is 6 5-8 inches long. The base is thinned down to an almost chisel-like edge. The hole is lenticular and

slightly countersunk. Axils of the barbs are squarely cut. The side showing the cellular or spongy structure is given in the figure. Both

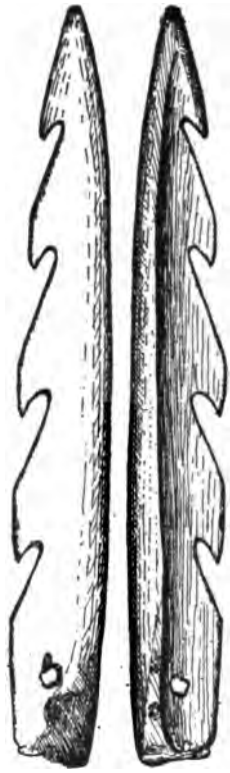


Fig. (29).

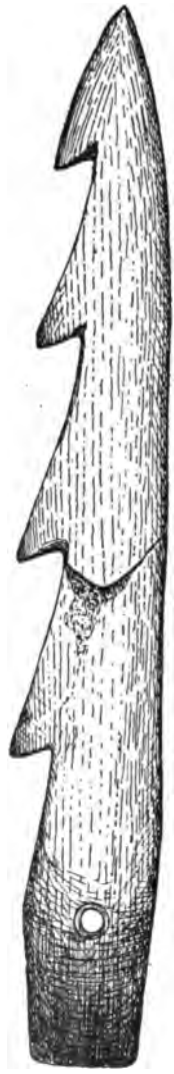


Fig. (30).

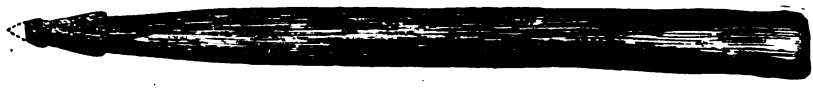
Fig. (31).

Fig. (32).

Fig. (33).

Fig. (35).

Fig. (36).



(Fig. (34).

this and figure 23 resemble Alaskan forms in having an oblong hole very near the edge. There is a fragment of a harpoon head (25,015) in the museum which has a round hole not quite ⅛ of an inch from the edge.

Figure 28 (8,104) shows one from Eglinton, York county, which is a very neatly made specimen 6 3-8 inches long. The barbs are well made and sharp, and the axils are rounded. The thickness of the base has been slightly reduced. The tip is somewhat injured and broken.

Both sides of a very well made specimen from lot 12, concession 7, Nottawasaga township, Simcoe county, collected by Mr. F. Storry, are shown in figure 29 (26,244). It is made of bone, one side still retaining a portion of the natural hollow or marrow cavity. This makes the barbed portion less than ¼ of an inch thick. It is nearly 3-8 of an inch thick at the back. Its length is 6 1-8 inches. The hole is very irregular, and more square than round. Some cutting has been done on the base to reduce its thickness. The barbs are slightly shouldered and are all quite sharp. The tip is not pointed, but is broad and chisel-shaped.

In figure 30 (25,053) is represented a very massive specimen made of elk horn, 8½ inches long and nearly 5-8 of an inch thick. The side figured shows the natural rounded surface of the horn; the lower one is flat. All the barbs are cut out square as if with a saw. Most of the barbs and the tip are quite sharp. Unfortunately, it is not known where this fine specimen came from.

For the sake of comparison with Ontario forms, we present in figure 31 (21,254) an illustration of a fgramentary harpoon, from the northeast shore of Lesser Slave lake, Alberta, Canada. This specimen must originally have been very large. Its present length is 4½ inches. It is made of deer or caribou horn and is very much weathered.

There is only one metal harpoon head in the Museum, and this is represented in figure 32 (9,829). It appears to have been made from an old iron knife blade. It is very much rusted. There is a small hole through the basal end. The third barb from the end is slightly shouldered. Length 5⅛ inches. It comes from Nottawasaga township, Simcoe county.

II. Bilaterally Barbed.

This type of harpoon head has a very wide distribution on this hemisphere, being found in use among the natives of Tierra del Fuego, and in California, British Columbia, Alaska, and among most of the Eskimo tribes inhabiting the polar regions between the latter country and the north Atlantic seaboard. Specimens of this type are also met with in Europe. The barbs on some of the British Columbian and Californian examples are large like those on harpoon heads used by the cave men of France. New York State furnishes many fine examples. Thirty of the forty-six specimens figured by Beauchamp in his Bulletin on "Horn and Bone Implements of the New York Indians" are bilateral. They resemble Ontario forms very closely. A fragmentary Hochelagan specimen represented by figure 26 in Dawson's "Fossil Men" is very much like some in the Museum here, except that the base is broader. They have also been found in the States of Vermont, Pennsylvania, Massachusetts, and Maine.

The writer was inclined to think that the bilateral type was, perhaps, the earliest form of harpoon head. Dr. Beauchamp, however, says (p. 294): "At one time it seemed probable that those with a double line of barbs were much earlier than the larger forms, but both have now been frequently found on sites not four centuries old," and further on he states that these two types have been discovered not only on the same sites, but in the same graves. Mr. George Allison, of Waterdown, Ont., has two bilaterial harpoon points in his collection, which were found on the Sparks' farm, Beverley township, Wentworth county, and from the same place he also has two specimens with unilateral barbs.

There are not many bilateral specimens in the Provincial Museum. We have only the eight described in this article. They are all smaller and more slender than most of those with unilateral barbs, and the largest is but 7 1-8 inches long. There is one from near the mouth of the Humber river, York county, in the Museum of the Geological Survey, at Ottawa, the length of which is 9 inches, and this is the largest Ontario specimen known to the writer.

It is hard to say whether these were intended to be used as fixed points, or whether they were detachable from the shaft. Not one of the Ontario examples is provided with a hole. Dr. Rau found this to be the case with all the bilateral harpoon heads from the United States, in the National Museum in 1884. He said, "It probably has been noticed that these pierced dart-heads have all unilateral barbs; those with barbs on both sides, it will be seen, are not perforated, but may also, in part at least, have been detachable. Perhaps it is only owing to accident that none of the bilaterally barbed heads at my disposition is perforated."* Dr. Beauchamp says that it is also his "experience in the examination of a great number of specimens. But one bilateral harpoon has been submitted to him with a perforation, and of this he had at first some doubts from other unusual features."†

Nearly all examples of the bilateral type in the Museum are more or less fragmentary, and it is usually the basal portion that is missing. This is found to be the case with many specimens from New York State.

Figure 33 (7,440) shows a specimen from Nonquon island, lake Scugog, Ontario county. It is made of horn. Length, 6 3-8 inches. The side shown in the illustration is round and the lower one is flat. The head of this specimen is sagittate, and there is an extra barb on one side. The base has been rubbed down to a blunt point, which is much more rounded on the under side than on the upper, as is shown in the section at the side of the figure. Collected by Dr. A. F. Chamberlain.

The bone harpoon point shown in figure 34 (7,089) was found in York county, north of Toronto. Part of the articular end of the bone is still intact, although considerably flattened by rubbing. Its length is 7 1-8 inches. There are two pair of barbs, and these are very blunt. This condition is undoubtedly due to decay. The tip is broken.

Figure 35 shows a broken bone specimen which was found by Lieutenant Geo. E. Laidlaw on lot 44, South Portage road, Eldon

* Prehistoric fishing, p. 150.

† Horn and bone implements of the New York Indians, p. 294

Fig. (37).

Fig. (38).

Fig. (39).

Fig. (45).

Fig. (40).

Fig. (41).

township, Victoria county. This specimen has three rounded barbs on one side and only two on the other. The tip is broken. Length, 3 1-8 inches.

The well made bone head shown in figure 36 (17,118) is triangular in cross-section, one side becoming convex as it approaches the point. The under side is flat. The base has been brought almost to a point. There is a shouldered notch on each corner of the triangular base, possibly to facilitate the fastening of the line by which it was secured to the shaft. There are three pair of barbs which are all moderately sharp. The tip is also quite sharp. A small piece has been broken off one side of the basal portion, but otherwise this specimen is perfect. Length, 3 inches. It comes from Percy township, Northumberland county.

Figure 37 (8,105) shows one from lake Medad, Nelson township, Halton county. It is made of bone, and is fragmentary. Its length is 2¾ inches.

Another fragmentary harpoon head is shown in figure 38 (7,091). It has three pair of blunt barbs. The tip is obtuse. This specimen is made of horn, and is 4 inches long. It is from York county.

Figure 39 (21,610) represents a fragmentary bone specimen from lot 12, concession 1, Fenelon township, Victoria county. It is elliptical in cross-section near the third pair of barbs, but, as shown in the illustration, one of the round sides becomes sharply ridged as it approaches the point. The barbs are blunt, but the tip is sharp. Length, 3 7-8 inches. Collected by Lieutenant G. E. Laidlaw.

Figure 40 (8,092) shows another bilateral specimen, and this one comes from near the town of Simcoe, Norfolk county; the most westerly point in Ontario where this type has been found. There are five pair of barbs, and they are not very sharp, and all are polished. The tip is blunt. The natural longtitudinal hollow on the side shown in the figure has been partly duplicated, from the tip to the last pair of barbs on the reverse side, by the primitive workman. This specimen is made of bone, and its length from the point to the fractured end is 5 7-8 inches.

III. Toggle-Heads.

Mr. Boyle's suggestion that the specimens illustrated and described below were possibly used as toggle-heads led the writer to make a study of those in the Provincial Museum. In comparing them with Eskimo examples, one is struck with the remarkable resemblance between them. A glance at the two toggle-heads selected from the Eskimo collection in the Museum, shown in figures 41 and 42,* will convince one that our specimens were used for the same purpose, and a comparison with some of the many figures given by Mason in his "Aboriginal American Harpoons" would strengthen this impression. The writer was surprised to read that similar specimens had been found in Europe. Figures 43 and 44, taken from Keller's "Lake Dwellings of Switzerland," show two specimens from a lake dwelling on Laibach Moor, Austria, which resemble the Ontario and

* Fig. 41 (22,188) is from the mouth of the Mackenzie river, and was collected by Rev. C. E. Whitaker. It is part of a harpoon used for spearing the white grampus. The one shown in fig. 42 (23,600) was obtained from the natives of Herschel island by the Rt. Rev. I. O. Stringer. It has two pairs of barbs. Both specimens are provided with steel blades.

Eskimo forms very much. They are thus described by Ed. Freih. von Sacken: "Pieces of antlers cut off diagonally, regularly sharpened, perfectly polished, and with a well-bored hole in the middle. Four specimens were found from 3 1-8 to 4 inches in length. The holes are bored in different positions, figures 14 and 20 [on pl. clxviii].* Some people have thought them to be the tops of gaffs, or fish spears, but from their excellent workmanship they probably are ornaments."†

The toggle-head harpoon is much more complicated than the barbed type. Figure 45 (22,187) shows an Eskimo model of one of these harpoons, from Herschel island. It consists of three parts, the head, the loose shaft, and the wooden shaft. When an animal is struck with this instrument the loose shaft is withdrawn in order to allow the head to toggle under the skin. It was only among the Eskimo that the loose shaft was employed; the Nascopie Indian harpoon has none, and those of the Pacific Coast Indians from California northward also lack this feature.‡ Our specimens were, no doubt, also used without the loose shaft, as nothing resembling this portion has ever been found in Ontario; and this leads us to think that possibly our Indians obtained the toggle-head idea from the Nascopies, rather than from the Eskimo.

The toggle-head, from lot 1, concession 6, Orillia township, Simcoe county, shown in figure 46 (26,960) is a well preserved specimen. It is slightly more than 4 inches long, and ¾ wide at the butt end, and is made of deer horn. The socket hole is 1 5-8 inches deep, and opens into the line hole, which was bored from both sides. There is the beginning of another perforation above this one, but a little to one side. It appears to have been the intention of the maker, at first, to have the line hole here, but for some reason or other, possibly because it was not in line with the barb, the boring of the hole was not completed. Another beginning was made below this one. There is a notch above the largest of these holes, near the butt end. Perhaps the maker intended to shorten the main portion of the head, so as to make the barb or spur much longer. The spur is 3-4 of an inch long, and is quite sharp. The whole specimen is considerably polished.

Figure 47 (25,592) represents an unfinished specimen of deer or elk horn. A conical hole ½ inch deep has been bored into the basal end. The spur is moderately sharp and bends slightly outward. The butt end has been whittled off with a slight incurve. Near the base are several kerfs or cuts made with an axe or other sharp cutting instrument. The point is whittled. Length, 4¾ inches. It comes from the Sealey farm, Brant county.

The specimen shown in figure 48 (8,093) is from block A, Indian Reserve, Otonabee township, Peterboro' county. It is 3½ inches long, and is made of a deer horn tip. The depth of the socket hole is 1 5-16 inches, and it extends a little beyond the line hole, as is represented in the figure by the dotted lines. In this example the lateral hole is bored in a different position. There is a shallow groove around the butt end. The spur is not very sharp. This specimen is very much weathered for over half its length, but the pointed end is still quite smooth and polished.

*Our figures 43 and 44.
†P. 610, Vol. II.
‡For descriptions see Mason, Powers and Schoolcraft.

In figure 49 (21,630) we have a specimen with two spurs. The kerf or notch on the side of one of these spurs leads one to think that the maker intended to remove it. The socket hole has been scooped out to a depth of $1\frac{3}{4}$ inches. The line hole is lenticular in shape and

Fig. (42).

Figs. (43 and 44).

(Fig. 46).

Fig. (47).

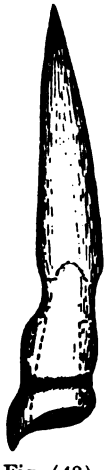


Fig. (48).

Fig. (49).

(Fig. 50).

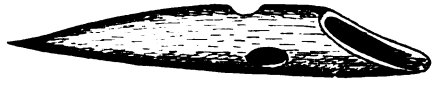


Fig. (51).

is countersunk on both sides. Length, 3 3-16 inches. It comes from lot 12, concession 1, Fenelon township, Victoria county.

Mr. H. A. Dean, of Toronto, kindly permits me to figure a specimen in his collection, from Tiny township, Simcoe county. It (figure 50) is much more slender than any of our specimens, and differs also

in not having the line hole drilled entirely through. It only goes as far as the socket hole. A piece has been broken out of the butt end, and this makes it somewhat gouge-like, but there is evidence of use subsequent to the break. Possibly the specimen was originally an arrow point, the break making it necessary to drill the hole so as to attach it more securely to the shaft. It is altogether likely, however, if the other specimens were used as toggle-heads, that this one was also employed as such. It is considerably polished. Length, 3½ inches.

The writer is also indebted to Dr. Beauchamp for permission to reproduce a sketch of his figure 79, representing an Iroquoian specimen from New York State, in figure 51. He says, "It is hollow and pointed, but the large perforations add new features. These are not opposite, nor is the base cut straight across as in the arrowheads. Its size is another thing, and it may have been intended for a dagger or a spear. It is from the Minden or Otstungo fort, and is of horn." He describes another specimen, which may also be a toggle-head: "Figure 108 is another fine example, smaller, but having much the same character. The base is neatly cut across, but is now gougelike on one side. The implement is of hollow horn, quite sharp, and perforated from side to side. . . . This was found at Brewerton by Dr. Hinsdale."*

Conclusion.

The accompanying map of the central and western portions of Ontario, gives the geographical distribution of the different types of harpoon heads contained in the Provincial Museum. By correspondence with collectors, in parts of Ontario not represented in the Museum by specimens, additional data were obtained, but much more information is desired.

It will be observed that there are large portions of the Province where no harpoon heads have been found. It seems strange that in the more easterly counties none have been discovered. One would think that, owing to the large number of small lakes dotting the country between the Ottawa and the St. Lawrence, there would be ample scope for piscatorial operations, and that harpoon heads would also be numerous. As far as can be ascertained, not one has been found in the Province farther west than the town of Simcoe, in Norfolk county. One was found at Fort Wayne, Michigan (*vide ante* p. 38, footnote) which, although beyond our borders,† we have indicated on the map. No harpoons have, so far, been discovered in the Niagara peninsula. Mr. George Oliver, of Jordan Harbor, Lincoln county, says he has never heard of any harpoon heads being found, although net sinkers are very abundant, which shows that net fishing was the principal means of capturing fish.

The different types are somewhat generally distributed. The unilateral specimens with single barbs are more numerous in the counties of Brant and Wentworth, some village sites in the former county being unusually prolific, nine specimens coming from one place alone. The multiple and bilaterally barbed heads, however, are not so plentiful in this part of the Province as they are farther

* Pages 291-292, "Horn and Bone Implements of the New York Indians."

† There were three or four towns of the Neutrals or Attiwandarons on the western side of the Detroit river.

eastward. Mr. G. J. Chadd, of Trenton, who has a large collection of Indian relics from Prince Edward county, writes that he has found the three types in Hallowell and Ameliasburg townships. It is possible that they may yet be met with farther east than this. The toggle-head specimens occur in widely separated localities.

Our specimens were nearly all found within the territory formerly occupied by the Attiwandaron, Tionnontate and Huron tribes of the Huron-Iroquois stock. In New York state the finds are also confined to the region once inhabited by the "Five Nations." Dr. Beauchamp says: "Few have been reported west of the Genesee river, and along the Susquehanna and Delaware they seem unknown.* According to Prof. O. T. Mason, "Both kinds (unilateral and bilateral) are most plentiful at the inlet of Onondaga lake, the outlet of Oneida lake, and near Chaumont bay, in Jefferson county. . . . The counties in New York yielding barbed harpoons are Jefferson, Montgomery, Madison, Cayuga and Livingston.†

Finally, as to the prehistoric or modern character of these harpoon heads, there can be no doubt that most of them were made during post-European times. Those from Brant county, especially, are not prehistoric, for they have been cut out with metal tools, and some from York county appear to have been made in the same way. Moreover, the specimens from the Sealey farm were found associated with such relics of European manufacture as iron tomahawks, brass kettles,, glass beads, etc. This, however, does not necessarily imply that the harpoon was introduced by the whites. On page 328 of his Bulletin, Beauchamp says: "The Iroquois made the unilateral harpoon of bone long after the whites entered New York, and the bilateral to some extent." He regards the unilateral head as "a recent form when of large size." The specimens from Brant county are nearly all much larger than most of those found farther eastward in Ontario. There can be no question as to the age of the harpoon heads taken from the Miller mounds near Rice Lake, as nothing suggestive of European contact was found by Boyle in these mounds. The bilateral specimen from Nonquon, or Noncon island, lake Scugog, might also be prehistoric, for no European relics were found with it; and even some of the other bilaterally barbed heads may have been used before the advent of the whites.

ACKNOWLEDGEMENTS.

Besides those mentioned in the text, grateful acknowledgements are due to the following gentlemen for information: Dr. H. M. Ami, of the Geological Survey of Canada; F. W. Waugh, of Toronto; T. A. S. Hay, Secretary Historical Society, Peterborough, Ontario; W. C. Mills, M.Sc., Curator and Librarian Ohio Archæological and Historical Society, Columbus, Ohio; Prof. O. T. Mason and Dr. W. Hough, U. S. National Museum, Washington, D.C.; and Dr. A. L. Benedict, Buffalo, N.Y.

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* Page 294.

† "Aboriginal American Harpoons," p. 235.

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THE MAKING OF A CAYUGA CHIEF.

Early last May I was honored with a special invitation from the Cayugas of Tuscarora Township, to be present at the ceremonies connected with the making of a chief Having formed somewhat lofty conceptions with respect to this ceremony, from the elaborate description which is given of it in Hale's Book of Rites, I fully anticipated the seeing and hearing of much that would correspond with his record.

Men, women and children, to the number of about fifty, met about two o'clock in the afternoon in the Cayuga longhouse, a very neat and commodious, though plain, building, within a short distance of the Six Nations post office. The men immediately concerned occupied the south-east corner of the building, and the proceedings began with the singing of a song by one of the chiefs slowly pacing meanwhile, east and west. This he continued for about twenty minutes, being seldom interrupted by responses from the others present. The music was not exhilarating by any means, and the frequent repetition of "Hi, hi," was especially noticeable. After one or two short addresses from other members of the tribe, a procession was formed in a very irregular sort of way, and set out for the Onondaga longhouse, about two miles distant. One was appointed to sing, and he kept up his song for fully half the distance, when another took his place. When within a few hundred yards of the Onondaga longhouse, we reached a point where an old stump by the roadside had been set on fire. Here a pause was made, and several of the leading men addressed those present, after which the procession was re-formed, and proceeded to the Onondaga building. By this time the audience had increased to nearly 150, so that the seats in the longhouse were uncomfortably filled, and a great many visitors had to remain standing, both inside and outside, close to the door. When everything was ready, one of the officials began to sing, walking backwards and forwards from end to end (east and west) of the longhouse, as far as he could do so on account of the large number of persons present, and what must have rendered his performance unusually fatiguing was the fact that the music was in no wise what could be called a march, for the steps did not keep time with the notes. This song was kept

up for nearly an hour and a half, and it is needless to say the "Hi, hi's"—which are said to signify 'attend' or 'take notice,' or 'hail, hail,"—formed a prominent part of the performance; on the conclusion of which the usual feast was indulged in.

Those in the longhouse, with few exceptions, seemed to be deeply impressed with the solemnity of the ceremony, and there was not the ghost of a sign of any impatience from the beginning to the end of all that took place.

It is needless to say that, after reading the highly, but probably not too highly, colored description already referred to, in the Book of Rites, the performance was extremely disappointing.

Most of the men and women present were dressed in their best; perhaps all were, but there were a few who did not seem to regard the occasion as one deserving of special significance, ceremonially. We must, however, bear in mind that the rites of the younger nations, of which the Cayugas are one, were not at all so elaborate as were those of the older nations.*

As it may interest some readers who have not easy access to the Book of Rites, to see Hale's translation of the ceremony of the younger nations, it will be found following this.

The Old Way of Making a Chief.

From The Book of the Younger Nations.

1 (*a*). Now—now this day—now I come to your door where you are mourning in great darkness, prostrate with grief. For this reason we have come here to mourn with you. I will enter your door, and come before the ashes, and mourn with you there; and I will speak these words to comfort you.

1 (*b*) Now our uncle has passed away, he who used to work for all, that they might see the brighter days to come—for the whole body of warriors and also for the whole body of women, and also the children that were running around, and also for the little ones creeping on the ground, and also those that are tied to the cradle boards: for all these he used to work that they might see the bright days to come. This we say, we three brothers.

1 (*c*) Now the ancient lawgivers have declared—our uncles that are gone, and also our elder brothers—they have said it is worth twenty—it was valued at twenty—and this was the price of the one who is dead. And we put our words on it (*i.e.*, the wampum), and they recall his name—the one that is dead. This we say and do, we three brothers.

1 (*d*). Now there is another thing we say, we younger brothers. He who has worked for us has gone afar off, and he also will in time take with him all these—the whole body of warriors and also the whole body of women—they will go with him. But it is still harder when the woman shall die, because with her the line is lost. And also the grandchildren and the little ones who are running around—

*The three elder nations consisted of the Caniengas or Mohawks, the Senecas and the Onondagas. The younger ones are the Oneidas, Cayugas and Tuscaroras. The Delawares, Tuteloes and Nanticokes were also included among the latter. The Tuteloes are now extinct, and the Nanticokes and Delawares are not numerous.

those he will take away; and also those that are creeping on the ground, and also those that are on the cradle-boards; all these he will take away with him.

1 (*e*). Now then another thing we will say, we three brothers. Now you must feel for us; for we came here of our own good-will—came to your door that we might say this. And we will say that we will try to do you good. When the grave has been made, we will make it still better. We will adorn it, and cover it with moss. We will do this, we three brothers.

2. Now another thing we will say, we younger brothers. You are mourning in the deep darkness. I will make the sky clear for you, so that you will not see a cloud. And also I will give the sun to shine upon you, so that you can look upon it peacefully when it goes down. You shall see it when it is going. Yea, the sun shall seem to be hanging just over you, and you shall look upon it peacefully as it goes down. Now I have hope that you will yet see the pleasant days. This we say and do, we three brothers.

3. Now then another thing we say, we younger brothers. Now we will open your ears, and also your throat, for there is something that has been choking you, and we will also give you the water that shall wash down all the troubles in your throat. We shall hope that after this your mind will recover its cheerfulness. This we say and do, we three brothers.

4. Now then there is another thing we say, we younger brothers. We will now remake the fire, and cause it to burn again. And now you can go out before the people, and go on with your duties and your labors for the people. This we say and do, we three brothers.

5. Now also another thing we say, we younger brothers. You must converse with your nephews; and if they say what is good, you must listen to it. Do not cast it aside. And also if the warriors should say anything that is good, do not reject it. This we say, we three brothers.

6. Now then another thing we say, we younger brothers. If any one should fall—it may be a principal chief will fall and descend into the grave—then the horns shall be left on the grave, and as soon as possible another shall be put in his place. This we say, we three brothers.

7. Now another thing we say, we younger brothers. We will gird the belt on you, with the pouch, and the next death will receive the pouch, whenever you shall know that there is death among us, when the fire is made and the smoke is rising. This we say and do, we three brothers.

7 (*b*). Now I have finished. Now show me the man!

Indian Adoption.

Before leaving this subject, it may not be quite useless to repeat what has been said on former occasions in our reports, viz.: that the adoption or complimentary receiving of white people into Indian brotherhood has no reference whatever to the "making" of such white people "chiefs."* It is a mere act of courtesy affair, and the ceremony

* On rare occasions the Indians themselves speak of making a man an "honorary chief," but, as far as I can make out, there is no ancient warrant for this use of language; the ceremony corresponds to giving one the freedom of a city, or making him a burgess now-a-days, which is very different from making him a councillor, or an alderman, or a bailie.

may be longer or shorter, as the Indians themselves determine, according to circumstances. Sometimes the ceremonial proceedings do not occupy more than a few minutes, and consist mainly in giving the person adopted a new name, and greeting him as a brother. At other times, short or long speeches are made. As the writer was adopted on Queen's Birthday (1892), when fully one thousand persons representing all the "nations" were present on the Ohsweken fair grounds, and as he is not aware that any description of such a ceremony has ever been written in detail, it may interest some readers to know just what is done on occasions of this kind. After several eloquent Indian speakers had addressed the crowd on the subject of loyalty to the "Great-Mother-across-the-big-lake," the proposed recipient of Indian honor was informed by Chief Dekanonraneh (a Canienga) that the people had decided to "make" the writer an Indian, and that he was to prepare himself for what was to follow. What did follow was the making of some more speeches by some half dozen chiefs, in which the audience was informed of what the writer had done for the purpose of investigating the former and present condition of Indian life, and stating to them that the old men of the various nations had determined to give him an Indian name, and ever afterwards to regard him as one of themselves. On being asked to express their opinion on this matter, the answer came in the form of a loud and somewhat prolonged whoop signifying approval. Several chiefs were directed to assist Skanawati (On-the-other-Side-of-the-River), commonly known as John Buck,* to act as master of the ceremonies, which were conducted on the platform erected for the Queen's Birthday speech-making. Skanawati himself then delivered an oration, part of which was given while grasping with his right hand the left hand of the candidate as they faced the people; after this there was a pause, during which the choice of a name was left to the old women of the assembled nations. This name was communicated to the candidate through Skanawati, who informed him that hereafter he would be known to the Indians as Ah-e-wa-no-neh, and Dekanonraneh translated this to signify "one who is sent on tribal business," or, as he added with a smile, "an ambassador."

It may be mentioned here that none of the "Nations" use the letter "r" very much, if at all, except the Mohawks or Caniengas, who are regarded as the oldest people of the confederacy; and as the about-to-be-made-Indian, on being asked to select his tribe, chose to become a Canienga or Mohawk, he was informed that on this account his name would take the form of Rah-re-wa-no-neh. He was also requested to choose his totem, and took that of the turtle.

The proceedings wound up with a few more speeches, followed by almost interminable hand-shakings.

EUROPEAN CONTACT AND THE INTRODUCTION OF DISEASE AMONG THE INDIANS.

When the Jesuit and other early Canadian missionaries visited various sections of this Province, they were very much annoyed to learn that, in many cases, the natives to whom they had ministered in other districts, took great pains to spread the report that wherever

* He was "Fire Keeper" of the Six Nations, and, as a matter of course, an Onondaga. The Fire Keeper's chief duty is to preserve and interpret the wampum records of the people.

the missionaries had hitherto been, many of the people became ill, and not a few of them died. Naturally enough the fathers concluded that such rumors were orginated and disseminated for "diabolical" purposes. Being in perfect health themselves, they were utterly unconscious of blame with respect to the carrying of contagion, and on doubt were firmly of the belief that the Indians were not speaking truthfully in attributing to them, the cause of so much illness and of so many deaths.

More recent observation has shown that in the making of such statements the Indians were, in all probability, confining themselves to fact. About seventy years ago, when a committee of the British House of Commons was appointed to investigate the condition of the aborigines in the Colonies of the empire, the following evidence was given by the well-known and universally respected missionary, the Reverend John Williams, as well as by others.*

"Q. Do you ascribe the diminution of the population of the Pacific Island groups to our people having introduced among them European vices and diseases?

A. Undoubtedly; but the very circumstance of coming in contact with Europeans will introduce a disease among the people; mere common intercourse, without introducing any vicious habits among them. I have known several instances of that.

Q. Do you mean the diseases of vice?

A. No; there is an island called Oparo or Rapa, about 1,000 miles south-east of Tahiti, where a disease was introduced by a ship, which I do not attribute to any vicious conduct on the part of the crew; but a disease was introduced there which reduced the population above half.

Q. What was the disease called?

A. I do not know; but it took the natives off with astonishing rapidity; a kind of fever; it seized them in their heads, they became delirious, and died in a very short time.

Q. Do you ascribe those effects to the commixture with native blood?

A. No; it is a very singular fact, that the mere circumstance of a ship's coming has in many instances brought diseases to the islands from South America and other parts.

Q. Do you mean that those were ancient European diseases, or were they engendered by the mere intercourse of the ship's crews, and the natives in a manner which you cannot account for?

A. Yes; it appears that the bare social intercourse† between the ship and the natives, produces a disease among the natives which carries them off in the way that I have described. It created a great sensation, and there was an investigation into it; the natives called it by the same term that they use for a musket, and we thought that this ship had been firing upon them, and we enquired into the affair,

* From "Evidence on the Aborigines, given before a Committee of the House of Commons," (Imperial) 1833-5. (published 1837) pp. 290-2.

†The Blackfellows of the Australian bush seem to have had some inkling of this "mysterious agency," as Mrs. K. Langloh Parker* informs us that "in olden times even to smell a stranger was considered a risk." As the immediately preceding references are to white people, we may infer that the word "stranger" here means a white man. In any case the natives had observed the serious results of contact with *outsiders*.

*The Ewahleyi Tribe, a Study of Aboriginal Life in Australia, by K. Langloh Parker, with an Introduction by Andrew Lang. Pp. 126.

but it was no such thing; a disease was introduced by which the people were carried off in great numbers.

Q. Are you aware that any medical investigation has ever been instituted into this very extraordinary fact?

A. No; we had no medical men among us, but it is a fact that can be substantiated by every missionary upon the island of Tahiti.

Q. Do you know whether the persons that came there were laboring under anything that would be considered an epidemic; and that they would have been liable if they had gone to any other place where the inhabitants were Europeans, to have communicated disease.

A. No; my conviction is this, that had they come to the island where I was residing nothing would have resulted. But there is a certain something in the first intercourse between Europeans and natives that introduces disease on the part of the latter. I do not know what it is, but that is a fact."

Darwin, in his Journal of a Voyage in the Beagle * refers to what he calls this "mysterious agency" and adduces several examples of its equally mysterious results, not only among human beings, but among lower mammals in different parts of the world.

"Besides these several evident causes of destruction," he says, "there appears to be some more mysterious agency generally at work. Wherever the European had trod, death seems to pursue the aboriginal. We may look to the wide extent of the Americas, Polynesia, the Cape of Good Hope, and Australia, and we find the same result. Nor is it the white man alone that thus acts the destroyer; the Polynesian of Malay extraction has in parts of the East Indian Archipelago, thus driven before him the dark-colored native. The varieties of man seem to act on each other in the same way as different species of animals—the stronger always extirpating the weaker. It was melancholy at New Zealand to hear the fine energetic natives saying, that they knew the land was doomed to pass from their children. Every one has heard of the inexplicable reduction of the population in the beautiful and healthy island of Tahiti since the date of Captain Cook's voyages: althought in that case we might have expected that it would have been increased; for infanticide, which formerly prevailed to so extraordinary a degree, has ceased, profligacy has greatly diminished, and the murderous wars become less frequent. The Rev. J. Williams, in his interesting work, says, that the first intercourse between natives and Europeans, "is invariably attended with the introduction of fever, dysentery, or some other disease, which carries off numbers of the people." Again he affirms, 'It is certainly a fact, which cannot be controverted, that most of the diseases which raged in the islands during my residence there, have been introduced by ships;† and what renders this

*Pages 411-12. Ward Lock & Co., London, New York and Melbourne.

†"Capt. Beechey states that the inhabitants of Pitcairn island are firmly convinced that after the arrival of every ship they suffer cutaneous and other disorders. Captain Beechey attributes this to the change of diet during the time of the visit. Dr. Macculloch says, 'It is asserted, that on the arrival of a stranger (at St. Kilda) all the inhabitants, in the common phraseology, catch a cold.' Dr. Macculloch considers the whole case, although often previously affirmed, as ludicrous. He adds, however, that 'the question was put by us to the inhabitants, who unanimously agreed in the story.' In Vancouver's Voyage, there is a somewhat similar statement with respect to Otaheite. Dr. Dieffenbach, in a note to his translation of this Journal, states that the same fact is universally believed by the inhabitants of the Chatham islands, and in

fact remarkable is, that there might be no appearance of disease among the crew of the ship which conveyed this destructive importation.' This statement is not quite so extraordinary as it at first appears; for several cases are on record of the most malignant fevers having broken out, although the parties themselves, who were the cause, were not affected. In the early part of the reign of George III, a prisoner who had been confined in a dungeon, was taken in a coach with four constables before a magistrate; and, although the man himself was not ill, the four constables died from a short putrid fever; but the contagion extended to no others. From these facts it would almost appear as if the effluvium of one set of men shut up for some time together was poisonous when inhaled by others; and possibly more so, if the men be of different races. Mysterious as this circumstance appears to be, it is not more surprising than that the body of one's fellow-creature, directly after death, and before putrefaction has commenced, should often be of so deleterious a quality, that the mere puncture from an instrument used in its dissection should prove fatal."

Even at this date it is only right to vindicate the honor, in at least one respect, of the simple-minded old Ouendat,* or Huron, who evidently told the simple truth as he understood it, and he understood it right, without knowing why any more than we do ourselves.

A good many years ago on meeting with Darwin's reference to the St. Kilda health conditions as above quoted, I mentioned the matter to my old and deeply respected friend Mr. John McLean, then Division Court Clerk in Elora, Wellington County, Ontario, perhaps mainly because he himself was not only a Highland Scotsman, but a man of wide information and more than ordinary intelligence. He was much pleased to see the subject referred to by so high an authority and stating that he had had a little of this experience in the Northwest himself, he looked up a passage in one of his own volumes, "Twenty-five years in Hudson Bay Territory," in which he speaks of certain Indian villages that were almost or entirely depopulated by the death of the natives from "acute *influenza*," I think he said to me, and he asks in his book, "What can be the cause of it? There has been no rum or small pox." Quoting this passage, which shows the open mindedness of the writer, I very deeply regret that the Rev. Mr. Morice has expressed himself in very deprecatory terms more than once in his latest book, "History of the Northern Interior of British Columbia," with regard to my old friend, Mr. McLean, who, in the opinion he wrote as above, simply felt as Darwin did that the health conditions were "mysterious," and as did also the great mis

parts of New Zealand. It is impossible that such a belief should have become universal in the northern hemisphere, at the Antipodes, and in the Pacific, without some good foundation. Humboldt says, that the great epidemics at Panama and Callao are 'marked' by the arrival of ships from Chile, because the people from that temperate region first experience the fatal effects of the torrid zones. I may add, that I have heard it stated in Shropshire, that sheep, which have been imported from vessels, although themselves in a healthy condition, if placed in the same fold with others, frequently produce sickness in the flock."

*The Wyandots, after the arrival of the 'Black Robes" saw many of their kith and kin take their departure through the Land of the Little People to the Great Northern Cave. To what other conclusion could t(he)y come than that the presence of the missionaries and the ailments of his tribe had some connection

Even the missionaries were quite unconscious as to the existence of bacteria and bacilli!

sionary of the South Pacific Islands, the Rev. John Williams, that the sickness was inexplicable, although he was quite sure it did not arise from the white *contagion* or *contamination*, as these words are commonly used.

Having known Mr. John McLean quite intimately for many years I cannot express myself too strongly by way of clearing his memory from the wholly gratuitous aspersion cast upon it by the Rev. Father Morice, of irreligiousness.

After quoting an account given by a diligent young priest, (Fr. Demers), relating to the immorality of the Carrier Indians, the Rev. A. G. Morice proceeds, that there is nothing exaggerated in this sombre picture, "the description given of the Carriers or Tekallies, by Mr. Demers," is attested by John McLean, who *little religious* as he seems to have been, wrote four years later. "The influence of the men of medicine, who strenuously withstand a religion which exposes their delusive tricks and consequently deprives them of their gains,—together with the dreadful depravity everywhere prevalent —renders the conversion of the Tekallies (Carriers) an object most difficult to accomplish." It would not be easy for any unprejudiced reader to find in this commendation of Catholic missionary work among the Carrier Indians, in the face of so many difficulties, anything to indicate a lack of religion. On the contrary, Mr. McLean's plain intention was to give the missionaries credit for what they had been able to accomplish among a people so depraved.

I can only say that whatever may have been the degree of non-sanctity that characterized Mr. McLean in those years, he never showed any evidence of such gross destitution of what Father Morice seems to regard as "religion" in his more advanced life. As far as is generally known, he was a Presbyterian in "good standing," regular in his attendance on "the means of grace," as church phraseology puts it and was wholly an exemplary man. In his conversation there was never the least betrayal of early "little religiousness," indeed he was looked upon by everybody as a "perfect gentleman." He was not a pious palaverer—not given to much speaking, but by no means was he an unthinking religionist, and would just as readily pass judgment on at pulpit crudity or insane platitude, as on a newspaper paragraph, or the vaporings of village gossip, which every one of his countrymen claims a prescriptive right to do, and exercises accordingly.

Whatever the conduct or utterances of Mr. McLean may have been which gave umbrage to the Rev. Mr. Morice does not appear, and as Mr. McLean's book was based on a state of affairs existing before or about the time that Father Morice was born, it is certainly somewhat a matter of wonder that the Reverend gentleman should speak of Mr. McLean as he does. Most assuredly John McLean did not lavish praise on Hudson's Bay Company's people—he has not given to this kind of language, and was no doubt a fault finder, or rather one who would not hesitate to point out faults when they existed, and it would be folly to contend that there were no faults in the management of the Company then, as well as at many other times, both before and since.

However, this may have been, knowing the man as I did. I cannot but take this opportunity to resent what I call Father Morice's

reflections on him. But as Mr. McLean is probably yet alive (he was until very recently, at over ninety years), and in British Columbia, there must be many of the Rev. Father Morice's neighbors, who can attest to the correctness of my estimate of the good old Argyllshire gentleman, whose memory is revered by so many who knew him and to whom this Dominion owes much more than it can ever repay, even if it would.

It is very pleasing to be able to vindicate to a very small extent, the character of my old friend, and to adduce his experience in proof of Darwin's contention, that disease of the kind under consideration is "very mysterious." Mr. McLean did not jump at conclusions. He observed closely and his observations forced upon him the conviction that the disease which was depopulating Indian communities was something unaccountable, something science had not yet recognized, and instead of saying, "Oh, it's easy enough to understand this—I know all about it, just as any one may, who knows how these people live," he *thinks* a good deal and comes to the conclusion that he cannot make it out at all. Admirable, canny old Scot. He asks himself, "What can be the cause of it? There has been no rum, no small-pox, no other disease that I can see or trace and yet the people die." This surely was laying no unholy imputation at the door of the missionaries, or even of their attendants, and should further proof be necessary to show that this so-called, unreliable irreligious and in every way bad man, John McLean, did not at all correspond with the statements made concerning him, by the author of the History of the Northern Interior of British Columbia, it may not be out of place to state that just about the time when he may be supposed to have been conducting himself so irreligiously and laying the foundation for being charged with want of reliability, he undertook a voyage to see his mother after an absence of sixteen years from "Home." He sailed from York Factory in a small sloop laden with fish-oil, and arrived at Plymouth after a remarkably quick passage and from that town he walked to Benmore in Argyllshire. On it being remarked to him that he had certainly made a dangerous and adventurous trip, his reply was, "I knew something about the vicissitudes before I left York Factory, but what would a son not do to see his mother, after an absence of sixteen years?" If this was not an example of the kind of piety that so often passes for religiousness it surely was filial piety.

It is not easy to believe that my respected friend, the Rev. Fr. Morice, would wittingly detract from the character of any worthy man and after examining the History of the Northern Interior of British Columbia with more than usual care, the conclusion seems inevitable that the author has confused my old friend with some other, and less worthy representative of the clan, *e.g.*, on page 171 we find, "A young man," writes Ogden, by name McLean . . . his father was killed in Red River . . . is in the Snake Country. Then Mr. Morice proceeds, "This single line gives us a clue to the innate disposition of the future New Caledonian. His father died a violent death; he was himself to meet with a similar fate, and most of his children were to die on the gallows—a doomed family indeed!" It seems quite certain that this can not by any possibility refer to John McLean, the author of "Twenty-five years in the Hudson's Bay

Company." I knew his son, John, very intimately, whose mother was an Indian, and never heard a whisper about any others he may have had, but as a matter of course it may be said that neither young John nor his father would be likely to mention that others of the family had died as Father Morice asserts, but I do know that that author did not meet his death in any such way, for I clearly remember seeing him when he left Ontario to spend the last of his years with a son-in-law, a well known legal practitioner in Victoria or Vancouver, B.C., where, for aught I know, he is yet living, and if so must be fully one hundred years old. His son, already mentioned, and his two extremely beautiful and refined daughters—the two latter in B.C.,— will no doubt be quite surprised to learn how suddenly and shamefully their father passed away, while they suppose they saw him die in the house of his son-in-law, without the ghost of any capital crime being suspected. It would therefore appear plain, that the reverend author of the "Northern Interior of British Columbia," has confounded two McLeans of totally distinct character, or else the references to them, in his book are so collocated as to lead readers to confound them. Either supposition although both are unforunate is more charitable than the ascription of intentionally malicious treatment, by the Rev. A. G. Morice, treatment of which it is quite certain, the reverend historian is wholly incapable.

Before the above was printed a typewritten copy of it was sent to the Rev. Mr. Morice from whom I have received the following reply. I am still of the belief that the Rev. gentleman's volume is likely to throw discredit on the memory of John McLean, my old friend, who was not at all a man of the kind indicated.

JOHN McLEAN AND FR. MORICE'S "HISTORY OF THE NORTHERN INTERIOR OF BRITISH COLUMBIA."

Mr. David Boyle is to be congratulated on the lasting character of his friendships such as is exemplified by the stand he takes against me, or rather two words of my "History of the Northern Interior of British Columbia," in connection with his "old and deeply respected friend Mr. John McLean." But, as usually happens when sentiment is too much in evidence, his judgment in this particular case is somewhat warped by the heat of his heart. On the other hand, if there is in the world a person who, to fulfill properly his mission, must be without likes or dislikes, I hold that this is the historian, and, conversely, the party who is the least apt to judge impartially is the "old friend."

Yet I confess that, in trying to answer Mr. Boyle's charges, I am at a disadvantage, inasmuch as many of those who may chance to read these lines, not knowing me personally, will be tempted to take into consideration rather the cut of my cloth than the weight of my reasons. Had my honourable opponent chosen another ground than an incidental remark bearing on a religious point on which to build his criticism, I would be quite at ease, as I am even now with regard to those people whose personal acquaintance I enjoy, and who know that I look on nothing with so much abhorrence as intolerance and bigotry. Indeed I do believe that if the incriminated history has found such favour with the reading public that a third

edition of it had to be printed within little more than a year of the first, this is due mostly to the author's lack of religious bias and general impartiality. As the reader is not bound to take my word without proof, I must be allowed to introduce myself with some sort of testimonials from disinterested parties. In order to show Dr. Boyle that I could not possibly have exercised the slightest influence over those who thus freely acknowledge my religious tolerance, I will choose only two taken from papers published at his door. Referring to the denominational subjects, I mention, the Toronto "News" wrote (16th July, 1904): "It is evident that the writer *justly* prides himself on his fairness and moderation." And again: "This characteristic is well brought out in his account of the work done respectively by the Protestant Highlander Alexander Mackenzie and the Catholic Highlander Simon Fraser." The same day the Toronto "Globe" printed the following: "The strongest impression produced by a perusal of this book is that of the fairness of the author in his treatment of themes usually approached with bias and handled with partizanship."

I think this is plain and to the point. Mr. Boyle himself is kind enough to recognize that I am "wholly incapable" of "intentionally malicious treatment" of a subject." Yet he "cannot express himself too strongly by way of clearing Mr. McLean's memory from the wholly gratuitous aspersion cast upon it" by me. He further refers to the "gross destitution" of religion which I attribute to him. Finally he wonders what the "conduct or utterances of Mr. McLean may have been that gave umbrage" to me and caused words from me which he must "resent," and from which "it is very pleasing to be able to vindicate" his friend.

In the first place, let me state that Mr. Boyle's warm heart has caused him to see a mountain where there is hardly more than a mole's hill. For, after all, what is my crime? Simply this: I show that John McLean, "little religious as he seems to have been," corroborated in his work the dictum of a Catholic priest! I never accused him of irreligiousness. I never even said that he was a "little religious." I simply remarked quite incidentally that he *seems* to have been, not irreligious, but little religious. How do I know that? exclaims Mr. Boyle. "As Mr. McLean's book was based on a state of affairs existing before [I] was born, it is certainly somewhat a matter of wonder that [I] should speak of Mr. McLean as" I do. This remark, under the pen of such an experienced writer as my honourable adversary, surprises me more than I can say. Does he suppose for a moment that, to be a reliable historian, you must have lived with the prime actors in the events you narrate? If so, pray let him quote a single reliable historian. Does he not know that for twenty years I have lived with people, some of whom have known his friend quite intimately? Is he not told in my Preface and can he not see throughout the book that, when I wrote it, I had at my disposal numberless unpublished documents dating more than twenty years before and after the appearance of his friend's own work? But I did not need these to form an opinion. McLean's "Notes of a Twenty-Five Years' Service" were quite enough for me, and though I protest that I have no intention whatever of further hurting Mr. Boyle's feelings, I fear that I cannot clear myself from what I con-

sider his uncalled for attack without entering into some details which must be more painful to him than the innocent incidental phrase of which he complains.

In the first place, is it a token of deep religious feeling to start an intrigue with "two very pretty young daughters," without minding the harm that may result for the heart of the maidens, as he confesses (p. 37) that he did with one of his friends? Is it evidence of much religion to stamp (p. 41) as "mummeries" the sacred ceremonies of the three-quarters of Christians? or to be constantly jeering at the "so-called Christian Indians" (p. 186), whom, though he knows them to be "immoderately fond of ardent spirits" (p. 188), he furnishes with so much liquor that one of them dies of it (p. 89), a circumstance which does not prevent him from giving afterwards "a small keg to the chief," who, of course, immediately gets drunk on it? Mr. Boyle may think differently, but I hold that his friend would with advantage have omitted his ever-recurring flings at the ministers of by far the most important Christian denomination. Nor can I bring myself to see much religion in his [McLean's] uncalled for statement that he "never had any great reverence for the (so-called) successors of St. Peter" (p. 209), meaning thereby, not the Popes of Rome, but the Catholic priests in general. Who ever called them so? Moreover, I hold that a truly religious man, who is not a bigot, must respect a Christian minister, to whichever sect he may belong. I respect Presbyterian clergymen, and I am proud to say that, on the very day when I received intimation of the displeasure I had caused in Toronto, I was honoured with a call from two such gentlemen who certainly had no reason to complain of the reception granted them. Then again Mr. McLean's book is full of covert sneers at a certain class of ministers of religion and their work, which other Protestant authors have eulogized beyond measure. To mention but the first volume of his work, see pp. 40, 144, 189, 215, 221. Perhaps some readers will object that these and other passages evidence rather bigotry than "little religiousness." Would Mr. Boyle have preferred the former word?

I repeat that I wish my honourable friend had chosen a different ground for this discussion, especially as he seems to have other grudges against me which he does not specify. Now I appeal to the judgment of every cool reader, when, quoting approvingly J. McLean, I said incidentally that he "seemed" to have been "little religious," did I warrant my present opponent to accuse me of having called him an "unreliable, irreligious and in every way bad man," a charge he now expressly lays at my doors? I am sure Mr. Boyle will see himself that his heart has had the better of his judgment, and that he has done me, unintentionally of course, an injustice. We are told that his friend is still alive. I do sincerely hope that he is not only alive, but still able to wield a pen. I will then easily show that, instead of "observing closely" and "not jumping at conclusions," as Mr. Boyle gallantly credits him with, he gives evidence in his book of unreliability in his descriptions and of hasty judgment in his estimate of the Indian make-up, both moral and mental.

The greatest *lapsus* I remember which can be put to the account of too big a heart is contained in the last page of my friend's criticism of my "History." He says that, having read it "with more

than usual care, the conclusion seems inevitable that the author has confused my old friend with some other and less worthy representative of the clan." He then refers to a letter which I quote (pp. 171, 175 of third edition). That letter mentions a McLean whose father was killed in Red River, on which I remark by way of comment that it "gives a clue to the innate dispositions of the future New Caledonian. His father died a violent death; he was himself to meet with a similar fate." Mr. Boyle then adds that J. McLean's daughters "will no doubt be surprised to learn how suddenly and shamefully their father passed away," and that if I do not confound two McLeans of totally distinct character, my "references to them in my book are so collocated as to lead readers to confound them." Wonderful, indeed, to say the least. Let us see the *corpus delicti* in the shape of my own printed pages. I state that John McLean —Boyle's friend—arrived at Stuart Lake, the capital of New Caledonia, in the fall of 1833 (p. 165). Though he never gives year dates, it is certain that he stayed but a short time in the district. In fact, he seems to have left it in he early spring of 1835. Now, that letter I quote concerning the McLean who met with a violent death, and which I say gives a clue to the innate dispositions of the *future* New Caledonian, is dated February 25th, 1837, and is recorded as such in my book! Therefore the McLean I then speak of must have gone to New Caledonia *after* Feb. 1837—on the other hand, I could not supply initials to the name, since I was quoting. How, I ask, can one, even without "more than usual care" take him for John McLean, whose arrival and stay in the country I had chronicled in a *previous* chapter? All disinterested readers, of course, recognize in that "future New Caledonian" the notorious character, Donald McLean, whose evil deeds and untimely end I duly record in the following chapters.

THE SWORD AND BELT OF ORION.†

[Told me by George Wright. Also told me by others of the tribe of Wyandots. The form here used is the first draft made by me after hearing the stories. It is, however, nearly that used by Wright. He was a fine thinker, and a poet by instinct, though entirely uncultured. He could read English, and could write, but his reading was very limited. He secured his stories from the old Wyandots in Canada and Ohio. He believed them implicitly, and, while he had in some degree accepted Christianity, he firmly expected to go through the great cave in the North to the Land of the Little People.]

The Sword and Belt of Orion.

William S. Connelley.

And so it seems that Dehn-dek of the Snake Clan married Ohtseh-eh-stah of the Clan of the Big Turtle. The village in which they lived was on the lake-side. The blue hills were behind it, and

†This beautiful Wyandot myth was sent to me by Mr. Connelley as illustrative of the belief that "The great cave, or yooh-wah-tak-yoh in which the Woman who fell from Heaven is supposed to dwell, is in the North," and that "every Wyandot had to go there after death, because it was the entrance to the underground way which led to the Land of the Little People."—D. B.

clear streams dashed down their sides under the green pines and tumbled into the flashing lake. Here the otter swam and the beaver built his house. Into their lodge in this village came a daughter who became very wise before her eighth year,—wiser than all the Oo'-kehs of that time. The beasts loved her. The snakes came when she called them. The fish rolled in the shining waves at the sound of her voice. The trees bowed their heads and talked to her with their leaves. The streams smiled when she looked into their dark depths, and the small streams sang to her as he played about their banks. Her name was Mah-oh-rah,—she who sees another (when she looks into the water).

A deep sickness fell upon Mah-oh-rah. The medicine of the Hooh'-keh cured her not, and that of the Oo'-keh from afar had no healing for Mah-oh-rah. They sang in the lodge, and said to Dehn-dek and Oh-tseh-eh-stah:

'She arises from the ground!
In a far land Mah-oh-räh walks before us!
She comes to the great city and stands before its gates!
Our Grandmother looks upon her! She who fell down from Heaven with Heh-noh lies upon her couch and beholds Mah-oh-räh!
She goes to the Land of the Little People; she goes through the old city in which our fathers were saved.
Get thee down in haste and bring her again to her own people.'

Dehn-dek was a mighty warrior. Enemies fled from the battle when he followed the war path. Skilled was he with the bow and strong with the war-club. And he could run more swiftly than the deer of the forest. The way was long from his village to the city—to the great yooh-wäh-täh-yoh in which dwells our grandmother. But Dehn-dek thought only of his daughter and the words of the Hooh'-kehs in his village. He came to the hills which stand above the city, and a man stood in the way to guide him beneath the huge stones which move to and fro and crash together with a mighty shock to crush the pilgrim entering the forbidden city. When the roof above him was descending to fasten him down forever, he saw the woman who fell down from heaven lying upon her couch by the gate, through which he had passed. Bearskins covered it, and smoke arose about it from the fire on the floor. And there blazed the torches given by Hehnoh, or grandfather; their flames leaped and curled along the rocky vault. Thick clouds rolled down the depths of the city, and dark waters roared and surged beneath the rocky floor. Red glowed the lights on the dark clouds and black vapors. Standing by her side were the three deer who bore Tseh-seh-howh-hoohngk over the whole earth when he went forth to make the world live again. They arched their necks, they tossed their proud heads, they shook their strong horns. They smote the stony floor with impatient feet. Behind them was the sledge which carried our father, lashed to their necks with many a thong.

When he drew near, Dehn-dek said to our grandmother:

'Give again into my arms the daughter gone now to the Land of the Little People!
She stood here in this hour, but is gone on the lonely way to that land.
Your children mourn for her; they cut themselves for grief!
Let her return with me to our own land.

Then the woman who fell down from Heaven said to Dehn-dek:

Mah-oh-räh stood indeed before me!
She was pale and faint from the journey!
The Hooh-kehs drew her back by their power!
She went out from my presence to return to her own people.
Two torches she bore aloft to make clear the way!'

Then was the roof rent with a great sound, and Dehn-dek saw Mah-oh-räh passing into the sky along the way of beautiful colors. She was as bright as the torches in her hands. Now did the grief of Dehn-dek overbear him. He thought only of his daughter and her loss to the village in the woods by the lake-side where his people mourned for her. He sat in the sledge, in the sledge of our father, did he sit down. He seized the thong which guides the deer. They fled with him swifter than lightning, to come up with Mah-oh-rah. As they rolled over the beautiful way, harsh thunder groaned above the great island. And Dehn-dek cried aloud to his daughter to return to him to go again to her people,—in his grief did he cry out. But she turned not from her course.

They did our grandmother say:

They go into the sky!
From that land are we cast down forever!
And another land is made for us.
Let them be made stars.
Now shall they be stars to shine forever there.
And their journey shall never cease!' "

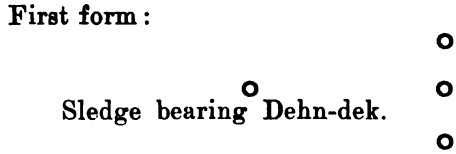
And from that hour the three stags, are the belt of Orion, driven yet in the cold nights of the northern winter by Dehn-dek in the sledge burning behind them, in pursuit of the daughter, we may yet see with her torches, forming the sword of Orion. Sometimes they go far away in the heavens; but they are again seen driving up the eastern sky in the old race. And this they will ever do till the Wyandots go to the land of the little people. Then shall he bring her to that land.

And when the warrior gazes there from the frozen woods or the woman from the icy streams by the village, they hear the thunder of the three stags in the fierce wind which shakes down the dark forests. And they say that Dehn-dek is riding the fiery stags down the sky to bring again to her own people his daughter Mah-oh-räh.

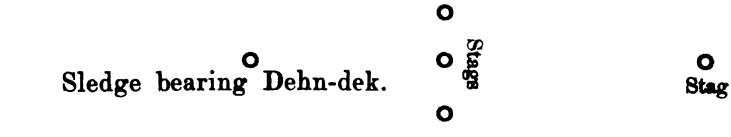
[The last two paragraphs are not in the language of the Indians, for they know no such name as Orion. I have only preserved the Indian idea in these paragraphs. I have not made a draft of this part of the legend because I was hoping to find the Indian names of the stars; in this, however, I have not been successful. Wright called the stars Dehn-dek and Mah-oh-räh. The Wyandots always pointed out the stars when telling me the story. Some versions say there were four stags to the sledge.]

(Below I give form of the stags and sledge, as pointed out to me.)

First form:



Second form:



ETHNOLOGY OF CANADA AND NEWFOUNDLAND.

In the following papers we have brief, general accounts of Canadian aboriginal people—something never before attempted in anything like a methodical and scientific way by writers who have made special studies of our Indians. For the suggestion of this idea, as well as for the carrying of it out, too much credit cannot be given Dr. Franz Boas, professor of ethnology in Columbia University, New York.

It is really remarkable to find so many otherwise quite intelligent people who regard all Indians just as Indians and nothing more. It is sometimes even supposed that there is an Indian language, so that when a Mississauga meets an Iroquois, or a Blackfoot a Micmac, conversation should be easy; and any differences that exist are thought to be simply those arising from degrees of savagery, or of civilization, or because of climate and environment.

Ethnologically it is fortunate for us that our so-called "red" brothers have afforded so many opportunities to study primitive conditions of life, in various circumstances, and under different skies, for in many respects the American Indian stands head and shoulders above most other aboriginal peoples, except perhaps the Maoris, and some South Sea Islanders.

It is quite true that among all primitive races there are similarities, and, not seldom, very strong ones, as there are among those who regard themselves highly civilized, but these coincidences exist because of our common humanity. We are all subject to like desires, wishes, hopes, and fears. Food is necessary, and we must provide it in one or more of numerous ways; yet, we are not all the product of one mould physically or mentally, and in the latter respect we differ much more from one another than in the former, individually, tribally, and nationally. To account for the cause of these divergencies is not always an easy task, even when the peoples concerned are geographically far apart; it is sometimes difficult to do so when they are neighbors; and in numerous instances, no reason is forthcoming.

Perhaps we shall never be able to explain all that is now so problematical, or to understand much of what remains in doubt, but year by year we seem to overcome what hitherto have seemed insuperable obstacles. The following essays are from the pens of living writers, and cannot fail to prove of great service to readers who desire to understand the relationship that exists among British American Indians from Vancouver to Newfoundland. It will be observed that the statements of the writers are sometimes at variance in matters of detail—this is inevitable when any subject is treated independently by various hands, but as a whole, readers have reason to congratulate themselves on the present opportunity to learn at first hand what are the opinions of so many acknowledged authorities on such an extremely interesting subject.

D. B.

I. HISTORICAL ACCOUNT.

By Cyrus Thomas.

At the time of the first post-Columbian contact of the Indians of Canada with Europeans, the country now embraced under this name was occupied by natives of several different linguistic stocks. These

groups were—following Major J. W. Powell's classification and nomenclature—the Algonquian, Iroquoian, Esquimauan, Athapascan, Beothukan and Chimmesyan families, the Siouan in part, the Kitunahan, Skittegatan, and the Salishan and Wakashan in part.

However, the dawn of Indian history in the Dominion of Canada dates back of Cartier's entrance into the St. Lawrence (1534) and even back of the appearance of Cabot on the coast of Labrador (1497). For the date of the first contact of the natives of Canada with people of the white race we must go back in the past to the appearance of the adventurous Northmen on the northeastern coast, which has perhaps a more important bearing in the study of prehistoric North America than is generally conceded. The recent re-examination by Storm, Reeves, Fischer, and others of the data relating to the discovery by the Northmen, has resulted not only in limiting the range of these adventurers along the coast of the New World, but also in determining more satisfactorily the localities visited. For example, it is now generally conceded that Helluland is Labrador; Markland, the Island of Newfoundland; and Vinland, or Wineland, the eastern part of Nova Scotia. The opinion formerly held that the natives encountered by Thorfinn Karlsefne in Vinland were Eskimo (Skrelings) is now considered erroneous; the two or three words uttered by them and the few characteristics noticed are not considered Esquimauan, but more likely Micmac or Beothukan—probably the former. If this conclusion be accepted, as now seems probable, then, to those who hold the theory that man's first appearance in North America was on the northwest coast in the post-Glacial era, this, and the additional fact that the Eskimo were most certainly met by the Northmen in Greenland, are positive proofs that these tribes or their ancestors had traversed the continent by the tenth century. Already the Eskimo had become an arctic people, had already skirted the northern coasts, and already adopted the customs suited to their habitats and mode of life. Already the great Algonquian stock had reached the Atlantic coast in its progress eastward. These facts must, therefore, form a basis of comparison and of time estimates in studying the traditions and early movements of the northern tribes.

The Eskimo, or Innuit, as they call themselves, have in the past occupied, and do yet in part occupy, a fringe of land along the Atlantic coast north of the Gulf of St. Lawrence; around the east and west sides of Hudson Bay; the Arctic coast and neighboring islands westward to Bering Strait, and down the northwest coast to the Alaskan Peninsula. They have seldom penetrated far into the interior, being essentially a littoral people, relying upon the products of the sea for food, clothing, and implements. From Alaska along the whole immense stretch of several thousand miles to, and including, Greenland, they all speak the same language, with but minor dialectic variations, and have the same general customs. They have always been a comparatively gentle and peaceable people, as is apparent not only from the reports of Arctic explorers, but also from the fact that they have always rendered assistance to these explorers when needed, and have never been known to attack isolated parties of whites who were not aggressors, however enfeebled by hunger, though these helpless visitors may have possessed many objects tempting to them.

We agree with S. E. Dawson (Can. and N. Fr. Stanford's Compend. N. Am. I. 67, 1897), in the belief that the general tenor of the

more reliable origin myths and traditions of the Indians of the Atlantic section of North America point to the northwest as the direction whence they came; the few traditions indicating movements from the east being comparatively modern and unreliable as indications of pristine habitats. Hence it has been in the past largely from the region north of the international boundary, as traditions testify, that the territory of the United States, especially east of the plains, has been peopled with a native population. It is our opinion that the Lenni Lenape started from the cold region north of the lakes on their migration to the south of the chain of great lakes and eastward to the coast; from whom offshoots were to branch out into New England and southward along the Atlantic coast to Pamlico Sound; that from the same region came the Iroquois, who sent offshoots to Virginia and the mountains of Tennessee and North Carolina. It was from the region north of Lake Superior the Chippewas of Wisconsin and Michigan came; and from the same region came the Miamis and Potawotomies; also the Winnebagoes and their southern offshoots. It was from British Columbia that the Athapascan offshoots made their way into Arizona and New Mexico, and it may be that from there also the Shoshoni group drifted southward. It is to Canada, since the white man gained control, that many of the remnants of tribes from New England and other parts of the United States have made their way in search of a final resting place.

Turning now to a brief consideration of the groups separately, we begin with those at the eastern extremity and move westward, somewhat along the lines of progress by the whites, to the tribes of the interior.

A small group consisting of a single tribe known as the Beothuks resided at the time of the Columbian discovery on the island of Newfoundland. These, probably first seen in post-Columbian times by Cabot, in 1497, and subsequently visited by Cartier in 1534, constituted, according to Major Powell's classification (Seventh Ann. Rep., Bur. Amer. Eth., 57) a distinct linguistic stock. It is probable that at the time of Cabot's discovery they occupied or had control of the whole island, but a century and a quarter later they had abandoned the southern portions, this change having been made on account of the frequent attacks upon them by the Micmacs and European settlers. They retired to the northern and eastern sections of the island; but their retreat was of no avail; pursued by the Micmacs, who took possession of the section they had abandoned, and warred upon by the European invaders, they rapidly wasted away, and by 1827 became extinct as a tribe. Possibly a few fled to Labrador to join the Nascapes.

The stock most widely distributed in the Dominion of Canada is the Algonquian, which extends (or did, before being gathered on reservations) from the Atlantic Ocean to the Rocky Mountains. In the eastern provinces were the Micmacs, Malecites, and Abnaki; in Labrador and eastern Quebec, the Nascapes, Mistassins, and Montagnais; in western Quebec and Ontario, the Missisaugas, Nipissings, and Ottawas, and the Chippewas in part; in Manitoba and the regions thence westward, the Chippewas in part, the Crees, and the Blackfeet group—though the Blackfeet have in recent years mostly drifted south of the international boundary. This widely extended stock, which was as widely-spread south of the boundary, was interrupted

about Lakes Erie and Ontario by the tribes of the Iroquoian stock, whose habitats were on both sides of these lakes.

At the time the first attempts were made to plant settlements along the Atlantic coast south of the Gulf of St. Lawrence, the Micmacs, called by the early explorers the Souriquois, were then inhabitating Nova Scotia and a part of the gulf coast of New Brunswick, also the neighboring islands. Their first contact with Europeans was probably at a very early date, as the Basque fishermen were in that region before Cartier's visit in 1534. However, continued intercourse with the whites did not begin until 1604, when Sieur de Monts attempted to plant a colony at Port Royal.

The French immigrants were kindly received by the natives, and allowed to settle on their lands without objection, and friendly relations were established between the two peoples which, notwithstanding the misfortunes of the colony, were maintained throughout, with a few slight interruptions. This friendship was largely due to the numerous marriages of Frenchmen with Micmac women. The history of these Indians for the next eighty years consists chiefly of wars with other tribes and the assistance they rendered the French in their contests with the English. The extinction of the Beothuks was largely due to the attacks of the Micmacs. The latter were, however, brought under the influence of the Catholic missionaries at an early day. The tribe seems to have been one tenacious of life, for, notwithstanding the vicissitudes through which they were forced to pass because of their exposed position, it appears from the later reports of the Canadian Department of Indian Affairs that they still number over three thousand persons—a thousand more than Biard's estimate in 1611. They are located in the Provinces of New Brunswick, Nova Scotia, and Prince Edward Island; nine-tenths of them being Roman Catholics. It is said that these Indians and some allied tribes had in use at the time they were first visited by Europeans a system of symbolic writing by means of which they were enabled to communicate with one another.

Other tribes of the Maritime Provinces are the Malecites, or Etchimins of early writers, and the Passamaquoddies, the two forming a sub-group of the Abnaki; to which sub-group the name Etchimin has been more correctly applied. These tribes formed an early attachment for the French, chiefly through the influence of their missionaries, and, with the other Abnaki, carried on an almost constant war with the English colonists until the fall of the French power in America. Although the other Abnaki tribes, as the whites encroached upon them, gradually withdrew to Canada, the Penobscots, Passamaquoddies, and Malecites remained in their ancient homes. The Abnaki, numbering some 400, are now at St. Francis and Beçancour in Quebec; the Malecites, numbering 800, in several villages in New Brunswick and Quebec; while the remnants of the Penobscot and Passamaquoddy tribes have homes in Maine.

The vast extent of territory embraced in the Labrador Peninsula has been thinly peopled in the past by semi-nomadic bands of Montagnais, Nascapes, Mistassins, and Swamp Crees, in addition to the Eskimo along the coast. The Montagnais group with whom the French came in contact at an early day, having joined Champlain in his first expedition against the Iroquois, was a confederacy of cognate tribes rather than a single integral body. These were the

Bersiamites, Tadousacs, Papinachois, Chisedecs, Ecoumains, and Nekoubanistes, though they were usually designated by the collective term Montagnais, or Lower Algonkins. Their linguistic relation appears to be closer with the Crees than with any other branch of the Algonquian family. The Nascapes appear also to be closely related to them.

The Montagnais are doubtless the Agouionda of Cartier, a name which he says the Indians of Hochelaga applied to those of Saguenay. They are spoken of in the first Jesuit Relation (Biard, 1611-1616) as friends of the French. Missionary labors among them were begun in 1615, and continued, with occasional interruptions, until 1776. They were at war at an early date, and probably in prehistoric times, with the Micmacs, and to some extent with the Eskimo; but their chief and inveterate foes were the Iroquois, who drove them for a time from the banks of the St. Lawrence, pursuing them to their strongholds about the upper Saguenay, compelling them to seek safety at more interior points. Sagard describes them as the lowest type of Indians in Canada, and Parkman says that they were the lowest and most degraded people of the Algonquian stock. They were to a large extent nomadic, unwilling, even under missionary influences, to settle down and cultivate the soil for subsistence. In 1812 they were estimated roundly at 1,500; in 1837, at 1,100; in 1884, the number officially reported was 1,395; in 1897, the Montagnais and Nascapes together numbered 1,741. At the last mentioned date they were gathered chiefly on the reserve at Lake St. John, Chicoutimi County, Quebec Province, the number at this point being 404. Although on a reserve and having a school with a competent teacher, they have made but little progress toward farming, still depending largely on hunting and fishing for subsistence, with such income as they receive as guides and for bark canoes, snow-shoes, moccasins, etc.

The Nascapes, the most northeastern Algonquian tribe, ranged over the interior of Labrador north of the Montagnais to Ungava Bay, and from Lake Mistassini to the Atlantic coast. Their usual habitat has been the interior tableland of the peninsula, it being only in recent years that they have visited the banks of the St. Lawrence. They have been, until very recently, semi-nomadic, their habits and customs being similar to those of the Montagnais. It is the general belief of the Nascapes that they were driven to their northern habitat by the Iroquois, who formerly waged war upon them. They have a definite tradition that their original home was west of Hudson Bay, and that when they reached northern Labrador they found the region uninhabited save by some Eskimo, chiefly along Hudson's Strait. It is possible that the Indians seen by Gasper Cortereal in 1499, seven of whom he carried to Portugal, were of this tribe, as the description given will not apply to the Eskimo. There was but little intercourse between them and the French.

Although the Iroquois played such an important role in the history of Canada, holding for a time the balance of power between the French and English, and certainly had their pristine home north of the lakes,* and have in part found their final resting place in Canada—yet, in the limited sense of the term *Iroquois*, the six (originally five) confederated tribes do not belong in historic times to Can-

*See page —— and following.

ada, but to the United States. The long and cruel war carried on by them against the French of Canada and their Indian allies has been so often written up and is so well known as not to require repetition here, did our space permit it.

It may be assumed as probable that, like other groups of the Atlantic section, they came originally from the northwest, as part, at least, of the Iroquoian family was located at an early day chiefly in the pensinsula north of Lake Erie. If credence is to be given to the tradition that they, or a part of the group—possibly some of the Iroquois—moved at an early date up the St. Lawrence from near its mouth, this may be explained by the supposition that some division pressed on in advance of the group to the gulf coast in search of a bountiful food supply. It is probable that, while the group was located chiefly in the region immediately north of Lake Erie, which section became the Huron country, the Cherokees, and possibly the Eries also, broke away from the parent stem and moved south of the lakes into the region now embraced in Ohio.

It is true that the people of Hochelaga, visited by Cartier in 1534, were of the Iroquian stock; but Mr. Hewitt concludes from his close study of the languages and history of the group that the evidence does not sustain the general opinion that a part of the Iroquois proper were living north of the St. Lawrence River at that time. The people of Hochelaga were most likely Hurons, or possibly one of the smaller cognate tribes. Seventy years later, when Champlain appeared on the scene, the Hochelaga and Stadicone of Cartier had disappeared, and Algonquian tribes were in possession of the St. Lawrence valley.

Although the Iroquois had battled so long and so persistently against the French while they retained the power in Canada, yet it was chiefly in this section that they sought a final retreat when conquered by the United States troops under Sullivan. Their number at present in the Dominion—chiefly at the Bay of Quinte, the Thames and Grand River, Ontario, and Caunawaga, St. Regis and Lake of the Two Mountains, Quebec—amounts to something like ten thousand persons (9,671 in 1897).)

The tribes of the Iroquoian family in this region, other than the Six Nations, were, at the time that Europeans appeared on the scene, as follows: The Hurons, occupying the section immediately north of Lake Erie and from Lake Huron eastward well toward Niagara river. Immediately east of them was the little tribe or sub-division named Tionontatis, known also as the Patun or Tobacco nation; east of these and occupying both banks of Niagara river the Neuter tribe, so named from their effort in their intermediate position to remain neutral in the war waged between the tribes on the opposite sides of them.

The saddest episode in the history of the Indians of Canada is that of the relentless warring upon the Hurons and, incidentally, the other two small tribes, and their final ruin, by the Iroquois. Not satisfied with massacring many of their people, and driving them from their homes, these relentless victors followed them into their retreats, forcing the scattered remnants to retire still further into the interior. During the strife the two smaller bodies—the Tionontatis and the Neuters—were entirely destroyed, becoming extinct at an early day.

Not only had the Huron towns been destroyed, and the nation scattered in fragments to the east, west and south, but the Indian

country all along the waterway from Montreal to Georgian Bay had been literally depopulated and turned into a wilderness. Moreover, we may add with Justin Winsor, "the Huron country never again knew the traces of this people, and only the modern archæologist, wandering between the latter-day villages of an alien race, finds in the forest the evidences of the former occupants" (Cartier to Frontenac).

The remnants of the Hurons, who are known, in part, as Wyandots or Wendats, are as follows: Hurons at Lorette, Province of Quebec, Canada, 456; Wyandots in Indian Territory, U.S., 365.

The area north of Lake Erie, from which the Hurons were driven by the Iroquois, was subsequently in part taken possession of by the Mississaugas. The people of the latter tribe, when they first became known to the French—about the middle of the seventeenth century—were located on Mississauga river north of Lake Huron, and in part on Manitoulin island. Not long subsequent to this date they moved east and south, taking possession of the region abandoned by the Hurons, and soon spread over the peninsula of southern Ontario from Lake St. Clair to the outlet of Lake Ontario. They also made raids to some extent on the Iroquois in New York. About the close of the revolution they had one village on the south side of Lake Erie, near Conneaut, Ashtabula county, Ohio. The land on which the Iroquois are now settled at Grand River, Ontario, was bought from the Mississaugas. In 1746 they were received by the Iroquois into their league as the seventh tribe, though not, as it seems, with the full privileges and rights of the other six tribes. However, this alliance lasted only until the French and Indian war, a few years later. The Mississaugas are closely related to, and seem to have been originally a part of, the Chippewas. In 1897 the population officially reported was 1,109, residing at Mud Lake, Rice Lake, Scugog, Alnwick, and New Credit, Ontario.

The Nipissings, though forming a comparatively small and unimportant tribe, are brought into early notice from the position which they occupied on the lake of the same name at the head of Ottawa river, the early travel-route to the upper lakes. Champlain met with them in 1615; Jean Nicolet was next among them for some time previous to 1632; and in 1637 they were visited by the missionaries, Garnier and Chastelain. In 1650 the Iroquois penetrated to their habitat, and, having massacred a large number of them, forced the others to seek safety in a more northern region. They chose as their retreat the shores of Lake Nepigon, where they remained until 1667, when they returned to their former home about Lake Nipissing. Their reputation as practicers of magic gave them the name of sorcerers which is frequently referred to by early writers. They have no history separate from other related Algonquin tribes of the same northern region. The chief remnants of the tribe are living on the reservation at Lake Nipissing. These, numbering about two hundred, are all Roman Catholics, and have an excellent church. They also have a school, usually taught by a female teacher.

The region about the northern end of Lake Huron seems to have been an important locality to the natives in the prehistoric era, a meeting point of the tribes. It was the chief crossing place from the north to the south side of the lakes in the early migrations. It was here that more than one of the original groups separated into tri-

bal divisions which started hence on their individual life history. It was here, also, that a number of these divisions which had not wandered away to other sections still lingered at the coming of the whites. It was in this region, as we have seen, that the Mississauga first became known to the whites.

Another minor Algonquin tribe of this section was that known as the Amikwa, or "Beaver Nation," found by the French on the north shore of Lake Huron opposite Manitoulin island. Bacqueville de la Potherie says that they and the Nipissings once inhabited the shores of Lake Nipissing, and that they made themselves masters of all the other tribes of that section until reduced by disease, and the Iroquois compelled the remainder of the tribe to retreat, some to the French settlements, others to Lake Superior and Green Bay, Wisconsin. In 1740 they settled on Manitoulin Island.

According to the traditions of the Ottawa, Chippewa, and Potawotomi tribes, the three groups are descended from the same stem and were formerly united as one people at some point north of the lakes, apparently north of Lake Superior; whence the Ottawa and Potawotomi tribes, and the Chippewa in part, migrated southward. They separated in the region of Mackinaw, the Potawotomis and southern Chippewas going west into the section now embraced in Wisconsin, while the Ottawas turned to the southeast. The earliest mention of the latter places them on Manitoulin Island, Lake Huron, and along the northeast coast of this lake. They were among the first of the western tribes to navigate Ottawa river on trading expeditions to the French settlements, and it is probable the river received its name from them. They were allies and firm friends of the French and the Hurons.

The Iroquois, having destroyed the Hurons in 1646, and still thirsting for blood, turned their arms against the Ottawas, who fled, with a remnant of the Hurons, first to the islands at the entrance of Green Bay, Wisconsin, where they were kindly received by the Potawotomis. A few years later they moved westward, a portion going to Keweena Bay, where they were found by Father Menard in 1660. Another portion fled, with a band of Hurons, to the Mississippi, and settled on an island, at the entrance of Lake Pepin. Driven thence by the Sioux, whom they had foolishly attacked, they moved to Chequamegon Bay. Harrassed here by the Sioux and being assured of protection by the French, they returned in 1670-71 to Manitoulin island, a former home. Their stay here was short, as by 1680 most of them had joined the Hurons at Mackinaw about the station established by Marquette in 1671. The two tribes lived together until about 1700, when the Hurons removed to the vicinity of Detroit. About the same time a portion of the Ottawas seem to have settled on the east coast of Michigan between Saginaw Bay and Detroit. The band which had moved to Southeastern Michigan returned to Mackinaw in 1706. Soon after this the chief seat of the tribe was established at L'Arbre Croche, Michigan. From this point they spread southward to various places in this state.

The Ottawas were strong adherents to the English interests, as against the United States; and a small part of the tribe which refused to submit to United States' authority removed to Canada and settled on Walpole island in Lake St. Clair. The other Ottawas in Canada are on Manitoulin and Cockburn islands, and the adjacent shores of

Lake Huron. As early as 1859 those in Canada had mostly become agriculturists, living in good comfortable log cabins; and most of those in Michigan have become citizens.

Originally the Ottawas were divided into four bands—the Keinouche, Kiskakon, Nassauaketon, and Sable, though it does not appear that there were any differences in the language spoken by these divisions. The total number of Ottawas at present is about 5,000, of whom one-fifth reside in Ontario, Canada.

Of the other two tribes, the Potawotomi and the Chippewa, of the confederated group mentioned above, we have only to refer here to the latter, as the Potawotomi, although originally on the Canadian side, have in historic times made their home chiefly south of the lakes. The Chippewas, or Ojibwas, at the time of their greatest numerical strength, formed the largest single tribe of Indians north of Mexico. Their former range was the region bordering Hudson and James bays on the north and Lakes Superior and Huron on the south, and also the southern shore of Lake Superior. The region immediately about Sault Ste. Marie seems also to have been a favorite resort and food-gathering point for them. The first knowledge of the tribe obtained by the French related to those residing at these falls, from which fact the name "Saulteurs" or "Falls Indians" was often applied to them, and also occasionally to the entire tribe. Their tradition seems to point to the shore of Hudson or James' Bay as their pristine home.

It is possible that Nicollet met with them in 1634 (or 1639); however, the earliest recorded notice of them is that in the Jesuit Relation for 1640, where they are mentioned under the name Baouichtigouin, as then residing at the Sault. In 1642 they were visited by the missionaries Raymbout and Joques, who found them at the Sault engaged in a war with a people to the west, apparently the Sioux.

Although the Chippewas have, since they first became known to the whites, been strong in numbers, spreading over an extensive territory, they have not occupied a prominent place in the pioneer history of the country, owing to their remoteness from the frontier during the colonial wars. The southern division—those living south of Lake Superior—being more warlike in disposition than those of the northern group, have played a much more important role in the intertribal wars of the northwest than the latter. Step by step they drove the Sioux westward, until they forced them out upon the plains. By them the Foxes, diminished in numbers by the attacks made upon them, were forced to seek safety by uniting with the Sauks. While the Chippewas, who had received fire-arms in advance of the other tribes west of Lake Michigan, were thus pushing back the eastern Sioux, many of their people, chiefly the Mississauga, already mentioned, had made their way eastward into the peninsula between Lakes Huron and Erie.

The Chippewas dwelling north of Lake Superior were comparatively unknown to the whites until long after intercourse with those south had been established. The location of this northern group being off the usual lines of travel, they seldom came in contact with the whites. They were generally mild and harmless, little disposed to war upon their tribes. On account of this peaceful disposition the name "Rabbits" was bestowed upon them by their more warlike southern brethren. They consisted of two local divisions known as

"Men of the Thick Woods" and the "Swamp People"—names derived from the character of the country they inhabited. The Maramegs, a tribe closely related to the Chippewas, if not actually a division of them, was incorporated with the northern group previous to 1670. The northern Chippewas are so intimately connected with the Crees and Maskegons that the three can be distinguished only by those acquainted with their dialects and customs; while south of the lake the Chippewas, Ottawas, and Potawotomis have always formed a kind of loose confederacy, frequently designated "The Three Fires."

The Maskegons, it is said, sprang from the three Chippewa gentes, the lynx, the reindeer, and the pike—which went northward from Sault Ste. Marie when the southern group started thence westward into the regions now embraced in Wisconsin, driven there possibly by some incoming tribe.

From the various estimates and enumerations of the population of the entire Chippewa tribe from 1764 to the present time, it would seem that there has been but little if any diminution in numbers. In 1764 the estimate was 25,000; in 1843, about 30,000; while the number at present is supposed to be between 30,000 and 32,000, of which 15,000 are in Canada and between 15,000 and 17,000 in the United States.

One of the most important of the tribes formerly inhabiting the region around the southern end and southwest of Hudson bay was that known as the Crees, but variously termed by early writers Cristeneaux, Knisteneaux, Klistenos, etc. The territorial limits of the tribe does not seem to have been definitely given by early explorers who visited the section before the relations of tribes were disturbed by the incoming of the whites. However, it is known that the Crees hunted over the region extending from Moose river, which enters James' bay, northwest to Churchill river, and westward from the vicinity of Hudson Bay to the head of Beaver river, and thence south to the hunting grounds of the Dakotas.

When they first became known to the Jesuit missionaries a part of the tribe resided in the vicinity of James' Bay, as it is stated as early as 1640 that "they dwell on the rivers of the north sea where the Nipissings go to trade with them." However, the relations of 1661 and 1667 indicate a region more to the northwest as the home of the larger part of the tribe. According to tradition, a portion of the tribe lived for a time about Red river, associated with the Chippewas and Maskegons, but were attracted to the plains by the buffalo. Although the Crees were essentially a woods people, many bands were virtually nomadic, their movements being governed largely by the food supply.

Ethnically and linguistically the Crees are closely related to the Chippewas—Hayden, in fact, makes them an off-shoot of the latter, and the Maskegons another division of the same group. However, Brinton and, perhaps, most ethnologists would be inclined to consider the Crees as representing the original stem of the sub-family to which these tribes belong. The tribe is, in fact, a typical member of the Algonquian stock, and, as was suggested more than half a century ago, may be the most direct representative of the original form of that stock, and, until gathered on reservations, had remained nearest the pristine home of the family. However, Hayden (Ethnography of the Indian Tribes of Missouri Valley) says the Crees assert

that formerly they inhabited a district much farther north than at the date at which he was writing (1865), their range at that former period being along the borders of Slave and Athapasca lakes, and thence to the northern end of Lake Winnipeg.

After obtaining arms the Crees made frequent war raids into the very heart of the Athapascan country, even to the Rocky mountains, but the Missiwipi river was accounted the northern limit of their territory, and their cessions of land to Canada claimed nothing beyond this line.

According to Hayden the Crees were divided, in 1865, into nine regular bands, which he names, in addition to which there were several small, unnamed bands besides a number of the tribe around Cross lake. So far as now known, the true ethnic divisions are the Crees proper, the Maskegons or "Swampy Crees," and the Monsonis or "Moose Tribe." The division into "Woods Crees" and "Plains Crees" has no reference to ethnic relations. The total population at the present time is estimated at 15,000.

One of the tribes of the Dominion which presents points of considerable interest to ethnologists is that known as the Assiniboins (or "Stone Sioux"). The chief point of interest in this case is that the origin and history of the tribe can be traced from the initiatory stage to its full formation. This tribe, which belongs to the Dakota group of the Siouan stock, forming one of the two primary divisions of that group, is an offshoot thereof. According to tradition the tribe was originally a part of the Wazikute gens of the Yanktonai, one of the Dakota tribes—a tradition which is confirmed by linguistic evidence. The separation from the parent stem, judging by the slight dialectal difference in the language, could not have greatly preceded the appearance of the whites. Nevertheless it must have taken place before 1640, as the Assiniboins are mentioned by the Jesuit Relation of that year as a distinct tribe. The indications, so far as apparent, point to the Lake of the Woods as the region where this separation took place, and the date thereof as not long prior to 1640. The relation of 1658 places them in the vicinity of Lake Alimibeg (Nipigon, Jeffery's map of 1762) between Lake Superior and Hudson Bay. From here they moved northwest to the vicinity of Lake Winnipeg, where they were living in 1670, having joined the Crees, who received them with open arms, and admitted them to friendly association. After separation from the parent stem they were henceforth at war with their Dakota brethren, their lot being cast with the Crees. During this association, which continued without interruption until comparatively recent years, the Assiniboins rapidly increased in numbers. They appear to have gradually moved westward upon the plains, becoming to a large extent nomadic; their range during the latter half of the eighteenth and first half of the nineteenth century, and until gathered on reservations, extending along the Saskatchewan and Assiniboin rivers, in the Dominion of Canada, from the forest limit westward well up toward the spurs of the Rocky mountains.

A band of this tribe accompanied La Verendrye in his expedition of 1738 to the Mandan villages of the upper Missouri, by which the whites obtained their first knowledge of that region. As they lived beyond the white settlements and away from the principal lines of travel, their history so far as known relates chiefly to their conflicts

with surrounding tribes. Besides their contests with their inveterate enemies, the Dakotas, they were frequently at war with the Gros Ventres and the Arikaras, forcing the latter from their earthen villages on the eastern bank of the upper Missouri and compelling them to seek a home further west.

At one period in their history they had pushed their way to the south side of Missouri river, along the Yellowstone, but the continued attacks of the Crows, the Blackfeet, and the Dakotas forced them, after suffering heavy losses, to return to their northern range. Previous to the great smallpox epidemic of 1836, the Assiniboin population was estimated at from eight to ten thousand, but this fearful scourge swept away in a single season fully one-half their numbers. In 1902 there were in the United States 699 at the Fort Belknap reservation, Montana, and 535 at the Fort Peck Agency—a total of 1,234; in Canada there were at various points 1,371, making the total population 2,605.

Farther to the west, in the region where the international boundary line approaches the eastern skirts of the Rocky mountains, is found an Algonquian group which seems, as it were, a tribe born out of due season—the Siksika, or, as better known, the Blackfeet, including, in the broader use of the term, not only the Blackfeet proper, but also the minor tribes known as the Kino, or Blood Indians, and the Piegans. These Indians, whom we shall include here under the term Blackfeet, though now chiefly south of the boundary, are Canadian in origin. They are of special interest to the antiquary and ethnologist in the study of the prehistoric northwest. Their country in modern times, until they were placed on reservations, was northern Montana and the adjacent portions of British possessions, extending from the Rocky mountains on the west to the junction of Milk river with the Missouri on the east, and north and south from Musselshell river in Montana to Belly and South Saskatchewan rivers in British territory. However, their history and traditions indicate a more northern origin.

When they were first encountered by employes of the Hudson Bay Company, they were living along Saskatchewan river and its tributaries. After this, driven apparently by the attacks of the Crees, they began to move south and west, and not long thereafter came into possession of horses taken in war from the Crows and Shoshoni. By 1816, aided only by the Gros Ventres, they had conquered a large territory from the Assiniboins, Crows, Flatheads, Shoshoni and other tribes. Their hunting grounds then extended from the Saskatchewan to the Yellowstone. However, Dr. Hayden and G. B. Grinnell agree in locating the early home of the Blackfeet far north in British America; the latter bringing forward a considerable array of evidence that their original home was in the country north of the Lesser Slave Lake and next south of the Beaver Indians. This tradition is fortified by their terms for the cardinal points, by the names applied to them by the Crees, by the evidence that they formerly inhabited a timbered country, and by the recollection of their first arrival at the Rocky mountains from or through a timbered region. But more especially does their long and intimate association with the Sarcees, an Athapascan tribe which certainly came from the north, indicate the region of their pristine home and the direction of their chief migratory movement.

All the evidence, therefore, leads to the conclusion that the Blackfeet were, within traditional times, the most northwestern representative of the Algonquian stock. Mackenzie tells of a people, whose name and further history he was unable to obtain, who were formerly wedged in between the Crees and the Athapascans, who were pressed back toward the mountains or else exterminated. It is now quite evident that these were the Blackfeet, who, when driven out, were accompanied by the Sarcees.

The questions which these facts bring forward, bearing on the prehistoric movements in the northwest, though belonging to the speculative field are nevertheless interesting. Were the Blackfeet, the last of the Algonquian procession developing and moving toward the southeast? Or were they, according to the opposite theory, the pioneer Algonquians in a movement to the northwest? Possibly the tribe was developed from an isolated or estranged element; nevertheless, speculation as to their origin brings before us the more important inquiry, was this northwestern section, the place of the development of the Algonquian stock?

In the more distant northwest, beyond Churchill river to Lake Athapasca, and thence to Great Bear lake, we meet with a number of tribes belonging to the Athapascan stock—a group which touches in its northern extremity, the Eskimo fringe along the Arctic coast, and in its southern extension reaches into northern Mexico. From east to west they roam over nearly the entire breadth of land from the Pacific ocean to Hudson bay. But the Indians of this area constitute only one of the groups of this great family. It is represented by a number of small colonies scattered along or in the vicinity of the Pacific coast in Oregon and California; and by the various Navaho and Apache tribes of Colorado, New Mexico, Arizona, and northern Mexico, and the Lipans along the lower Rio Grande. The tribes of this stock are of more than ordinary interest to the ethnologist and philologist, because the geographical positions of the various offshoots show beyond question evidences of extensive prehistoric migrations; and also, notwithstanding the larger portion of the northern group is found east of the Rocky mountains, that the family belongs essentially to what we have termed the Pacific section, that is, the western ethnological section of North America, the Atlantic or eastern section comprising only that portion east of the Rocky mountains and north of the Rio Grande.

The Indians of the northern group, the only division of the family found in Canada and Alaska, have very commonly in recent years been designated by the term Tinneh, or Déné, a name which they apply to themselves.

The Déné had until recently very little intercourse with the whites, this being limited to their fur-trading relations with the Hudson Bay Company, and occasional contact with an explorer. It is known, from the first knowledge of them obtained by the whites, that they carried on a desultory warfare with the Crees and other tribes living south of them, and that those living on the lower Mackenzie river were almost constantly at war with the Eskimo.

II. PHYSICAL TYPES OF THE INDIANS OF CANADA.

By Franz Boas.

Although anthropometric material from Canada is very incomplete, it is possible to describe a few of the prominent types inhabiting the country. Unfortunately, two large regions must be excepted from our consideration, because practically no material to speak of is available. These regions are the Mackenzie basin, extending from the Rocky Mountains to Hudson Bay, and the whole interior of Labrador. A determination of the physical types of the region between the St. Lawrence and Lake Superior is also difficult, because at the present time the natives are so much mixed with white blood that an accurate determination of the earlier types is almost impossible. Therefore all we can do at the present time is to describe from the material heretofore collected the distribution of types found along the Arctic coast, the Pacific coast, and along the western part of southern Canada. In this area four distinct types may be distinguished: first, the Eskimo type, which is found in its most marked form along the shores of Hudson Bay and in the Arctic archipelago; second, the north Pacific coast type, which occupies the coast extending from the Aleutian Islands, southward along the coast of British Columbia, showing, however, in this district considerable variations; third, the western plateau type, which is found in the interior of British Columbia; fourth, the Mississippi Basin type, which occupies the whole of the southern prairies of Canada. While the Eskimo type, the plateau type and the Mississippi Valley type are each quite uniform in the territory in which they occur, the Pacific coast type shows a remarkable degree of variability in different parts of the coast.

Before describing the types of these various regions, it may be well to make a few remarks regarding the position of the Canadian Indians in relation to the American race, and to the Asiatic race. Taking the anatomical traits of the tribes of northwestern Canada as a whole, we are impressed by their resemblance to Siberian tribes. The color of the skin, the texture and color of the hair, the form of the head, and the conformation of the face of the inhabitants of these areas show undeniable similarities. At the same time, the Asiatic types differ from their nearest American neighbors in the more pronounced Mongoloid development of the eye and in smaller measures of the face. In recent times opportunity is frequently given to see American Indians, Japanese, and Chinese, in the same costumes, on board of vessels plying on the Pacific coast, and notwithstanding their far-reaching similarity, it is on the whole, not difficult to recognize the Asiatic by the two traits just mentioned, although a considerable number of cases occur in which it is not quite easy to judge whether the subject is an Asiatic or an Indian.

On the other hand, if we compare the northwestern Canadian Indian with types like that of the Indians of southern California, or with that of the Indians of the central parts of the United States, the differences of type are striking. The color, formation of the head, conformation of the face, and shape of the nose are so fundamentally different in these regions that the similarity between the northwestern

Canadian and the Asiatic types seem to be greater than that between this type and that of the California Indian or of the Indian of the middle Mississippi.

It appears, therefore, that we must consider the inhabitants of northeastern Asia and of America as a unit divided into a great many distinct types, but belonging to one and the same of the large divisions of mankind.

After these introductory remarks, we will briefly describe the various types enumerated above.

The Eskimo type, as stated before, is found in its most pronounced characteristics in the Hudson Bay region. Their stature is short, the men averaging, approximately, 158 centimeters, the women 148 centimeters. Their heads are characterized by large size and great capacity of the cranium. The cephalic index is very low, averaging approximately 72; the skulls, at the same time, are very high, the index averaging nearly 77. At the same time the head is absolutely very long and very high, the average length of the head being about 195 mm., the width 144 mm., the height 150 mm. One peculiar trait of the Eskimo skull is the great width of the face as compared with the width of the skull. Eighty-five skulls from Smith sound, measured by Bessels, give an average breadth of head of 130 millimeters, while the width of the face is 133 millimeters. Similar conditions prevail among all the pure eastern Eskimo. Combined with the great width of the face, is a pronounced prominence of the cheek-bones, which gives to the whole face a remarkable flatness and width, extending from the malar points across the nose. In contrast with this great width is the narrowness of the nose, which almost seems incongruous. While, in most races we are accustomed to combine with a wide face a wide nose, the Eskimo has a very narrow nasal aperture, and, compartively speaking, high nasal bones, which give to the men, at least, a high-bridged nose. The color of the skin is, on the whole, light but when exposed to the sun, it assumes a dark reddish tinge. The hands and feet are remarkably small.

West of the Mackenzie, these traits are not so marked. The average stature in this region is much higher, the men averaging about 168 centimeters, the women about 156 centimeters. The length of the head is still considerable, reaching in the men, approximately, 190 millimeters, while the width of the head is about 154 millimeters, the cephalic index being approximately 80, but the trait that the width of the face is greater than the width of the head still persists, the width of the face in this region being approximately, 156 millimeters. Although nasal measurements are few in number, it seems that the peculiar narrow nose is characteristic of these tribes also.

It was stated before that very little is known of the type of people of the Mackenzie basin. The few skulls and measurements that are available suggest a fairly close relation between this type and that of the northern part of the coast of British Columbia. The inhabitants of the region west of the Mackenzie seem to have a stature of about 166 centimeters and their heads are moderately long, averaging about 195 millimeters, and the width of the head overaging about 153 mm. The face is wide, having about the same width as the face of the Indians of the Mississippi basin and of those of the northern parts of the Pacific coast, averaging 148 millimeters. The cephalic index is about 79. It would seem that the cheek bones are

not as prominent as those of the Eskimo. The nose seems to be much smaller than that of the Indians of the Mississippi basin.

The physical characteristics of the Indians of British Columbia are by no means homogeneous. As compared to the Indians east of the Rocky mountains and further south, they have in common a lighter complexion and lighter hair, but the shapes of their heads and faces differ considerably. Two sub-types may easily be distinguished—the northern type, represented by the Haida, the Indians of Nass River, and the Tsimshian; and the Kwakiutl type. In the Province of British Columbia is also found the type of the western plateaus.

These types may be characterized by the following measurements:—

I. MEN.

	Northern Type.		Kwakiutl Type.		Type of the Western Plateaus.	
	Average.	Mean Error.	Average.	Mean Error.	Average.	Mean Error.
	mm.		mm.		mm.	
Stature	1675	±7.40	1645	±5.90	1634	±7.90
Length of head	194.6	±0.80	188.7	±1.19	186.5	±0.55
Breadth of head	160.6	±0.67	159.0	±1.00	155.9	±0.52
Breadth of face	153.7	±0 85	151.4	±0.54	147.4	±0.41
Height of face.	121.6	±0.87	128.0	±0.67	120.3	±0.71

II. WOMEN.

Stature	1542	±5.70	1537	±5.90	1540	±5.00
Length of head	185.6	±0.88	186.9	±1.64	179.5	±0.53
Breadth of head	153.2	±0.90	154.3	±1.44	150.0	±0.41
Breadth of face	143.9	±0.80	144.3	±0.64	138.8	±0.40
Height of face	114.3	±0.93	119.3	±0 82	112.5	±0.54

They may be described as follows: All these types are of medium stature, and their arms are relatively long, their bodies short. Among the northern type we find a very large head. The transversal diameter is very great. The same may be said of the face, which has an enormous breadth. The height of the face is moderate, and therefore its form appears decidedly low. The nose is often concave or straight, seldom convex. The noses of the women are decidedly concave. The elevation of the nose over the face is slight. The point of the nose is short.

The dimensions of the head of the Kwakiutl are similar to those of the northern types, but the head seems to be slightly smaller. The face shows a remarkably different type, which distinguishes it fundamentally from the faces of the other groups. The breadth of face is nearly the same as that of the northern type, but its height is enormous. The same may be said of the nose, which is very high and comparatively narrow. The point of the nose is short: its eleva-

tion is also very great. The nasal bones are strongly developed, and form a steep arch, their lower ends rising high above the face. For this reason convex noses are found very frequently among this type. Convex noses also prevail among the women, and for this reason the difference between the female form of the Kwakiutl and the female form of the northern type is very great.

The western plateau type is characterized by a very small head, both diameters being much shorter than those found on the coast, while the proportions are nearly the same. The transversal diameter of the face is much shorter than that of the coast Indians, being nearly the same as that found among the Indians of the plains. The face is much lower than that of the Kwakiutl type, and also slightly lower than that of the northern type. The nose is convex and heavy. Its point is much longer and heavier than the point of the nose among the coast types.

There are good indications of the existence of a distinct type on the most southern part of the coast, but the evidence is not quite satisfactory. The Lillooet of the Harrison lake region are remarkable on account of their very short stature, which averages less than 160 centimeters, and for the great breadth of head, which is indicated by a cephalic index of nearly 89. The northern branch of the Lillooet are slightly taller, averaging 162 centimeters in stature, and the heads are not quite so broad, having an index of about 87. The coast Salish of the Fraser River delta, southern Vancouver Island, and of the Puget Sound region seem to be closely allied to this type. The head form is not quite certain, since it can be determined only among young children who have not been subjected to the custom of deformation, which prevailed until recent times all along the coast. They all seem to be characterized by great shortness of the head, the index ranging between 84 and 87. The average stature is, approximately, 164 centimeters; the face is characterized by great breadth, flat, often concave, nose, thick lips and receding chin. It is worth remarking that further to the south a sudden change of type takes place on the Columbia River, where narrow and high ridged noses are found, and taller statures. In some respects the Columbia River type resembles the type of the Kwakiutl.

The Kootenay are in type similar to the Indians of the plains. They are much taller than the Indians of British Columbia, averaging 169 centimeters; their heads are more elongated, the average index being about 80. At the same time, their color is darker, the face slightly heavier than that of the Indians of the interior of British Columbia and the nose is more like that of the plains Indian than that of the more western tribes. In general, it would seem that the type of the southern interior of British Columbia is more closely affiliated to this type than to those of the coast.

Very little is know of the physical characteristics of the Tlingit of the coats of Alaska, but the few measurements and descriptions that have been obtained, suggest that they resemble the tribes of northern British Columbia.

It is also remarkable that the Aleutians differ entirely from the Eskimo of the neighboring mainland. The skulls that have been described are short, and, so far as we can judge, entirely different from the skulls of the Alaskan Eskimo, and also from those of the native tribes of northeastern Asia.

In southern Canada, east of the Rocky Mountains we find the type which is characteristic of the Mississippi basin. The cephalic index ranges a little below 80, while the stature ranges from 168 to 172 centimeters, the more southern tribes being, on the whole, the taller ones. The cephalic index, in the region of the great lakes, is a little higher than that found further to the west. The average is about 80 among the western Ojibwa, and about 82 among the eastern Ojibwa. The distribution of the index suggests that among the eastern Ojibwa a very short-headed type may survive. Further to the east, we find the Iroquois, whose heads are more elongated, having an index of approximately 79. The same index is found among the present inhabitants of the Atlantic Provinces. The stature of the Iroquois and Indians of the Atlantic Provinces at present is approximately 172 centimeters. It must, however, be borne in mind that the bulk of the present population are mixed bloods.

It is important to note that skulls collected from ancient cemetries of the region inhabited by the Hurons, and extending from there to the mounds of Dakota are very long. An average of 35 supposed Huron skulls gives an index of not quite 75, and the same value is obtained from 19 skulls from Dakota mounds. One hundred and one skulls from Illinois mounds gave an average index of 77. We have therefore the peculiar condition that at the present time a somewhat short-headed population is found in this area, which was preceded by a population characterized by very long heads. Detailed descriptions of the cranial conditions are not available, so that no thorough comparison of the types in question can be made.

Turning farther to the east, it is worth mentioning that 75 skulls from Indian burial places in New England, all of which probably precede the period of white contact, give an average index of 75. It seems instructive to compare the absolute skull measurements of these areas.

	Length of skull.	Width of skull.	Height of skull.
Eastern Eskimo	185	132	138
New England	181	136	136
Sioux	180	142	131

It appears that the New England type, so far as expressed by skull diameters, is intermediate between the type of the Eskimo and that of the Mississippi Valley Indians. Whether this may be assumed as proof of an admixture of Eskimo blood is a point that I do not venture to decide at the present time. It would be interesting to know the relation of this type to the long-headed Huron type.

III. THE INDIAN LANGUAGES OF CANADA.

By Franz Boas.*

One of the most peculiar ethnographic phenomena of the American continent is the great diversity of native languages. The number of distinct linguistic families in North and South America is very large, probably exceeding one hundred. On the whole, the number of

*The section on Kootenay has been contributed by Dr. A. F. Chamberlain.

families on the Pacific coast is much larger than that on the Atlantic coast, the majority being found in the region of the Rocky Mountain system and of the Andes, including their eastern foothills. In North America, particularly, large areas are inhabited by tribes speaking cognate languages, on the plains and on the Atlantic coast, while on the Pacific slope, a surprising diversity of language is found. Similar diversity prevails on the coast of the Gulf of Mexico.

It has frequently been claimed that all the American languages have certain traits in common. They have been called incorporating and polysynthetic languages; incorporating, in so far as there is a strong tendency to embody the object of the sentence in the verbal forms; polysynthetic, in so far as a great number of material ideas are combined into a single word by means of grammatical processes.

Closer studies of the American languages which have been carried on during the last twenty-five years show very clearly that such a generalized view of the type of American languages is not admissible, and that a great variety of forms occurs.

The characteristics of distribution and the diversity of form here referred to are also found in Canada. Of the fifty-four linguistic stocks which are enumerated north of Mexico, ten or eleven are spoken in Canada.

(1) *The Eskimo*, which is spoken all along the Arctic coast of our continent. At the present time it extends as far south as the southern coast of Labrador, while we have evidence that in former times it was spoken for a considerable distance along the shores of the Gulf of St. Lawrence, perhaps even on its southern side. The whole coast line of Labrador, the shores of Hudson Bay, with the exception of its extreme southern part, the inhabited islands of the Arctic Ocean, and the coasts of Greenland, with the exception of its uninhabited northeast portion, are the home of the Eskimo. Ruins of houses found all over the Arctic archipelago, and practically all along the coast of Greenland, indicate that at times their habitat extended much further to the north than it does now. Only in the regions west of Hudson Bay are Eskimo tribes found living far from the sea—on the large lakes and rivers with which that country abounds.

(2) *The Athapascan* or Tinneh (Déné). Numerous dialects of the Athapascan languages are spoken in the northern part of Canada. Athapascan tribes occupy the whole interior of Alaska and extend from there over the Mackenzie basin eastward towards Hudson Bay, and westward to the coast range.

Isolated Athapascan bands were also located in the Nicola and Similkameen valleys in southern British Columbia, and an offshoot of this family is found east of the Rocky Mountains near Calgary, forming part of the Blackfoot Confederacy. The western isolated Athapascan bands belonged to the large group of Athapascan tribes which are found all along the Pacific coast, extending through the States of Washington, Oregon, and California, and connecting with the Apache, Navaho and Lipan, the most southwestern tribes of this stock.

(3) *The Algonquin*. The Algonquin occupy practically the whole southern part of Canada east of the Rocky Mountains. By far the greatest number of Algonquin tribes belong to the central group. These include the Cree, who extend through the most northern part of the region occupied by the Algonquin tribes, from the Rocky

Mountains to the interior of Labrador, and the Ojibwa, who occupy the more southern part of the country. In the Atlantic region a number of distinct dialects are found, the principal of which is that of the Micmac of Nova Scotia.

At present a branch of the Siouan family, the Assiniboine, inhabit a small part of the plains of Canada. Orinigally the habitat of this tribe was farther east and south.

(4) *The Iroquois.* In the eastern part of Canada, the Iroquois are found. Although their principal habitat was in the State of New York, a number of important tribes occupy the north side of the St. Lawrence River and the shores of Lake Ontario and Lake Erie.

(5) *The Beothuk* of Newfoundland have become extinct, but it seems probable that they represented a distinct linguistic family.

(6) *The Kootenay.* Proceeding westward from the territory occupied by the Algonquin stock, we find the Kootenay, who inhabit principally the valley between the Rocky Mountains and the Selkirk range, and speak an independent language.

(7) *The Salish.* West of them is found the important Salish family, occupying the whole southern interior of British Columbia and extending northward to the southern boundary of the region occupied by the Athapascans. In the southern part of the Pacific coast of British Columbia they have crossed the mountains and occupy the coasts of the Gulf of Georgia. Their territory extends southward into the United States, where they border on the Sehaptin. An isolated Salish dialect is spoken on the Pacific coast, south of Columbia River, while another isolated dialect is spoken on the northern part of the coast of British Columbia on Dean Inlet. Salish is divided into a great number of dialects.

(8) *The Wakashan.* On western and northern Vancouver Island and on the coast of British Columbia, northward from the Gulf of Georgia, reaching to Douglas Channel, are spoken the Wakashan languages, which embrace the two important dialects of the Nootka and Kwakiutl.

(9) *The Tsimshian.* On the Skeena and Nass Rivers are located the Tsimshian, whose language differs fundamentally from those of all the neighboring tribes.

(10) *The Haida.* On Queen Charlotte Islands in the northern extremity of British Columbia the Haida language is spoken, which at present also extends into southern Alaska.

(11) Although outside of the limits of Canada, *Tlingit* or Koloshan must be mentioned, the last of the great linguistic stocks of the northern coast of the Pacific Ocean.

In the following pages a brief characterization of these linguistic stocks will be given.

(10) *The Haida.* On Queen Charlotte Island, in the northern characterized by a simplicity of consonantic clusters, by the avoidance of consonantic clusters at the beginning and at the end of words, by the occurrence of a considerable number of velars, stops as well as aspirates and nasals; by the absence of labiodentals and the occurrence of a number of palatalized l's. Its vowel system is simple. The word in Eskimo forms a firm unit, held together by word-form-

ing suffixes, which are of verbal, nominal and pronominal character. Derivations are formed exclusively by means of suffixes. Whenever a word appears provided with suffixes, it loses its word-forming elements, and in more or less modified form enters into composition with these suffixes.

The number of etymological suffixes is very considerable, 143 suffixes being counted, which may be attached to any verb or noun, the limits of their variability being determined only by the requirements of the sense. On account of the great variety of ideas expressed by these suffixes, the single Eskimo word often expresses ideas which in European languages are expressed by sentences. The etymological suffixes include not only the elements which transform verbs into nouns, expressing the ideas of the actor, the abstract noun, the passive participle, the place or time where something is done, instrument, etc., and also elements which transform nouns into verbs, like "to be," "to have," " to do something to somebody," "to use," "to become', etc., but also a very large number of adjectival and adverbial ideas like, "small," "nice," "ugly," "miserable," "only," "much," "very," "exactly," "for a little while," "badly," "more," "really," "entirely," etc. Many adverbial suffixes are more readily translated in English by subordination of verbs, such as, "to begin to do," "to cease to," "to be able to," "to desire to," "to intend to." To this group must be added also suffixes which have to be translated by our tenses, which, in Eskimo, are morphologically of the same order as the adverbial suffixes here described. Many of the suffixes here enumerated have very special significance, such as, "to smell," "to call," "to be tired of." As an example of etymological composition the following may be given:

Takusariartorumagaluarnerpâ? Do you think he really intends to go to look after it?

Takusar(pâ), he looks after it; —iartor(poq), he goes to;— —uma(voq), he intends to—; —(g)aluar(poq), he does so—but—; —nerpoq, do you think he—.

It is evident, therefore, that much of the syntax of Indo-European languages is expressed in Eskimo, by means of etymological suffixes.

While the tenses of the verb, as mentioned before, are expressed by means of etymological suffixes, the modal development of the verb is quite considerable. The indicative, interrogative, optative, and three subordinate moods occur, in all of which the pronoun shows separate forms. The pronoun has also developed separate forms for the single intransitive subject and for all the combinations of subject-object. The compound forms expressing the relation of a pronominal subject and pronominal object have been so much modified that the component pronominal elements can no longer be clearly traced. The transitive forms of the verb expressing the subjects of the various persons combined with the object of the third person singular are closely related to the possessive form, so that the expression "I see him," is practically the same in form as the word, "my-seeing." This analogy becomes still more apparent when we consider the methods of expressing the subject of a transitive sentence and the possessor of an object. The Eskimo language possesses two cases, one of which, generally called the objective, is used for expressing the object of transitive verbs and the subject of intransitive verbs, while the second case, generally called subjective, is used

for expressing the subject of the transitive verb and the possessor. If this form be expressed by the English possessive case, we may translate the forms found in Eskimo as follows: "the man's, his house," or, "the man's, he sees him," which, as stated before, is in form analogous to the possessive, and might therefore be expressed by "the man's, his seeing him." The possessive forms have also a separate development for the subjective and for the objective, so that forms occur like "his house's, its door," where "his house's" would occur in the subjective form. It is important to note that these subjective forms of the possessive are analogous to one of the subordinate moods, so that a sentence like "I met him when he came" might be considered as analogous to the form, "his coming's, my meeting."

Eskimo has three numbers, singular, dual, and plural, which are expressed in the noun as well as in the verb. The demonstrative pronoun is highly developed, there being twelve distinct pronouns, which express position in relation to the speaker, the person addressed, and the person spoken of, also distance, directions to the right, left, in front, behind, above, and below the speaker, and probably also the direction south and the position at a distance from the speaker in relation to the house, namely, outside, when he is inside, and inside, when he is outside.

Since etymological suffixes do not embrace any local adverbs, local relations are expressed by means of nominal suffixes, expressing the ideas of "to," "from," "through," "towards," "by means of," and "like."*

(2) *Athapascan.* The Athapascan or Dené languages, notwithstanding their wide distribution and dialectic differentiation, have preserved the same fundamental grammatical traits. Their phonetics are rather harsh, the vowel system variable. They lack all traces of reduplication and use for expressing grammatical concepts principally composition and position, to a less extent phonetic changes of the stem. The restriction of the use of certain stems, particularly of verbs, to the singular, dual, or plural number, or to certain tenses, or even to certain persons, is developed to an unusual degree in this linguistic family. Although this feature is primarily a lexicographic character, it is used to such an extraordinary extent by all the Athapascan dialects, that it must be mentioned in a morphological sketch of the language. The change of stem occurs particularly in verbs expressing kinds of motion, position, mental action, in verbs expressing actions done by certain instruments and in some other verbs not readily classified. The same characteristic changes, although too a much more limited extent, occur in other Canadian languages, like Tsimshian, Salish, and Kwakiutl.

The number of etymological affixes which transform verbs into nouns is small; most nouns being independent stems. Verbal phrases have, however, often a denominating function. Many compound

*S. Kleinschmidt. Grammatik der grönländischen sprache. Berlin, 1851.
Theodor Bourquin. Grammatik der Eskimo-Sprache. Gnadau, 1891. (Labrador.)
E. Petitot. Vecabulaire Francais-Esquimau, Paris, 1876 (Mackenzie River).
Francis Barnum. Grammatical Fundamentals of the Innuit Language. Boston, 1901. (Alaska.)
William Thalbitzer. A Phonetical Study of the Eskimo Language. Copenhagen, 1904.

nouns are formed by juxtaposition. A true nominal plural and dual are not found, but these ideas are expressed by suffixes expressing "many" and "feet" "(*i.e.*, two). Only a few terms designating animal beings have in their plural form a suffix that cannot be explained in this manner. There is no formal classification of nouns according to sex, form, animation, but classes are distinguished by the use of distinct verbal stems relating to states or acts of objects of different form.

Verbal forms originate by composition of an extended series of elements which are quite varied in character and very numerous. In many compounds they are also apparently so equal in weight, that the distinction of affixes and stems is somewhat arbitrary. Ordinarily the essential idea is expressed by the terminal element which is regularly preceded by pronominal elements and which, therefore, may be considered as the stem to which the others are prefixed. Suffixes seem to express only syntactic relations.

The first group of component elements express ideas like those of completion, negation, repetition, but also many local ideas, like: out of, through, back towards the speaker, back from the speaker, falling, rising. In compounds these may be followed by another group expressing adverbial ideas like: up, down, into, hardly, badly, well. Besides these two classes there are many nominal elements which are used as prefixes immediately preceding the verbal stem with the pronominal subject. These express locatives and instrumentals; for instance, in the air, on the ground, in water, in fire, with the hand, with the foot, with the back.

Possession is expressed by the pronominal elements which precede the noun. In many cases their connection with the noun is so close that the initial sound of the latter is modified when preceded by possessive elements.

The verb in syntactic construction with pronominal subject takes its pronominal element following the etymological prefixes before described, and preceding the terminal verbal stem of the compound. Although the pronouns for different tenses and different verbs seem to be derived originally from the same forms, they are so much differentiated in the present state of the language, that they appear in quite different forms in aorist, present, past, future, and imperative. Each tense seems to contain certain characteristic phonetic elements which have become closely amalgamated with the pronouns. Furthermore, different classes of verbs have different characteristic elements—on the whole vocalic—which precede the pronoun. These vocalic elements may have had a separate meaning at one time, but their significance is not apparent, and they give the impression of purely formal elements.

The subjective pronoun has a singular and a dual. The plural is formed from the dual by an additional element preceding the dual form and, in some cases, by slight modifications of the dual forms.

The objective pronouns differ from the subjective ones, and are identical with the possessive forms. In transitive verbs the pronominal object precedes the subject with which it forms contractions. In a great many cases the verb has an indirect object which is expressed by means of postpositions. In sentences which have nominal subject and object, the object always precedes the verb with which it

forms a firm unit. The subject either precedes the object, or it is placed at the end of the sentence, following the verb.*

(3) *Algonquin.* Of the numerous Algonquin dialects the western, central and eastern groups are represented in Canada. The Blackfoot belongs to the western group, and differs very much from the other groups. The central group is represented by the Cree and Ojibwa with their subdialects, while the Micmac of Nova Scotia is the characteristic type of the eastern group. The following remarks are based primarily on the central dialects.

The grammatical processes employed in Algonquin are varied. Prefixing, suffixing, vowel change and reduplication are utilized for expressing grammatical categories. The etymological structure of the word is very complex. The method of composition is somewhat different in nouns and in verbs. In the latter generally two important component elements are found which are apparently nearly co-ordinate in value. Since, however, the total number of initial stems is much greater than that of second place stems, the former appear on the whole as primary, the latter as subsidiary elements. The ideas expressed by either group are very general and qualify each other. Many initial stems express ideas of motion in a certain direction, while secondary stems express more often concepts of manner of motion, such as "slowly," "quickly." Other ideas, however, all of a very general character, are expressed by these stems. Initial stems convey ideas like: to busy oneself with a fluid, to wipe, association, beginning, completion. Secondary stems comprise not only modal ideas like those expressed by our adverbs, but also those of form, like: relating to a hole, matter at rest; and in a more general way qualities, such as color, mental state, feeling; and limitations of space, like relations to parts of the body. Still another group of stems follow in position the secondary stems here described. Many of these designate manner of motion, as to dance, to swim, to move through air, to crawl, to move on land. These elements are often followed by classifying elements, to most of which no definite meaning can be ascribed. In a similar position, following the initial or secondary stems, occurr instrumentals which express ideas like: to do with the hand, the mouth, with a point or general causality.

These elements occur, also, in nouns in which sometimes a secondary stem may appear in initial position. The noun has also many generic suffixes denoting ideas like: fluid, string, fruit, instrument.

Reduplication is used to express intensity of action, customary action, continuity, repetition, distribution and duration.

All objects are classified as animate or inanimate, and this distinction pervades the whole language, animate and inanimate gender being expressed in the noun, pronoun, and verb. Plurality is also always expressed.

The pronominal elements used in syntactic construction of verbs are quite complex. They differ considerably in different tenses. and particularly in moods. The forms expressing the combination of pro-

*E. Petitot. Dictionnaire de la langue Dènè-Dindjié. Paris. 1876.
A. G. Morice. The Déné languages. Canadian Institute Transactions. 1891. Vol. I., pp. 170-212.
Pliny Earle Goddard. The Morphology of the Hupa Language. Berkeley, 1905.

nominal subject and object are so much specialized that their relation to the simple pronominal forms is quite obscure. First and second persons, third person animate, third person inanimate, inclusive, exclusive, are distinguished, and in the plural occur second person and third person animate and inanimate. First and second persons indicative are prefixed while the third persons are suffixed. The inclusive has the second person prefix and a special suffix; the exclusive has the first person prefix and the same suffix. In the future tense the prefixes amalgamate with a future element.

In dependent clauses an entirely different set of pronominal elements is employed, which contains only suffixes. Various types of subordination are expressed by pronominal elements, most of which are related to this series. Various prefixes differentiate temporal, causal, and other forms of subordination. The exuberance of these forms is quite remarkable.

In transitive verbs in the indicative mood the prefixes of the first and second persons reappear. Whenever the second person appears in subject or object its prefix is used, while that of the first person is used only in relation to the third person. The multitude of forms of the dependent moods is here, of course, still greater than in the intransitive verb. In most dialects identity and difference of several third persons occurring in a sentence and relating to preceding sentences are expressed with great nicety.

In the substantive three syntactic cases occur: subjective, objective, and locative, to which may be added a vocative. Possession is expressed by prefixed personal elements and by suffixes which differ in singular and plural, animate and inanimate. In these forms, also, the cases above mentioned are distinguished, and, in the third person, the relation of the possessor to the other third persons contained in the sentences modify the possessive forms.

Owing to the high development of syntactic, particularly pronominal forms, and the close amalgamation of etymological elements the word of the Algonquin languages presents a firm unit.*

(4) *The Iroquois.* The Iroquois is spoken in a number of closely related dialects by tribes whose habitat was in the region of the Great Lakes. The stock embraces two important groups of languages, the Iroquois proper and the Cherokee, the latter originally spoken in the southern Alleghanies. The Iroquois proper differs in phonetic character and in form considerably from other Canadian languages. The system of consonants is very meager. We find no labial stops, but

*F. A. Cuoq. Etudes phlilogiques sur quelques langues sauvages de l'Amérique. Montréal, 1866.

F. Baraga. A Theoretical and Practical Grammar of the Otchipwe Language. Detroit, 1850; Montreal, 1878.

F. Baraga. A Dictionary of the Otchipwe Language. Cincinnati, 1853; Montreal, 1878, 1880.

E. F. Wilson. The Ojebway Language. Toronto, 1874.

A. Lacombe. Dictionnaire et grammaire de la langue crise. Montreal, 1872, 1874.

F. W. Tims. Grammar and Dictionary of the Blackfoot Language. London, 1887.

S. T. Rand. Dictionary of the language of the Micmac Indians. Halifax, 1888.

A. S. Maillard. Grammar of the Mikmaque Language. New York, 1864.

Wm. Jones. Principles of Algonquian Word-Formation. American Anthropologist, N.S., Vol. VI., 1904, pp. 369-411.

only two dentals and one palatal, both surds and sonants. The spirant series is more fully developed, including an *f*, various dentals and palatals. Among the nasals only *n* and *ñ*(*ng*) occur. An *r*, which is common, shows close affinity to *l*. A very weak breath, and the glottal stop occur also. Nasalized vowels are common.

Grammatical processes are essentially prefixing and suffixing. Reduplication is absent, but intricate phonetic changes are very frequent. Denominating terms are classed as masculine, non-masculine, and indefinite; but also as animate and inanimate. Singular, dual and plural are distinguished. In the verb many adverbial ideas, such as tense and habit, are expressed by derivative affixes. The passive is expressed in the same manner. Temporal forms are quite numerous, while there are only three moods, the indicative, one subjunctive, and the imperative. On the whole, however, the verb is not rich in derivational elements, and local adverbial affixes are not found, different verbal stems expressing the idea of motion in various directions, such as up, down, into, out of, etc.

Syntactic relations of inanimate nouns and verbs are ordinarily expressed by incorporation of the noun in the verb, the noun being placed between the prefixed pronoun and the verbal stem, in the same manner as is done in Kootenay, Shoshone, and Nahua. In this case the noun loses its word-forming prefixes, the most common of which are *o*— and *ga*—, while it is increased by certain new suffixes. The subject of the intransitive as well as the object of the transitive are thus incorporated. For this reason adjectival terms appear also generally as intransitive verbs with incorporated nominal subject. Animate nouns are not thus incorporated. The animate subject precedes the verb, the animate object follows it.

In the noun, singular, dual, and plural are distinguished. Both have the same suffix, but the dual has besides a prefix derived from the numeral "two." The independent pronoun shows no distinction in the first and second persons between singular, dual and plural, while the third persons differ in singular and plural. A similar lack of distinction appears in those combinations of subject and object in which the two differ in number. In this case the form remains the same, no matter whether subject or object are singular, *viz.*, dual or plural. The possessive pronoun and the objective pronoun are closely related. Both possess eleven forms: first and second person singular, dual, and plural, third person masculine and non-masculine singular and plural, and indefinite. The subject of the verb, on the other hand, has fifteen forms: first, second, third person masculine and non-masculine, in singular, dual and plural, indefinite, and a subdivision of the first person dual and plural in inclusive and exclusive. It is very remarkable that the locative forms of the possessive, expressing "at, like, in, under, near," have the same set of fifteen forms, as though they were really verbs. The transitive forms include the object and the component elements are highly modified. All pronouns are prefixed to nouns as well as to verbs. Various classes of words present variations of the pronominal forms which affect principally their terminal sounds. Similar variations occur in plural forms as well as in the endings of incorporated words referred to before. These modifications are apparently quite irregularly distributed and have not, so far, been brought into such order, that the type of a word would indicate the class of modification that has to be used.

(5) *Beothuk.* Practically nothing is known of the grammar of the Beothuk, the only available material being a few brief vocabularies.*

(6) *The Kootenay* (by A. F. Chamberlain). The Kootenay is spoken in two dialects, the Upper and Lower Kootenay, which, however, differ only slightly in phonetics, grammar, and lexical material. In phonetics the velar stops abound, likewise, the broad lateral stop (similar to tl) which is so characteristic of many western languages. Surds and sonants are difficult to distinguish. The language does not possess the consonants *b, v, f, r.* The e and i series and the o and u series are interchangeable.

The indefinite E is common. Reduplication has no rôle in Kootenay, occurring only in a few words of onomatopœic origin (chiefly bird names), even the *puspus* ("cat") of the Chinook Jargon has been reduced to *pus.* Words of onomatopœic type seem, likewise, rare. Monosyllables are very few, the characteristic word being evidently a compound.

The Kootenay language possesses a very large number of suffixes and prefixes, the terminal-*tl* and initial *aq-* (*aqk-*) being very common the latter, indeed, occurs in several hundred words, and is a notable feature of this interesting tongue. Another marked characteristic of Kootenay is the incorporation (after the fashion in Nahuatl) of noun-objects and also pronominal objects in the verb. Besides composition by juxta-position of independent words and by means of radicals with other suffixes and prefixes, Kootenay has a series of "radical suffixes," used in composition to express actions done with the various members of the body (also in water, in fire, etc.). Thus, from the radical *it-* ("to do") are formed *itQane,* "he bites" (*-Qa-*"with the teeth;) *itkine,* "he does something with the hand" (*-kin-*"with the hand"); *itQoine,* "he lies down" (*-Qo-*"with the back"). The "radical suffixes" are not at all related to the terms for the members whose actions they denote (the root of the word for "back," *e.g.,* is *-tlak*).

There is no grammatical gender in Kootenay. The noun has an indefinite suffix in-*nam* (*titonam,* "father of some man," *aqkitlanam,* "somebody's house); an oblique case in *-es* or *-s,* plural form in *-nintik,* a dual in-*kistik* and a distributive in-*kantik.* The form of a noun used in composition is different from that of the same word used independently (e.g. *aqkinmítuk,* "river," *náimanmitukine,* "there are two rivers;" *aqko'ktle,* "horn," *quwitlk'tle,* "big horn." here the composition-forms are *-mituk* and *-ktle* respectively). As a rather lengthy compound may be cited *aqkínkanu'ktla'mnam,* "crown of the head," composed of *aqkink'an,* top," *-uk,* "point," *-tlam,* "head," the first part being further separable into *aq-, -kin-, -k'an,* the last the radical suffix, apparently for "top," and *-kin-* another interpretative particle. As an instance of verbal composition may be given *tsQatlítQanawasine* "he is going to bite us," resolvable into *asQatl-* (particle indicating the future), *itQane* (from *it-* to do," *Qa-,* "with the teeth"), "bite," *-awa,* "he. . . us,-*ine* verbal auxiliary.

The adjective usually precedes the noun. Of the numerals four (*QaEtsa*) and eight (*woQaEtsa*) are related, the latter meaning "second four." The third personal pronoun, *ninko'is* ("he, she"), is derived from the second, *ninko* ("thou"). The subject-pronouns used

*A. S. Gatschet. Proceedings of the American Philosophical Society, XXII., 1885, pp. 408-424; XXIII., pp. 411-432.

with the verb are different from the independent personal pronouns. The possessive is related to the personal.

The sign of the future tense in the verb is *tsqatl-*, of the past *ma-*. There is an auxiliary verb (radical *-i-*), which often, corresponds to our "to be" e.g., *sukine*, "it is good," *ipine*, "he is dead," *wagine* "it is thick," etc. Several particles of negation and privation exist. The radical of the verb can be obtained by removing the termniation of the second singular imperative (e.g., *ike*, "eat thou" radical *ik-*, "to eat." The letters employed here have their continental sounds.)

While the Kootenay stands alone lexically, some of its peculiarities of morphology suggest comparison with the Shoshonean (Nahuatl) Athaspascan and Siouan stocks.*

(7) *Salish.* The Salish may be divided into two large groups, the Salish of the interior and the coast Salish. The former group embraces the Calispelm, which is spoken by the Pends d'Oreilles, Flatheads, Spokane, Cœurs d'Alène, Okanagan; the Shuswap of eastern British Columbia; the Thompson Indian language, which is spoken in the region of the confluence of the Thompson and Fraser Rivers and in the canyon of the Fraser River; and the Lillooet. The coast Salish dialects extend from the coast of northern Oregon as far north as Dean Inlet. They may be divided into a number of groups; the Tillamook, south of Columbia River, separated from other Salish dialects by the Chinook; the Chehalis group, spoken on the outer coast of Washington and probably closely related to the Upper Chehalis and Cowlitz, which dialect is spoken in the valley extending from Puget Sound southward toward the Columbia River. On Puget Sound is found a group of dialects, the representatives of which are the Puyallup and the Nisqualli. The isolated dialect of the Twana is found in the southwestern part of Puget Sound. North of this group are found the dialects represented by the Songish of Victoria. These include the Clallam of the south coast of Juan de Fuca Strait and the Lummi south of Mt. Baker. North of this group are located the dialects of Cowichan, including the Cowichan proper and the Nanaimo of Vancouver Island, and including dialects spoken in the Fraser River delta. On the mainland north of the Fraser delta, on Burrard Inlet and Howe Sound, an isolated dialect is found—the Squamish. The dialects north of these groups, embracing the Sechelt of Jervis Inlet, the Claamen of Toba Inlet the Puntlatch of Comox and the Comox, formerly of Cape Mudge, may be combined in a single group. Separated from these by a stretch of country inhabited by Wakashan tribes are found the Bella Coola of Bentinck Arm and Dean Inlet.

The phonetics of all the Salish dialects are characterized by a very strong tendency towards clustering of consonants, a superabundance of s, l, and k sounds, with a strongly developed velar series; and the inclination to weaken and eliminate vowels. The labiodentals are absent. In the coast dialects no r sound is found, which, however, occurs in some of the dialects of the interior. The most southern coast dialect, the Tillamook, has lost all its labials, while the elimination of vowels has developed most extensively among the most northern tribe of the group, the Bella Coola. The process of disintegration has proceeded so far in this dialect that a considerable

*F. Boas, in Report of the 59th Meeting of the British Association for the Advancement of Science. 1889. pp. 889-892.
A. F. Chamberlain, Ibid. 62nd Meeting, 1892. pp. 589-615.

number of words are found which have lost all their vowels; as, for instance, smnt (mountain), tqt (stone), sts (salt).

The tendency to elimination of the vowels seems to be closely connected with the extended use of reduplication, accompanied by a weakening of the stem vowel.

The grammatical processes applied in all the Salish dialects are prefixing, suffixing, reduplication, and vocalic changes of the stem. Grammatical forms are often influenced by laws of euphony. A very considerable number of stems, particularly of verbal stems, are restricted in their use either to singular or plural. In transitive verbs the use of singular or plural stems and forms is determined by the object, not by the subject.

The number of etymological affixes is considerable. Most of these are suffixes. There seems to be a complete absence of instrumental etymological affixes, while the number of local elements is very considerable. Prominent among these are a great number of suffixes indicating parts of the body, which, although practically local in character, are used to express the objects of transitive verbs, as, for instance, "I strike his hand" would be "I hand-strike him." Verbal nouns and elements transforming the noun into verbs are numerous. There are also many suffixes or other derivative elements which express ideas that might be expressed by auxiliary verbs or adverbs. Among these may be mentioned causative, duplicative, (formed by reduplication), iterative, often formed by a prefix; frequentative, formed by a suffix; diminutive, formed by a prefix; reciprocal, reflexive, collective, and desiderative. Many adverbial local ideas are expressed by verbal prefixes. Such are into, from, on, etc. Similar ideas may also be expressed by affixes of nouns. Verbal nouns are quite numerous and are formed by the use of prefixes and of suffixes. The demonstrative has in most of the Salish dialects a double development, designating presence and absence, as well as visibility and invisibility.

There are some remarkable differences in regard to the ideas expressed by grammatical processes in the coast Salish, as compared with the dialects of the interior. In the dialects of the interior no trace of grammatical gender is found. The tendency to form compounds is very strong, and in one at least of the dialects of the interior a distinction is made between the inclusive and the exclusive first person plural.

In the coast dialects there is a strong development of grammatical gender, which, however, is found only in the pronoun. In this the coast Salish dialects resemble the Chemakum and the Chinook. There is no indication of inclusive and exclusive plural forms, and it would seem that the complex verbal forms of the dialects of the interior have undergone some disintegration. There is a very extended use of auxiliary verbs in the coast dialects, more so than in the interior.

The numeral systems of the various groups of dialects show important differences. It would seem that different groups of radicals are used in the various dialects. In counting, the objects are classified by means of suffixes according to form. The local suffixes referred to before are also used in classifying numerals. The numerals for counting animate objects are formed by reduplication, those used for counting persons, either by another kind of duplication or by triplication.

The possessive pronoun is expressed partly by prefixes, partly by suffixes. Its form depends often upon the initial sound of the noun. The pronominal elements of the verb have apparently different forms for different tenses. This, however, is probably due to a contraction of the pronoun with temporal elements or prefixes. Similar changes in pronominal forms occur in various moods. The transitive verb incorporates pronominal forms expressing both subject and object, and these are evidently derived from the simple pronouns, but considerably modified and have different forms for different tenses. In the coast dialects there is a strong tendency to separate the subjective from the objective pronoun whenever the verb is accompanied by an adverb, the adverb being treated as an intransitive verb, while the transitive verb retains its object.*

(8) *Wakashan.* The Wakashan is divided into two principal dialects, the Nootka and Kwakiutl, which are distantly related. The Kwakiutl is spoken in three principal dialects, and the dialect of northern Vancouver Island is selected here for describing the principal characteristics of this linguistic family. The phonetic character of the Kwakiutl is similar to that of other North Pacific languages. The language avoids, however, such clusters of consonants as are frequent in Salish. The words begin with a single consonant. The k series is very fully developed, the three series of anterior and medial palatals and of velars being present. The "l" series is also very fully developed, the sonant, surd, fortis, aspirate, and paltalized "l" being found. Every single stop occurs as sonant, surd, and fortis. Nasals are rare, only n and m occurring. The r and dentolabials are absent. The vowels are quite variable; probably only an e, a, and o series are found. All words occur with word-forming suffixes. There is a great abundance of etymological suffixes, which are joined to words in a way similar to that found among the Eskimo, namelv, after a loss of the word-forming suffix of the stem and with modification of the phonetic character of the stem. No prefixes occur and all grammatical relations are expressed by means of suffixes or by reduplication and by *umlaut*. Reduplication is abundant and serves a variety of purposes, so that under certain conditions, even triplication may occur. The etymological suffixes express a very great number of ideas. Some transform verbs into nouns, others nouns into verbs. To the former class belong suffixes

*G. Mengarini. Grammatica Linguæ Selicæ. New York, 1681.

Giorda. A Dictionary of the Kalispel Language. St. Ignatius Print. Montana, 1877-79.

F. Boas, Grammatical Sketches of Bella Coola, Nanaimo, Shuswap, Lillooet, Okanagan, in Report of the 60th Meeting of the British Association for the Advancement of Science, 1890, pp. 679-715.

F. Boas. Grammatical Sketch of the Thompson Language. Ibid. 68th Meeting. pp. 654-663.

C. Hill-Tout. (The same dialect.) Ibid. 69th Meeting, pp. 22-38.

F. Boas. Bella Coola Texts. Proceedings American Philosophical Society, Vol. XXXIV., 1895. pp. 31-48.

C. Hill-Tout. Grammatical Notes on the Squamish. Report of the 70th Meeting of the British Association for the Advancement of Science, 1900, pp. 495-518.

——— Grammatical Notes on the dialects of the Fraser River Delta. Ibid. 72nd Meeting. pp. 17-48, 63-89.

——— Grammatical Notes on the Sechelt. Journ. Anthrop. Inst., XXXIV., 1904, pp. 58-91.

——— Grammatical Notes on the Lillooet. Ibid. Vol. XXXV., pp. 156-218.

indicating the actor, the abstract noun, the instrument, place, time, passive participle, etc. To the latter class belong suffixes like those expressing "to make," "to desire," "to obtain," "to have," etc. Besides these, adverbial suffixes are very common. Most numerous among these are the local suffixes, expressing the place where an action occurs, as, "in the house," "on the ground," "in the water," "on the beach," "on the rocks," etc.; temporal ideas, as, past, present, and future, transition from existence to non-existence, inchoative, continuative, exhortative, dubitative, and others. Even a considerable number of our conjunctional ideas are expressed in the same manner. A number of these suffixes have very special meanings. Adjectival suffixes are not numerous. Among the local suffixes mentioned one class deserves special attention, namely, the group of suffixes indicating parts of the body. These are used quite frequently with transitive verbs, and as in Salish, acquire an objective meaning signifying the part of the body to which an action is done, not the instrument, such as we find in the Siouan, Kootenay and Athapascan languages. There are, however, a small number of instrumental suffixes which indicate the organs with which an act is performed, as "with the hand," or "with the eyes," or, "with the sense of smell."

The idea of plurality is not strongly developed. Where the idea of distribution or the idea of collectivity is to be expressed reduplicated forms are used.

The development of the demonstrative pronoun is very remarkable. Three positions are distinguished, that, near the speaker, near the person addressed, and near the person spoken of, or, first, second or third person demonstrative. Each of these occurs in two forms, as visible and invisible. All these demonstrative ideas are expressed by means of nominal and verbal suffixes, which possess certain differences in form, so that the total number of demonstrative forms is very great. In every sentence the location of subject and object is expressed by the proper demonstrative suffixes.

The syntatic relation of parts of the sentence is expressed exclusively by three forms of the pronoun, the subjective, the instrumental (genitive) and objective. For instance, the sentence "I strike him with it," would be expressed in the form, "strike-I-him-with-it." These pronominal elements are, on the whole, phonetically weak, consisting only of a single sound. When subject, object, or instrument are nouns, these nouns are placed immediately following the pronominal element designating their grammatical function, so that the sentence, "the man strikes him with it" would have the form, "strikes-he-the-man-him-with-it." On account of this peculiar position of the noun, the weak pronominal elements become apparently suffixes to the noun. This becomes still more apparent in the case where, for instance, the object is expressed by a noun, as, "he strikes the child with it." "Strikes-he-it-the-child-with-it." This insertion of the noun in the verb with its pronominal suffixes makes the syntactic word-unit very indefinite. Obviously the whole sentence must be considered as a unit; its breaking up into words is entirely arbitrary.

A very peculiar process which is closely related to the preceding is, that wherever possessive pronouns occur, they combine regularly with the pronominal elements, and in this way become detached from

the nouns to which they belong. While the word-complex "my-child" is expressed by the word "child" with the suffix "my," the sentence "he strikes my child with it," takes the form "strikes-he-it-mine-child-with-it." Or, in the same way, "my friend comes," will have to be expressed in the form "comes-he-mine-friend." Related to this phenomenon is also the tendency of Kwakiutl to break up its transitive verbs whenever they are accompanied by adverbs, into an intransitive verb and a transitive verb. For instance, "I did not see him" would be expressed by "not-I seeing-him," "not" being treated as an intransitive verb, while "to see" takes only the object. The whole series of forms of the pronoun which develops from this peculiar treatment in combination with the demonstrative pronouns is very numerous, and exhibits a considerable number of peculiar irregularities.

Since many of our conjunctions and modal ideas are expressed by etymological suffixes, the modal development of the verb is very slight. There is practically only one mood: the indicative, although the imperative and exhortative have a number of peculiar forms.

Subordination of sentences is accomplished almost exclusively by means of nominal forms, in which an interesting transition of the demonstrative to the personal pronoun takes place, the demonstrative of the first, second, and third persons being always used to express subordination of sentences with first, second and third person subject. For instance, the sentence, "the wind began to blow when I came," might be translated literally "the wind began to blow at this (my) coming;" and "the wind began to blow when he came," by "the wind began to blow at that (his) coming." In both of these cases, the demonstrative pronouns are sufficient to express the personal pronoun.

It seems worth while to mention the use to which reduplication is put. The most common form of reduplication is that used for expressing distribution of plurality. Ordinarily this reduplication is used with the vowel *e*. Diminution is expressed by reduplication with the vowel *a* combined with a suffix. "To endeavor to do" is expressed by reduplication with the vowel *a* combined with a suffix. "To eat something" is also expressed by a peculiar reduplication of the stem of the noun.

Numerals are formed on the decimal system. They take classifying suffixes, the most important of which are those for designating human beings, round, long, and flat objects.*

(9) *Tsimshian*. The dialects of Tsimshian show no considerable degree of differentiation and the description of one of them will be sufficient to illustrate the characteristic points of the morphology of the language. The phonetics of Tsimshian do not differ much from those of the other languages on the north Pacific coast, but the Tsimshian proper seems to be most closely related in its phonetic character

*F. Boas, in Report of the 60th Meeting of the British Association for the Advancement of Science, 1890, pp. 655-679; also 1896, pp. 585-586.

——— Sketch of the Kwakiutl Language. American Anthropologist, N.S., Vol. II., pp. 708-721.

A. F. Hall. A Grammar of the Kwagiutl Language. Trans. Royal Society of Canada, 1888. II., pp. 57-105.

F. Boas and George Hunt. Kwakiutl Texts. Publications of the Jesup North Pacific Expedition. Vol. III. Leiden, 1905. Vol. X., Part I., Leiden. 1906.

to the Tlingit of Alaska. The use of the fortis is not common, if it occurs at all, and there is a tendency to transform the velar sonat *g* into a very weak velar *r*. Considerable clusters of consonants occur in the middle and at the end of the words, but consonantic clusters at the beginning of words are not common. The grammatical processes found in Tsimshian are prefixing, suffixing, and reduplication, with a very strong preponderance of prefixes which, however, generally remain phonetically separate from the word stem. The structure of the language is such that the unit of the word is ill defined and it is arbitrary whether the prefixes here referred to are considered as portions of the word or as proclitic particles.

A very great variety of ideas are expressed by means of prefixes or proclitic particles. These ideas are both verbal and nominal. They embrace an extensive group of local adverbial ideas, such as, "into," "out of," "from land to sea," "from sea to land," "up river," "down river," etc. All local adverbial prefixes have either parallel independent nouns of location or parallel nominal prefixes, so that the expression "he goes down to the beach," would be translated in Tsimshian, "down-to-the-beach-goes-he to the beach." Or in case where there is a parallel prefix we find expressions like "Into-goes-he to inside-house." There is also a large number of modal prefixes, for instance, "properly," "improperly," "well," "miserably," "in the dark," etc.; and there are others which correspond to ideas that we are accustomed to express by means of conjunctions. The principal one among these expresses the idea of cause and is used often for expressing causal relation of sentences. Besides these, a considerable number of particles are found which seem to have a somewhat greater freedom of position, and although they carry no accent and are proclitics, they seem to be somewhat different in type from the etymological prefixes, although closely related to them. To this group belong particularly the temporal and semi-temporal ideas, such as past, present, future and their combinations, also ideas like "on his part," "again."

The difference between the two groups of proclitics is that the former always form a unit with the verb and cannot be separated from it by any other syntactic elements, while the latter are often separated from the verb by pronominal elements. It is obvious that with the great development of these proclitics or prefixes a very large portion of the ideas which in other languages are expressed by syntactic processes become in Tsinshian part of etymological processes, and reduce the frequency of occurrence of subordinate clauses.

The idea of plurality shows a very remarkable development in Tsimshian. The method of forming the plural is the same in both nouns and verbs. A considerable number of verbs which, however, cannot be classified, the names of animals, with few exceptions, and miscellaneous groups of nouns have no separate forms for singular and plural. By far the greatest number of words form their plural by reduplication with weakened stem vowel, the reduplication extending to the first consonant following the first vowel of the stem. Still another class of words forms its plural by prefixes. There are two entirely different groups of prefixes of this kind: one group beginning with the velar k, the other beginning with an l. The latter group has a strong tendency to irregularity. We also find certain groups of words, the plural of which is formed by combined pre-

fix and suffix. The number of stems, the use of which is restricted either to singular or to plural, is very great. Cases of this character occur even among the etymological prefixes.

The personal pronouns and the possessive pronoun have two distinct forms: one group is used to express the possessive pronoun, the subject of the intransitive verb and the object of the transitive verb; while the second group embraces the subject of the transitive verb. These two groups of pronouns are entirely distinct; while the former are suffixed and coalesce with the nominal and verbal stems, the transitive subject is prefixed and remains phonetically as independent as the etymological prefixes. The difference in treatment of the two groups characterized before as etymological prefixes and as proclitic particles, consists in the position of the subject of the transitive verb, which in the second group is always placed following the proclitic particle; while in the first group it always preceds the verb with all its etymological prefixes. The modal development is slight. Passive and medial forms are found with great frequency. They are formed by means of suffixes which depend upon the character of the terminal consonant of the verb. The interrogative is formed by the suffix *a*. The imperative is generally expressed by the phrase "It would be well if you did so and so" combined with the future.

Owing to the strong tendency to incorporate local ideas in the verb, the Tsimshian has no nominal cases, syntactic relation between the parts of the sentence being expressed by a consonantic suffix, which indicates that the word provided with the suffix has a syntactic relation to the following word. This consonantic connection differs according to various classes of words, it has a definite form used with proper names, terms of relationship and pronouns, and another one used with common nouns.

The demonstrative ideas of absence and presence are expressed by means of suffixes. In other dialects this idea is not so rigidly expressed.

There is an indefinite preposition which is used to express all local, temporal and modal relations, its sense being determined partly by the verbal etymological prefixes, partly by the parallel nouns referred to before.

Subordination of sentences is generally brought about by means of nominal constructions, which in the case of temporal subordination are introduced by the temporal proclitics, which, however, often assume the sense of finality or causation. The subordination of negative sentences is brought about by transforming the verb into a noun and giving it an etymological prefix signifying "without." There are only two demonstrative pronouns expressing presence and absence, but, as indicated before, demonstrative position is expressed throughout by means of syntactic connectives.

The numeral system shows a very peculiar development. There are separate sets of numerals used for counting, and for enumeration of men, long objects, flat objects, measures. In some cases the numerals of the various series are derived from distinct stems, while in other cases, classes are indicated by suffixes.

Notwithstanding the great number of clearly defined etymological prefixes, and the much lesser number of etymological suffixes, the analysis of Tsimshian stems, verbs as well as nouns, is difficult. While among most of the neighboring languages it is easy to isolate brief stems, Tsimshian stems are apparently complex. This seems

to be due partly to a tendency to contraction, the rules of which have not been discovered so far. Since many of these stems are long, while at the same time there is considerable similarity in certain endings, it seems plausible that the Tsimshian stems, as we know them at the present time, have undergone considerable change, so that without a comparative study of the dialects and a more thorough knowledge of the grammar their history cannot be traced.*

(10) *Haida.* The Haida is spoken in two slightly different dialects on Queen Charlotte Islands and in the southern part of the Prince of Wales archipelago. Until about one hundred and fifty years ago, the language was entirely confined to the Queen Charlotte Islands.

The phonetic system is quite similar to that of the more southern languages of the north Pacific coast. The vowel system is simple, and there is no clear distinction between the *i e* series, on the one hand, and the *u o* series on the other. The anterior palatals, which are prominent in other languages of the north Pacific coast are absent. Labials are very rare. All the stops occur as sonant, surd, and fortis. The nasal ñ (ng) is very common. In the northern dialect the velars are often very much weakened. The only processes by which grammatical ideas are expressed, are prefixing and suffixing, the function of each part of the sentence being determined also by position. Reduplication and diæresis are absent, with the exception of one or two doubtful cases. There is a strong tendency to build up complex words by means of composition of independent stems.

The etymological analysis of words shows them to be compositions partly of stems, which also occur independently, partly of subordinate elements that have no independent existence. Among the ideas that are expressed by etymological processes, those concerning instrumentality deserve particular mention. Action done by means of the back, by shooting, pushing, pulling, by walking, by stamping, grinding, chopping, with the hand, with a stick, by fire, etc., are expressed by means of prefixes. While most of these occur only as subordinate prefixes, a considerable number of them are identical with the nouns designating the instrument, as, for instance, to do with the foot, or to do with the hand, or by canoe, which are expressed by the independent words designating these objects.

Another prominent group is that of classifiers. These are used with verbs as well, as with numerals and nouns. The ideas thus expressed are essentially those of form, like flat, cubic, ring-shaped, cylindrical, long, etc. The total number of these classifiers is remarkable, there being about twenty-five in all.

While these two groups of ideas are expressed by prefixes, locative ideas are expressed by suffixes. We find here suffixes expressing motion into, out of, across, downward, upward, under water, towards a shut place, towards an open place, etc. Of similar character are temporal suffixes, which indicate the past, a quotative past, and future. There are also semi-temporal suffixes signifying con-

*F. Boas, in Report of the 58th Meeting of the British Association for the Advancement of Science, 1888, pp. 878-890; also 1895, pp. 521-524, 1896, pp. 586-591.

F. Boas. Tsimshian Texts. Bulletin 27, Bureau of American Ethnology. Washington. 1902.

A. C. Graf von der Schulenburg. Die Sprache der Zimshian-Indianer. Brunswick, 1894.

tinuatives, frequentatives, completives. Related in form to these temporal and local suffixes are a number or modal suffixes expressing ideas like early in the morning, by sea, here and there, potentiality. It is somewhat difficult to draw the line between these suffixes and a few others which determine the syntactic function of the verb, as imperative, interrogative, negative, etc. While in form they seem to be the same as the adverbial suffixes, their sense implies that they serve a syntactic function. It may also be mentioned that Haida has a few suffixes to indicate the social relation of the speaker and the person addressed. As, for instance, a suffix indicating that the speaker addresses a person of lower rank.

There are very few suffixes in Haida by means of which nouns can be formed from verbs.

It is important to note that in many cases nouns may be used in the same position which is occupied by the two important groups of prefixes, namely, instrumentals and classifiers.

In the pronouns, two sets of forms must be distinguished, the active, and the neutral or objective. These forms differ in the first and second persons singular and in the first person plural. In the third person singular a definite and indefinite singular may be distinguished. A similar distinction may be made in the plural. These pronouns do not firmly coalesce with the verb. In the transitive verb the object always precedes the subject, although in cases in which nouns accompany the verb, the subject precedes the object, probably because the object forms a firm unit with the verb. The possessive pronoun is closely related to the objective pronoun.

The idea of plurality is not strongly developed. In most cases nouns do not change their form. while those indicating relationship, and a few others take plural suffixes. Other words expressing human beings also take a plural suffix. In other cases, plurality is expressed by means of indefinite pronouns. In the verb, a double suffix may be used for expressing repetition, and the idea of collectivity is expressed by a classifying prefix. Adjectives expressing shape and size also take a peculiar plural suffix.

In the sentence the verb almost always stands at the end. Adjectives and possessives always follow the nouns they refer to.*

*F. Boas in Report of the 58th Meeting of the British Association for the Advancement of Science, 1888, pp. 868-878.

John R. Swanton. Notes on the Haida Language. American Anthropologist, N.S., Vol. IV., 1902, pp. 392-403.

John R. Swanton. Haida Texts and Myths. Bulletin 29. Bureau of American Ethnology. Washington, 1905.

A Translation of the papers by F. Boas, full of misprints, and reprints from a few gospel translations with faulty interlinear translations, were published by Raoul de la Grasserie, Cinq Langues de la Colombie Britannique; Haida. Tshimshian. Kwagiutl. Nootka et Tlinkit. Paris, 1902. The book is from beginning to end an appropriation of material from English sources. M. de la Grasserie himself has not contributed anything to what was previously known about these languages.

IV. ETHNOGRAPHIC.

1. The Eskimo.

By Franz Boas.

The Eskimo inhabit the whole coast of Arctic America, extending on the east to Greenland, and westward to the East Cape of Asia. Their southern limits are near the Gulf of St. Lawrence, the extreme southern part of Hudson Bay and southeast of the Peninsula of Alaska. They are essentially a litoral people, living primarily on sea-mammals. In some regions fishing supplies an important part of their sustenance. Caribou and polar-bear and, where it occurs, musk-ox are hunted both for their meat and for their skins, which are used for clothing. The vegetable diet used by the Eskimo is insignificant, consisting only of the few berries that ripen in the Arctic.

The villages of the Eskimo are located in those places where the pursuit of sea mammals is productive, and for this reason their villages change somewhat with the seasons; but, on the whole, the same community shifts from one definite location to another, according to the season. They are not migratory in the sense that their villages are located sometimes in one part of a large territory, sometimes in other regions. In summer the animals hunted are primarily various kinds of seal, walrus, white whale, narwal, and the whale. Late in summer is the season for the summer hunt of the reindeer and musk-ox. In the fall the pursuit of the sea-mammals is continued until the sea is covered with ice. In those regions where open water is found in winter not far from the villages, such sea-mammals as frequent the edge of the land-floe are hunted. In other regions, where the winter village is located on the coast, far away from open water, the Eskimos live on the common seal, which has breathing-holes that are kept open throughout the winter.

The material for clothing, for household utensils, and for building, is obtained almost entirely from the animals hunted, and of a few kinds of rock easily worked. Wood is so scarce that very little of it is used, except in those regions where drift-wood is plentiful.

The economic conditions of life are practically the same all along the Arctic coast. The only regions where certain differences are found are the extreme southern parts of Labrador and Alaska, where the forests approach the coast inhabited by the Eskimo, and the interior of the region northwest of Hudson Bay, where the Eskimo live on large lakes and rivers.

Partly owing to the uniformity of geographical surroundings, the occupations of the Eskimo are very uniform in the whole district inhabited by them. A considerable degree of differentiation of culture is found in the region west of the Mackenzie River, where they seem to be influenced by the neighboring Indian tribes, and in the extreme west, where they are also influenced by the Chukchee of Northeastern Siberia. Notwithstanding these differences, the Eskimo appear as exceedingly conservative in preserving their cultural possessions. This phenomenon may be observed as well in the remarkable uniformity of the Eskimo dialects from Greenland to Alaska, as in the similarity of the material possessions and in the uniformity of their folk-lore. It was stated before (p. 79) that there is evidence that the Eskimo west

of the Mackenzie River are not of pure Eskimo descent, but probably mixed with Indian elements.

The inventions of the Eskimo used in the pursuit of sea-mammals are remarkably ingenious. The animals are killed by means of harpoons. In regions where wood is not available, the harpoon-shaft often consists of bone or of narwal tusk. To this is attached a moveable fore-shaft, connected with the shaft by means of thongs. The attachment of the foreshaft to the shaft is such that when there is no lateral pressure, the shaft and foreshaft form a straight line, but as soon as there is a strong lateral pressure, the foreshaft turns over and disengages the harpoon point, which is placed at the extreme end of the foreshaft. The detailed arrangement of these harpoons differs with different regions. The harpoon used in winter in hunting on the ice has no moveable foreshaft, but the harpoon point alone is detachable. Harpoons that are used in hunting animals which swim about in open water are provided with bladders intended to keep the shaft afloat. These floats are either tied firmly to the shaft, or, in other cases, they are attached to the harpoon line, preventing in this way the sinking of the animal after it has been killed. While the harpoon is primarily used for securing the game, the lance is used for dispatching the harpooned animal. The lance generally consists of a shaft with movable foreshaft attached in the same manner as that of the harpoon, but provided with a cutting edge. In some cases, the shaft is provided with a socket, into which lance-points may be inserted, which, after stabbing the animal, remain in the body. For hunting larger game in open water, drags are attached to the harpoon line, which hinder the movements of the wounded animal.

For the pursuit of the game in open water a peculiar hunting-canoe is used, called the kayak. It consists of a light framework made of wood, whalebone, or bone, over which is stretched a skin cover. The details of the form show considerable variation in various regions, but all kayaks are built on the same fundamental plan, the whole frame being enclosed with skin, leaving open only a central hole in which the hunter sits. In regions where very light kayaks are used the hunter wears a water-tight garment, which is fastened around the kayak hole, so that no water can enter the hold. In regions where larger kayaks are used, this is not the case. The kayak is propelled by a double-bladed paddle. The harpoon and lines are placed in front of the hunter on the deck of the kayak, while the drags and floats attached to the harpoon-line are placed aft. The quarry is tied on the deck of the kayak aft. Whale-hunters and travellers use the large so-called "woman's boat," a flat-bottomed structure having a framework made of wood and covered with the thick hide of large seals or walruses. The woman's boat is propelled by oars, which are held in place by means of oar-locks. Sails made of intestines are also used, and allow the boat to sail before the wind. Its course is directed by a large stearing paddle.

Fish are caught with nets and hooks; salmon with three-pointed fish-spears. Birds are caught with nets and with the bird-spear, which is provided with lateral prongs, and is cast by means of a throwing-board; waterfowl are caught with snares made of whalebone. For hunting large game like caribou and musk-ox, the bow and arrow are used. The brittle driftwood cannot be utilized for making elastic bows; and elasticity is secured by an ingenious backing

with twisted sinews, taken either from the caribou or from the white whale. The arrows have wooden shafts and foreshafts made of bone. Caribou are often driven into the water and then hunted from the kayak by means of lances.

The habitations of the Eskimo are well adapted for protection against the inclemencies of the Arctic climate. Two types of winter-houses are found, a semi-subterranean structure, the sides of which are built of stone and supported by whalebone. The roof of the structure is formed of poles or bones, over which is stretched a cover of skin. The skin-covering is protected by a layer of small shrubs or similar material, which, in turn, are covered by a second skin-cover which is weighted down with stone. The entrance to this dwelling is generally a subterranean passage covered with flat slabs of stone and soil, and sloping slightly upward so as to prevent the cold air from entering the living room. Large dwellings of this type are found in Greenland, while the dwellings in the central regions are generally small. The second type of winter house is built of snow, in form of a vault. Blocks of snow are cut out with ivory or bone snow-knives, and are built up into a vault by means of a spiral construction, every newly added block of snow resting on the lower course of the spiral and on the last preceding block. In a few regions, stone houses built on a similar principle are used. The invention of these vaulted structures may be considered one of the most remarkable achievements of the Eskimo. Generally, the rear part of the house is occupied by the bed, which is covered with shrubs and caribou skins, while to the right and left the lamps and kettles are found, which are used for heating the houses and for cooking. Attached to the snow-house there are generally a number of storerooms in which provisions are kept. In summer the people live in tents made of skins. In northern Greenland these tents consist simply of a few poles of wood or bone, each being often spliced together of short pieces, over which sealskins are thrown. In other regions, the tent is more carefully constructed, being similar in plan to the winter-house. A semi-circular rear portion is set off from a longer entrance. The rear portion contains the bed, while the entrance, which is covered with the transparent inner layer of sealskin, admits light and is used as a store-room. In the southern parts of the west coast of Hudson Bay conical tents with a framework of converging poles are used.. Farther north the tent is supported by a single pole over which a stout thong is stretched. In summer the cooking is done outside of the tent over an open fire.

The most important part of the household belongings of the winter-house is the lamp. This is made of soapstone, and is a flat crescent-shaped dish. A wick made of moss or from vegetable fibre is spread along the straight front edge, while the bowl of the lamp is filled with seal-blubber which sustains the light. When cooking has to be done, the kettle, also made of soapstone, is hung over the wick. When not in use it is pushed back. Over the lamp is a frame used for drying clothing. On account of the importance of soapstone for the manufacture of kettles and lamps, the Eskimo make long trading-trips from regions where no soapstone occurs to those where this material is found, the distance covered being sometimes as much as a thousand miles. Similar trading-trips are made for driftwood. On Southampton Island, a large island in Hudson Bay, where no soapstone occurs, lamps and kettles of the same type as those used else-

where are made of thin slabs of limestone, which are sewed together and caulked by means of a mixture of blood and soot. Dishes are made of skin and whalebone. In those regions where wood is available, they are bent of pieces of wood made pliable by steaming.

Among the tools of the Eskimo may be mentioned the drill, originally a piece of flint or other stone, inserted in a long bone handle. The drill is set in motion by means of a bow, generally made of the rib of a seal. The string of this bow is a thong and is quite loose. It is twisted once around the drill. The butt-end of the drill is placed against a mouthpiece, and the drill is rotated by rapid motion of the bow. Knives were generally made of flint and similar material. In Arctic Greenland, where meteoric iron is found, knives were also made of small bits of iron. Flints and pieces of iron were inserted in the cutting edge, and in this way a long saw-like edge was secured. It is remarkable that in cutting off pieces of bone, the Eskimos did not ordinarily use a stone saw, but preferred to make drill-holes close together and then to wedge the bone apart. For arrowheads and lanceheads, points made of flint and of slate were used. Women's knives, used in the preparation of skins, and in sewing garments, were made of slate or similar material, and were similar in form to our butcher-knives. The typical knife of the men was double-edged.

Of greatest importance in the domestic economy of the Eskimo is the dog, which is used for hunting as well as for drawing sledges. The distances that must be covered by the hunter every day are considerable, and the daily trip from the home to the hunting-ground is generally made by dog-sleds. The long and frequent travels of the Eskimo families from one winter village to another, for purposes of trade, or for visits, are also made by dog-sleds. East of the Mackenzie River the sled has two low solid runners of wood or bone, connected by cross-bars, and generally a high back is used for steering. The dogs are harnessed by means of long lines and are attached to a stout thong, so that, when running, they are arranged fan-like. One dog has a longer line and serves as leader of the team. The driver generally sits on the sled and directs the dogs by means of calls and of a long-lashed short-handled whip. The demestication of the dogs is very imperfect. They are badly fed and allowed to run wild in summer when they are generally placed on an island where they have to find their own food. The dog resembles the Arctic gray wolf, with which it frequently intercrosses.

The caribou is nowhere domesticated in America. Clothing is made of furs. In most regions sealskin is worn in summer, caribou skin in winter; but there is considerable differentiation in the style of clothing. Both sexes wear long stockings and boots, trousers, and a short jacket provided with a hood. All these garments are double. The inner one is worn with the fur side to the skin, the outer one with the fur side out. The jacket of the married women has a very large hood which extends far down the back. A belt is attached around the jacket under this hood, which serves for carrying the infant, the infant being put into the hood on the back of the mother. The arrangement of different colored skin in the garments follows a definite style and differs somewhat in the two sexes. In Greenland clothing is generally ornamented with dyed skins from which the hair has been removed. Almost everywhere the jacket is provided with a short tail

in front and another one behind. These tails are generally longer in women's garments than in men's. In Labrador and Baffin's Land the tails of the women's garments reach an extraordinary size, reaching down to the ground. On the west coast of Hudson Bay a most remarkable development of the stocking is found, which practically supplants the women's trousers. These stockings are extraordinarily wide, forming enormous pouches above and below the knee. Similar pouches are found in the sleeves of the jackets of this region. The ornamentation of the garments seems to emphasize, on the whole, the form of the body. We find very often that the shoulder-blades and the breastbone are indicated by skin of lighter color.

The preparation of the skins is in most regions the work of the women, although in a few cases the men do this work. The skins are carefully cleaned and subjected to various kinds of treatment, according to their use. Watertight hides are prepared for kayak covers and for boot-soles, while skin that is to be used for clothing is carefully treated so as to be as soft as possible and to hold the hair.

On the whole, the decorative art of the Eskimo is not remarkably developed. The fairly rich ornamentation found in Alaska is probably partly due to foreign influences. The same may be true of the decorative art of Greenland. In the central regions, practically all utensils are of rude form, and there are very slight indications of any tendency to decorate the objects of daily use. Where such decoration occurs it generally consists of a series of dots and lines in ivory, which are filled with black. These dots are arranged in geometrical lines; they sometimes represent human or animal figures. Old specimens from this area show, that the elements of decorative geometrical designs in Alaska and in the Hudson Bay region were of the same character. On the other hand, the Eskimo have a well-developed plastic art. They are fond of carving in ivory and make a great many good realistic carvings, which, however, on the whole, do not serve any practical end. Most of such carvings are toys, or are made for the pleasure of the work. Handles of quivers, toggles and similar objects, which lend themselves readily to realistic representations, are carved in this manner. The lack of decorative art is, therefore, not due to a lack of artistic sense on the part of the Eskimo.

The social organization of the Eskimo is very simple. The social unit is the family, which is reckoned in both paternal and material line. The household—consisting of father and mother, children, and sometimes a brother and widowed relatives—forms the social unit. In many cases, the children after marriage continue to form part of the household. There is no strict rule of residence, the husband sometimes residing with his wife's parents, and the wife sometimes moving to her husband's house. The various households which live in the same locality do not form a strict political or social unit. Their union is temporary and may be dissolved at any moment. It is clear that under these conditions no well-developed chieftaincy can exist. In some regions the experienced hunter who knows the movements of the game well, and who by his advice can guide the men of his village, may attain a certain degree of authority. This is particularly true in cases where in pursuit of game the tribe makes habitually long trips every year. Such is the case, for instance, in regions where the people hunt seals in winter on the sea-ice, while they spend the summer a long distance from their winter hunting-

grounds in the interior of the country. Nowhere, however, do we find chiefs who exert strict authority over their tribes. Owing to intermarriages, distant relatives and friends are often scattered over a vast territory. This leads to frequent visits and the temporary residence of a family in various parts of the country. The distances covered in such migrations are remarkable, and cases are known of families that have resided at one time on the shores of Hudson Bay, while at other times they were found on the shores of Smith Sound.

Notwithstanding the looseness of the village unit, there is a certain sense of unity of tribal organization which manifests itself particularly in the distrust of strangers. It seems that in olden times, among all Eskimo tribes, certain ceremonial forms of meeting strangers were in use. In the central regions these generally consisted in a formal contest, which sometimes ended in the death of one of the contestants, but it generally had a more harmless character and merely preceded the hospitable reception of the stranger. These contests consisted in wrestling matches or in trials of endurance.

Although there is no definite form of government in the village community, the men, at certain times, act in the capacity of an informal council. Thus, if a man has made himself obnoxious, the men of the village may consult, and agree on the desirability of ridding the community of that particular person. After this, any man has the right to kill the disturber of the peace without fear of blood revenge.

Both polygamy and polyandry occur among the Eskimo. A man may marry several sisters, and where women are few in number, families are found consisting of several brothers and of unrelated men who are married to one woman. Scarcity of women is largely due to the custom of infanticide, female children being often considered as a burden and being killed shortly after birth. Where this custom does not prevail, the dangers that beset the life of the hunter are liable to bring about a preponderance of women in the tribe, which leads to greater frequency of polygamy. It is interesting to note that among the Eskimo cases of men remaining bachelors are not by any means infrequent. Old people are generally treated with respect, but in cases of famine they are often left to die, and when they feel themselves an incumbrance on the tribe they may even seek death by suicide.

The religious views and practices of the Eskimo while, on the whole, alike in their fundamental traits, show a considerable amount of differentiation in the extreme east and in the extreme west. It would seem that the characteristic traits of shamanism are common to all the Eskimo tribes. The shaman is called by the Eskimo angakok. The art of the angakok is acquired by the acquisition of guardian spirits. In some regions the belief prevails that the ability to acquire a guardian spirit must be transmitted by the teaching or by the direct influence of a shaman. Thus, the Greenland Eskimo believe that a child that is kept on the knees of a shaman will itself in course of time become a powerful shaman. In the region of Hudson Bay and Baffin's Land, no such transmission of power seems to be believed in, but it is stated that the shaman suddenly feels a supernatural light surrounding his body. His eyes acquire the power to see supernatural objects that are invisible to ordinary mortals, and by the help of his guardian spirits he acquires the power to cure diseases and to visit the world in which the supernatural beings reside.

The statements made by various authorities in regard to this subject are not quite consistent, and it seems probable that the ideas held by the Eskimo show a considerable degree of variation. It might seem that in some cases the initiation of the shaman consists only in his subjective feeling of the acquisition of supernatural power without the revelation of an individual guardian spirit; while in other cases it would appear that supernatural power is acquired by an encounter with such a spirit. Many different kinds of beings may become the guardian spirits of men, but prominent among these are polar bears and other animals.

Besides the spirits which may become guardian spirits of men, the Eskimo believe in a great many others which are hostile and whose visits bring disaster and death. These hostile spirits are not animals or human beings, but have fantastic forms, believed to be endowed with life.

Powerful shamans are believed to be able to change their sex, to take off the skin from their face in order to frighten to death their enemies. Their souls are believed to be able to leave the body. They can see the spirits that haunt the villages and can discover the transgressions of taboos, which are the cause of misfortune and starvation.

Before describing their practices it is necessary to describe briefly the beliefs of the Eskimo regarding taboos and transgressions of taboos. Restrictions in regard to food and in regard to work are very numerous. It is forbidden to bring sea-animals, particularly seals, ground-seals, and whales, into contact with caribou. It is forbidden to do certain kinds of work after a seal has been killed and after a death has occurred. A person who has touched a dead body must not touch any kind of game. No work on deer-skin is allowed until sea-ice has formed, etc. Restrictions like these are found among all primitive tribes, but the interpretation of these customs among the Eskimo is peculiar. It is believed, for instance, that a person who has touched a dead body or anything that has been in contact with a dead body, is surrounded by a black halo, which is distasteful to the game-animals, and that if a person thus affected goes hunting the animals will keep away. Furthermore, if an animal should be killed by a person who has transgressed one of the taboos, the transgression of the taboo, which is considered a material object, is believed to become attached to the soul of the animal, which takes the transgression of the taboo along to the deity that has control over the animals. It is believed that the transgression of the taboo hurts the deity, and for that reason she visits the tribe with misfortune.

Since it is thus necessary to avoid all contact with the transgressor of a taboo, for the reason that by contact with him the material transgression of the taboo may be transmitted to another person, the Eskimo requires that every transgression of a taboo be publicly confessed, in order to enable others to keep away from the transgressor, and for this reason the transgression of the taboo is not so much considered a sin as the concealment of such a transgression. From this point of view the idea has developed that confession is sufficient to atone for the transgression of the taboo, and this confesssion, although it may often be compelled through relatives of the offender, is generally secured through the shaman.*

*Compare, pp. 200 and 201.

It is therefore one of the important functions of the shaman to discover the offences which give rise to misfortune and starvation. Two principal methods are used for this purpose: the lifting of stones, or of the head of a patient by means of attached thongs, the theory being that when a question is asked and the shaman is able to lift the stone or the head, the reply is negative, while when he is unable to lift them the reply is positive. The second method is the visit of the shaman to the deity that has control over the destinies of mankind, and which controls the supply of game. It is supposed that on these visits the shaman sees the transgressions that have caused the misfortune. The shaman may also discover the material transgressions which are attached to the body of a sick person, and he may cure him by cutting off these transgressions.

Different from the art of shamanism is witchcraft, which consists in the use of parts of corpses or of other objects for purposes of sympathetic magic.

These peculiar forms of belief are most fully developed among the central Eskimo, but an analysis of the traditions and customs of Greenland suggests that similar ideas were originally held among all the Eskimo tribes.

The ritualistic development of Eskimo religion is very slight. There are only a very few instances where members of the village join in religious rituals. In former times each village had an assembly house, which was devoted to the celebration of festivals, most of which had a semi-religious character without, however, being sufficiently formal to deserve the term of religious performances. In these assembly houses, singing contests were held and many of the shamanistic practices were performed there. The central Eskimo tribes, however, have at least one important annual festival, which has a direct relation to their belief in a deity protecting the sea-mammals. It is believed that every fall, when the ice forms, this deity visits the villages. Then a ritual is performed, the essential object of which seems to be the home sending of the deity and the attempt of the shaman to rid her of all the transgressions that are attached to her body and that give her pain. The forms in which his celebration is performed are not the same everywhere, but in many cases the ritual is characterized by a definite series of rites and by the appearance of certain masked figures, who represent assistants of the deity or other spirits. One of the features of this rite is the temporary exchange of wives, which is believed to be one of the means of appeasing the wrath of the deity.

West of the Mackenzie River the series of the rituals is very much more complex, and in the more southern regions the number of masks used is quite considerable. Judging from the types of the masks and the description of the festivals it seems, however, likely that these are to a great extent influenced by Indian customs.

Some older accounts of the central Eskimo suggest that other rituals were performed after the capture of whales. The people assembled in open stone enclosures, built for this purpose and performed a ceremonial of thanksgiving.

The mythological concepts of the Eskimo are remarkably meagre and unsystematic. They seem to be most fully developed in the central regions, where the most important myths centre around the deity who is the mistress of sea-mammals. According to tradition, she is a girl who was given in marriage to a bird. When the bird

maltreated her she tried to escape with her father, who had come to visit her. The birds raised a storm, which threatened to swamp the boat in which she was fleeing. Then her father cast her overboard, and when she clung to the gunwale, he cut off the joints of her fingers one after the other. The first joints were transformed into whales, the second joints into seals, the third into ground seals. She became the mistress of the under-world and controls the animals which originated from her fingers. It is believed that the souls of those who die a natural death go to her abode.

There is a considerable variety of beliefs in relation to the fate of the soul after death. The soul of those who die a violent death go to heaven, where they play ball with a walrus head, thus causing the northern lights. But other places are believed in, and in some regions a number of upper worlds and a number of lower worlds are believed to exist, each of which is the home of a particular group of souls.

Sun and moon are believed to be sister and brother, the brother being constantly in pursuit of his sister; although in other traditions, sun and moon are described as residing in one house in heaven.

Setting aside these traditions and a few animal tales, the Eskimo have practically no creation legends. According to their ideas the world has always been what it is now. Rain, thunder and lightning are believed to be produced by a few women, who escaped from human society and to live by themselves. It is believed that in the beginning of the world, children were found in the snow, but that through the action of two girls, the present state of affairs was introduced. The narwal is believed to be a transformed Eskimo woman, whose braid became the narwal's tusk. The walrus and the caribou were created from parts of a woman's clothing, which she had cast away. A woman running along the beach and bewailing the loss of her grandson was transformed into a bird. The transformations enumerated here and a few others are told in trifling stories, or are merely incidents in elaborate tales. They do not stand out primarily and prominently as myths accounting for the creation of these animals. In fact, it might seem that these animals are believed to have existed even before the event told in the tradition and that the creation is that of a particular individual of the species rather than that of the whole species.

The rest of the very rich folklore of the Eskimo is essentially human, and deals with the exploits of heroes, with the deeds of shamans, and with incidents that might happen at the present time in any Eskimo village. The belief in the supernatural, which is characteristic of the present Eskimo, enters, of course, almost into everyone of these traditions; but, nevertheless, they reflect essentially the Eskimo life of the present day and do not belong to a mythological period, a feature which is characteristic of almost all Indian mythologies.

A comparison of the traditions of various Eskimo tribes is of great interest, because it proves the great conservatism of the people. Tales which are apparently so trifling that we might be inclined to consider them as having happened a short time ago and by chance retained in the memory of the people, are told in the same way in Labrador, in Baffin's Land, and in Greenland—regions, the inhabitants of which have not been in contact for hundreds of years. This proves that many traditions must have retained the same form for a considerable

period, and the phenomenon is quite in accord with the permanence of customs and of language referred to before.

In view of this fact, it is interesting to note that the few animal tales referred to above are not the exclusive property of the Eskimo, but belong to both Eskimo and Indian. Thus, the story of the origin of the narwal begins with an incident of a blind boy who is maltreated by his mother. In the course of events, he shoots a bear, his mother directing the aim of his arrow. Later on, his eyesight is restored by a goose, who dives with him in a pond. This portion of the tale is found among the British Columbia Indians, in the Mackenzie Basin, and among many eastern Eskimo tribes. The tale of a monster which steals bodies from graves and which finally is induced to carry away a person who pretends to be dead, is found spread over the same area. This distribution of the animal tales suggests that they are probably not part of the original Eskimo folklore, but were borrowed from the Indians, and later on became the common property of many of the Eskimo tribes. The area of distribution of these animal tales may be defined as extending from the mouth of the Columbia River on the Pacific coast, across the continent to the southern part of Hudson Bay; thus occupying the whole of Artic America and the northwestern part of our continent.

The folklore of the Eskimo, west of the Mackenzie River, differs in many essential traits from that of the esatern Eskimo. It is much more complex, many of the elements of the folklore of the North Pacific coast being embodied in it. In this respect the folklore of the western Eskimo bears evidence of the mixture with Indian elements, which is suggested as well by the physical type of the people as by the peculiar foreign traits of their culture, all of which point to an extended influence of the Indian tribes located south of the Alaskan Eskimo.

While the traditions mentioned indicate a certain amount of borrowing from Indian sources, other traits suggest a diffusion of cultural elements across Behring Strait to northeastern Asia. Common to the Eskimo and to the Chuckchee is the human character of mythology. Among the Chuckchee hero tales are even more strongly developed than among the Eskimo. Many of the shamanistic practices of the Chuckchee and other tribes of Eastern Asia are remarkably similar to those of the Eskimo; thus, the custom of divination by means of head lifting and stone lifting is the common property of the Eskimo and of the Chuckchee and other tribes as far south as the Amur River region. Most of the traits in the material culture of the maritime Chuckchee are so much like the corresponding traits of Eskimo culture that both must evidently be considered as originating from the same sources. On the whole, it seems more likely that the Chuckchee have adopted Eskimo customs than that the reverse has taken place.*

*H. Rink. Tales and Traditions of the Eskimo. London, 1875.
F. Boas. The Central Eskimo. Sixth Annual Report, Bureau of Ethnology, pp. 399-669. Washington, 1888.
——— The Eskimo of Baffin Land and Hudson Bay. Bull. American Museum of Natural History. Vol. XV., 1901, 1906.
W. J. Hoffman. The Graphic Art of the Eskimo. Report U. S. National Museum for 1895, pp. 739-968. Washington, 1897.
A. L. Kroeber. The Eskimo of Smith Land. Bull. American Museum of Natural History, Vol. XII.

2. THE BEOTHUKS OF NEWFOUNDLAND.

By Alexander F. Chamberlain.

Habitat, name, etc. The Beothuks, or "Red Indians," of Newfoundland, are now extinct, their last representative, Shanandithit, one of three women taken by the whites in 1823, having died at St. John's in 1829. The suggestion has been made that a few individuals may, at various times, have escaped to the Labrador coast, where they mingled with the Algonquian Indians of that region (Nascapies, Montagnais, etc.,) but no evidence of this is forthcoming. Whether they ever inhabited the whole island is doubtful; their characteristic area, after the intrusion of the whites, was the country inland from the Bay of Exploits along the river of the same name, and about Red Indian Lake, which received its appellation from them. In summer they moved around among the islands and on the coast from Cape Freels to Cape John (formerly much further). Among the localities where remains of the Beothuks, or traces of their former presence, have been discovered are Red Indian Lake, Pilley's Island (in an arm of Notre Dame Bay), Rencontre Island of the lower Burgeo group, Bonavista Bay, Birchy Lake, Long Island in Placentia Bay, Fox Island, Trinity Bay, Funk Island, Twillingate Island, White Bay, Hare Bay, Bonne Bay, Flat Bay, St. George's Bay, Codroy River. This embraces the greater part of the coast-line of the island and leads to the belief, that these Indians were acquainted with, or dwelt upon, most of the sea-coast, while a considerable portion of the interior was at one time or another occupied by them.

Of the name Beothuk, Beothik, or Bœothick, no satisfactory explanation has been given,—it is probably a word for "Indian, man," or some tribal designation. The appellation "Red Indians" is said to have been given to them by the Europeans on account of their custom of "painting" their faces and other parts of their bodies with red ochre, which they also applied to some of their utensils. According to Patterson, however, this name antedates the coming of the whites, and is simply a translation of the Micmac *Maquajik*, "red people." Rand, in his Micmac dictionary gives *Megwajijik* as the name of "the Red Indians of Newfoundland."

Relations with other peoples. Whether the Micmacs (whom the Beothuks called *Shawnak*) had relations with the Beothuks in "prehistoric" times is uncertain, but by the beginning of the eighteenth century they had their colonies in the western part of Newfoundland and began a war of extermination against the Beothuks, in which they were aided and abetted by the French, who, from 1660 onwards, had established themselves at Placentia and elsewhere on the southern coast, and afterwards by the English fishermen and colonists. The possession of firearms by the Micmacs gave them a decided advantage over the Beothuks, who were soon driven away from the Micmac portion of the country with severe losses. They continued

L. M. Turner. Ethnology of the Ungava District. Eleventh Annual Report, Bureau of Ethnology, pp 159-350. Washington, 1894

John Murdoch. Ethnological Results of the Point Barrow Expedition. Ninth Annual Report. Bureau of Ethnology, pp. 1-441. Washington, 1892.

E. W. Nelson. The Eskimo about Bering Strait. Eighteenth Annual Report Bureau of Ethnology, pp. 1-518. Washington, 1899.

mortal enemies to the last. With the Eskimo, who visited Newfoundland by way of the straits of Belle Isle, the Beothuks are said to have been on hostile terms. They called them "dirty." The Beothuks seem not to have been the equals of the Eskimo in conflicts on the water. The Indians (Algonquian) of the coast of Labrador, known to the Beothuks as *Shanwomunk* were friendly, and carried on trade and barter with them, and *vice versa*, such visits being attended with quite friendly relations.

The extermination of the Beothuks by the Micmacs and the whites is a dark chapter in the history of Newfoundland, and a blot upon European civilization. They were shot like deer or partridges, the hunters boasting how many "head of Indian" they had killed. Men, women and children all suffered. Of those captured many were, according to Cartwright, "exposed as curiosities to the rabble at the fairs of the western towns of Christian England at two pence a piece." Several Beothuks were brought to England by Cabot in 1497, and quite a number were sent as slaves to Lisbon, as a result of the expedition of Cortereal in 1501. During the sixteenth century brief notices of the Beothuks (though not by this name) are given by Cartier (1534), Hore (1536), Frobisher (1574), and Hayes (1583), the last reporting that there were no natives on the south coast, "but in the north are savages, altogether harmless." The attempts at colonization by the English under Guy in 1610, at Mosquito Harbor (Conception Bay), seem not to have led to disturbances with the Beothuks, whose intercourse with the whites was quite friendly. Whitbourne, in 1615, represents them as "living altogether in the north and west part of the country, which is seldom frequented by the English," and having a good reputation with the French and Biscayan whalemen. Baron de Lahontan (at one time governor of Placentia, when held by the French) knew so little about the Beothuks, that he could say in 1690, "there are no settled savages on the island,"—so far into the interior had they retreated even at this time (probably into the country about the River of Exploits). Cartwright, in 1768, says that the conduct of the English fishers towards the Beothuks is "an inhumanity that sinks them far below the level of savages." In 1760 the Government, under Capt Palliser, issued the first official document in favor of the natives, and during the next few years several expeditions (including that of Cartwright in 1768) were sent out to discover and treat with the Indians, which were more successful in obtaining ethnological information than in inducing the Beothuks to trust the English settlers. A few individuals were captured, but that was about all. The efforts of Govs. Gambier in 1802, Holloway in 1807-1809, Duckworth in 1810-1811 (the Buchan Expedition) were hardly more successful. After this the relations between the settlers and fishermen of the north of the island and the Beothuks continued to be hostile. A few natives were occasionally carried off to the white settlements, as was the case with Demasduit, or "Mary March," in 1819, Shanandithit in 1823, etc. In 1827 there was organized in St. John's the "Bœothic Institute," which sent out, under Mr. Cormack, an expedition into the Beothuk country, but neither they nor any subsequent explorers ever found a living representative of the tribe.

Physical characters. Dr. Brinton, in his *American Race* (p. 67) describes the Beothuks as of "medium stature," but the tradition of

the English in Newfoundland is that they were tall. De Laet, indeed, does speak of them as "of medium stature,"; but Howley says that "they were of middle stature, say five feet, ten inches," a height which would bring them into Deniker's "high statures." The husband of "Mary March" is said to have been 6 ft., 7½ in. tall, and the woman Shanandithit is described by Rev. Mr. Wilson as "a tall, fine figure, nearly six feet high." The Micmacs and whites, doubtless, exaggerated the stature of the Beothuks, but the latter may be considered to have been a "rather tall people." The individual brought to England by Cabot, when properly apparreled, "looked like Englishmen," according to the chronicler of the time; and all narrators agree that they were not ill-formed physically,—Howley, indeed, says: "The Beothuks were a much finer and handsomer race than the Micmacs, having more regular features and aquiline noses, nor were they so dark in the skin." Reference is frequently made to their black and piercing eyes, very black hair, fine teeth, etc. All observers distinguish them in physical features from the Eskimo more even than from the Micmacs. The few skulls of Beothuks that have been examined show a good development of the frontal region with prominent nasal spine and absence of depression at the root of the nose. The cheek-bones of "Mary March" were rather high. Her hands and feet were "very small" and limbs "small and very delicate," particularly her arms, and she was very proud of this. Her complexion became lighter after washing, and freedom from the smoke of the wigwam. The Beothuks are said to have been "active and athletic."

Temperament, etc. The earlier accounts speak of the Beothuks as harmless savages," "ingenious and tractable people," of a certain mild and gentle disposition, except, of course, when imposed upon, deceived or attacked. Such acts of reprisal as are attributed to them after experience with the whites were but natural under the circumstances, and do not indicate particular savagery or cruelty of a notable sort. Those who had to do with "Mary March" were impressed by "her modesty and propriety of behavior, her gentleness and kindness, her gratitude for favors and her affection for her kindred." A woman captured in 1803 "showed a passionate fondness for children." Shanandithit was "bland, affable and affectionate." Several instances of the child-like character of these aborigines are on record.

Intellect, senses, etc. Father Pasqualigo, who saw in Lisbon the Beothuks brought over by the Cortereal expedition of 1501, wrote of them as "admirably calculated for labor, and the best slaves I have ever seen." Whitbourne (1615) reports them as ready to assist the French and Biscayan whalers, "with great labor and patience." Their quickness of intelligence is noted by many observers, both as to particular individuals resident among the whites, and as a general fact for the tribe. Of a Beothuk boy, living with the whites in the time of Cartwright, we are told that "he became expert in all the branches of the Newfoundland business." Demasduit, or "Mary March," possessed "quickness of observation, reading of character and power of imitation." Shanandithit had considerable talent in drawing with paper and pencil,—of her it is related that, "in one flourish she drew a deer perfectly, and, what is more surprising, she began at the tip of the tail." She also made some sketches indicating the events of the Buchan expedition (1810), which are said to be "quite accurate" in many particulars.

Occupations, industries, arts, etc. The Beothuks were notably hunters and fishers. Their country in Newfoundland abounded in deer, and they hunted also the bear, the fox, the otter, the hare, the seal, etc., besides land and sea fowl. They also took many salmon for food. Their bows had arrows sometimes three feet long, and they are said to have been excellent archers. Spears eight feet in length have been found in the Beothuk settlements. Flint and bone arrow and spear heads, and other stone implements were common,—some of the arrow-heads are very beautifully formed. In the kitchen-middens on the coast (e.g., at Long Island, Placentia Bay) arrows and spears heads and a considerable variety of stone implements (axes, chisels, gouges, scrapers, sinkers, rubbing and sharpening stones, etc.) have been found. Some also in graves antedating the coming of the whites. The Beothuks had a long-shafted retrieving spear or harpoon for killing seals, etc. But their most remarkable hunting invention was the "deer-fence." The extent of these "fences" and "pounds" indicates a considerable degree of co-operation among these Indians, and accounts for the large amount of meat found in their deserted storehouses by the whites. They appear also to have made a sort of pemmican.

The houses of the Beothuks were generally lodges of poles, of peculiar construction. They had v-shaped hulls, high prows, and a marked central rise. They are said to have been skilful boatmen, exceeding the Micmacs in running rapids, etc. The Beothuk snow-shoe was also peculiar, being rather like a tennis-racket in shape, longer and narrowing behind more than those of other tribes.

The houses of the Beothuks were generally lodges of poles, covered with skins or birch-bark, large enough to accommodate from six to twenty persons, each of whom had a hole (lined with moss or fir-boughs) around a central fire. They seem to have had both summer and winter "wigwams." They also had square houses, which may have been imitated from the English; also large store-houses, "said to have been from 30 to 50 feet long, and nearly as wide."

The art of pottery seems to have been unknown to the Beothuks, although suitable material was not absent; they made, however, pots and lamps of steatite worked *in situ*. Birch-bark vessels and utensils of various shapes and sizes were much used.

Among the ornaments known from the wearers or found in graves, etc., are bone, hair and dress ornaments figured in varied fashion, strings of small pieces of bone and ivory, pendants of ivory, shells strung together, small forked and pronged bone amulets intricately and ingeniously figured, etc. Many objects and implements were stained with red ochre,—this seems to have been a custom with some special significance. The skin dresses of the Beothuks were often well ornamented and there were special "dancing dresses" for the shamans.

Health, disease. It is recorded that all the Beothuk women who lived among the whites died of consumption, but how far this extended to their fellow tribesmen is not known. The Beothuks had the "sweat-bath" of the well-known Indian type, the sweat-house being constructed in the usual manner, and steam produced by pouring water on heated stones.

Social and political organization. Of the structure of Beothuk society very little is known. Something may be inferred from the

number of persons occupying a single lodge, but they were in all probability not communistic, nor polygamists, as a rule. Certain actions of "Mary March" suggested to some that she may have been the daughter of a chief,—the chief among the Beothuks was probably a man of considerable authority,—or perhaps herself a chief. Family affection and love for children is accorded them by all authorities, and it was marked in the case of captured women. The absence of such a domesticated animal as the dog (some observers say that they had half-tamed wolves) among the Beothuks may be of social importance. Likewise the fact that no agricultural processes were found among them (the climate was against this). They were probably quite a sociable people and had dances and like amusements. Culin, from consideration of some of the bone disks, thinks that the Beothuks "may have used gambling disks resembling those of the Micmac."

Mythology, religion, etc. Few of the religious and mythological ideas of the Beothuks have been recorded, although the vocabularies extant contain some words belonging in this category. Their term for "God" is given as *mandee*, which seems identical with Micmac *mundoo*, now signifying "devil." One of their names for "devil" was *ashmudyim*, which Shanandithit described as "an ugly black man," who was "short and stout, having long whiskers, dressed in beaver-skins, and sometimes seen at the east end of the lake." Some of these ideas are probably post-European, but the Beothuks probably had a manitou-idea similar to that of the Algonkians from whom the *mandee* may have been borrowed. One authority reports that these Indians believed that "they sprang from arrows stuck in the ground by the Good Spirit." Certain objects had perhaps some religious or symbolic meaning attached to them, e.g., some of the bone and ivory ornaments, or "amulets," the sticks with semi-circular head-pieces, the wooden images and dolls placed in the graves, etc.

The Beothuks had several modes of burial ("hut," scaffold, box, cairn). and deposited with the dead, food, utensils and implements, ornaments, etc. In one burial-place, e.g., were found small wooden images of a man and a woman, a doll (for a child), toy canoes, weapons, culinary utensils, etc. The grave of a boy contained, among other things, some smoked salmon in a bark-basket and several packages of dried trout. The burial-place of what was supposed to have been a "medicine man," yielded a medicine-bag and contents, several bird skulls, etc. The bodies of the dead were encased in the birch-bark, and, for some reason or other, became largely mummified, somewhat after the Alaskan fashion. The careful treatment of their dead may have had some religious import. Broken arrows were sometimes found in the graves.

Language. The linguistic material of the Beothuk consists of brief vocabularies obtained at various periods from captured women of the tribe, Owbeg, Demasduit, Shanandathit, the last recorded by Mr. Cormack in 1828, being thought the most reliable, although the woman had then been living some five years among the whites. The total number of words known is about 500. Dr. A. S. Gatschet, an expert linguist, who studied this material very carefully, concludes that the language of the Beothuks is "a separate linguistic family," altogether distinct from Eskimo and Algonkian in particular. There are phonetic, grammatical, and lexical reasons for this position. The Beothukan stock is included in the Powellian classification of

independent linguistic families of North America. Brinton thinks that in Beothuk may be detected "some words borrowed from the Algonkin, and slight coincidences with the Eskimo." He also ventures the opinion that "derivation was principally, if not exclusively by suffixes, and the general morphology seems somewhat more akin to Eskimo than Algonkian examples." The numerals, especially are un-Algonkian, also the names for parts of the body, etc., two test-series of words of great significance. It has been remarked that the words of these Beothuk vocabularies often seem to present a "disordered look," which is not unnatural considering the time and circumstances of their origin. It deserves notice also that they were all obtained from female members of the tribe, and it may just be possible that the language of the women differed in some way from that of the men (captured or foreign wives, e.g.), and we may have here something else than the real language of the Beothuks, or Shawantharot, as they are said to have called themselves.*

3. INDIANS OF THE EASTERN PROVINCES OF CANADA.

By Alexander F. Chamberlain.

Habitat, names, etc. With the exception of the "Iroquois" (Mohawks) of the Lake of the Two Mountains, those (Mohawks) at Caughnawaga and St. Régis, and the "Hurons" of Lorette, near the city of Quebec, the Indians of the Eastern Provinces all belong to the Algonkian stock. These include, at present, the *Abenakis* of St. Francis and Bécancour, Que., numbering some 390; the *Amalecites, Milicites,* or *Maliseets,* of Témiscouata and Viger, Que., and Madawaska, etc., N.B., some 800; the *Micmacs* of Restigouche, Maria, and Gaspé, Que., some 700; *Micmacs* of New Brunswick, some 850; *Micmacs* of Nova Scotia and Cape Breton, some 2,000 (also a few in Newfoundland); *Micmacs* of Prince Edward Island, 290; *Montagnais* of the north shore of the upper St. Lawrence (Seven Islands), Betsiamits, etc.) and the region about the Saguenay and Lake St. John, in all about 1,800; *Nascapies,* or *Naskapi,* beyond the Montagnais and in the interior of Labrador, some 2,000, of which a considerable number are within the limits of the province of Quebec. Besides these there are the few *Nipissings,* or "Algonquins" of the Lake of the Two Mountains.

The Montagnais (*i.e.*, "Mountaineers"), so called from the fact that when first coming into contact with the whites, they occupied the rocky shores of the upper St. Lawrence and the region of the Laurentides, between the Gulf and Lake Mistassini, have roved over this country, contracting their range with the pressure of the whites, for centuries. Champlain met them on the St. Lawrence, between Quebec and the Saguenay, in 1607. With them belong the *Skoffies, Sheshatapoosh* (etymology?), "Shore Indians," etc. Behind them, roving between Lake Mistassini and the Atlantic and over a considerable

*Geo. Patterson. Transactions of the Royal Society of Canada, 1891, II., Sect. II., pp. 123-171.
Geo. Patterson. Ibid., 1892, Sect. II., pp. 19-32.
A. S. Gatschet. See before, p. 91.

portion of the interior of Labrador, have been the Naskapi, or Nenenot (*i.e.*, "true, real men"), as they call themselves. According to Turner (1883) the term Naskapi is one of reproach conferred on them by their neighbors, the Montagnais. In part of the north region of the Lower St. Lawrence lived also the Skoffies, now extinct, who were very closely related in speech to the Montagnais. About the region of the St. Lawrence there formerly existed in large numbers (now reduced to very few) the so-called *Tête-de-Boule*, apparently closely affiliated with the Montagnais. The chief divisions of the Montagnais-Naskapi group at present are: Naskapi, Montagnais of Mistassini (the R.C. Mission is at Oka, on the shores of this lake), Montagnais of Lake St. John (the mission and Indian rendez-vous is at Pointe-Bleue—the Montagnais begin to go there at the end of June), Montagnais of the Saguenay (their earliest great rendez-vous was at Tadousac), Montagnais of Betsiamits (region about the river of this name, which enters the St. Lawrence below the Saguenay), Montagnais of the Seven Islands, etc. (near the mouth of the Moisie). The country over which the Montagnais and Naskapi still roam is a vast one, although the hunters and the seekers after game fish among the white men are more and more intruding upon it and narrowing the Indian limits. The Abenakis of St. Francis, etc., are, according to Professor Prince (1902) "the direct descendants (of course with some admixture of French and other blood) of the majority of the savages who escaped from the great battle of the Kennebec in Maine, where the English commander, Bradford, overthrew their tribe Dec. 2, 1679." Many of the survivors fled to Canada, settling at St. Francis, near Pierreville, Que., in 1680, whither others subsequently migrated. The Penobscot Indians of to-day "are the descendants of those of the early Abenakis, who, instead of fleeing to French dominions, eventually submitted themselves to the victorious English." The name *Abenaki* is a French corruption of the eastern Algonkian *Wonhbanaki, Wabanaki, Wapanakhi*, "Easterner," in reference, some hold, to the legendary origin of these tribes in the east. The Micmacs seem to have occupied at the period of their greatest extension the eastern half of New Brunswick (and part of north eastern Quebec, south of the St. Lawrence), all of Prince Edward Island, Nova Scotia and Cape Breton, and, more recently, part of Newfoundland. The Maliseet territory embraced (according to Ganong) all of the St. John's valley (except, perhaps, the mouth) and the valley of the St. Croix. There were two divisions, the "St. John's River Indians" (or Woolahstukwik), and the Passamaquoddies of the St. Croix basin—to the west lay the Penobscots about the river of that name. According to Rand (1875), the country of the Micmacs (Megumaage) was "divided into seven districts, each having its own chief, but the chief of Cape Breton was looked upon as head of the whole." These districts were Cape Breton, "at the head" of the wampum belt; Pictou, Memramcook, Restigouche, Eskegawaage (Canso to Halifax); Shubenacadie, Annapolis (to Yarmouth). Beyond these areas the Micmacs roved, of course, in their canoes, reaching the coast of Newfoundland, and proceeding at times for long distances up the river St. Lawrence, where they came into contact with the Montagnais, etc. The origin of the name *Micmac* is not known . The word *Maliseet* is said to mean "broken language,"—*Etchemins*, according to Gatschet (1897) is their Micmac name.

Relations with other peoples. As the vocabulary obtained by Jacques Cartier in 1534, and his further discoveries of 1535-1536 indicated, the banks of the St. Lawrence from Hochelaga (Montreal) to Stadacona (Quebec) were, at the beginning of the sixteenth century, occupied by peoples belonging to the Iroquoian stock, while the country about the Saguenay was held by Algonkian Indians, who also possessed the most of what is now the Maritime Provinces of Canada, and probably, likewise, some of the region to the south of the St. Lawrence in the eastern portion of the modern Province of Quebec. Between the advent of Cartier in 1534-5 and that of Champlain in 1608 (the specimen given by Massé in Champlain's *Voyages* (1632), is Montagnais), the "towns" of Stadacona and Hochelaga, together with all evidence of Iroquoian power in this region, had entirely disappeared. The country was roved over by a few Algonkian tribes, who made no very great impression on the European explorers. The Iroquoian peoples were found massed about the country to the south of the upper St. Lawrence and Lake Ontario, while a state of constant warfare existed between them and the neighboring Algonkian peoples in alliance with whom were the Hurons, a tribe of Iroquoian lineage, as evidenced by their language. The conflicts of the Micmacs and other allied tribes of Acadia with the Iroquois (Mohawks in particular) were very sanguinary, and the former often advanced far into the territory of the latter, as several place-names, besides traditions, demonstrate. In the harbor of Bic, on the south shore of the St. Lawrence, beyond the mouth of the Saguenay, lies an island called "L'Islet au Massacre," in memory, it is said, of the slaughter by the pursuing Iroquois of 300 Micmacs (men, women and children) in the time of the French-English wars, in which the Micmacs fought against the English (until 1760). This tale is, however, equalled by the tradition of the treacherous destruction of a party of Mohawks by the Abenakis on one of the islands below the mouth of the Keswick river, not far from Fredericton, N.B. The Mohawks, who are called in Micmac *Kwedech*, figure considerably under that name in Rand's *Legends of the Micmacs*, and other like works. The Mohawks made many raids in the St. John country, where the sites of battles are still pointed out by the Indians. In 1808 a council of whites and Indians (including Mohawks) was held at St. Andrews, N.B. Not infrequently the Micmacs and allied tribes made incursions into the country of the Iroquois. The Micmacs from Cape Breton and Nova Scotia, in alliance first with the French and then with the English, helped exterminate the Beothuks of Newfoundland, if, indeed, they had not begun the work before the arrival of the whites. The Micmacs had also some contact with the Algonkian Indians of the north shore of the St. Lawrence, and with the Eskimo in the Gulf. They have had feuds with the related tribes of Acadia in earlier days. Rand reports several traditions of wars with the Maliseets (Milicites), called *Kuhhusooük* ("muskrats") by the Micmac; they had also many disputes with the Passamaquoddies, including a "great war," which was finally ended by a permanent treaty of peace. Feuds were formerly numerous between the Maliseets and the Penobscots.

The Algonkian tribes of the north shore of the upper St. Lawrence and the adjacent interior Montagnais, Nascapies, etc., have had, as those nearest them have to-day, encounters with the Eskimo. Those of the past were very sanguinary. But the relations between

the Indians of the interior of Labrador and the Eskimo are (according to Turner in 1882-4) quite friendly, and some of the former are even parasitic on the latter, chiefly old men and women left behind in the hunting season. These impose on the good nature of the Eskimo. Considerable intermixture has taken place between the white settlers and the Indian tribes of the Eastern Provinces, some authorities going so far as to say that "among the Atlantic coast Algonkians no full bloods survive." The Montagnais, etc., have intermingled to some extent with the French Canadians, and Du Boscq de Beaumont (1902) noticed at Pointe-Bleue a number of halfbreeds, children of Montagnais mothers and Irish employees of the Hudson's Bay Company.

The intermixture of the Micmac and related tribes with the French, English and Scotch inhabitants of the Eastern Provinces has been of long continuance. In certain French parishes in New Brunswick, e.g., there is said to be hardly a pure-blooded white man or a pure-blooded Indian. The Indians of the Eastern Provinces found the French easier to get along with. According to Gabe Acquin, "Sachem of the Abenakis," who died in 1901: "The French lived among us, learned our language, and gave us religion; they were just like ourselves; that is why we thought so much of them." That there is justification for this belief is clear from the statement of Rand, who says that in 1846 "the power of caste and prejudice against the Indians was so strong in Nova Scotia that even such a good man as Isaac Chipman did not dare to allow me the use of an unfinished and unoccupied room in Acadia College, in which I could obtain lessons from one solitary Indian, for fear of affecting the prosperity of the college." Rand adds, with some exaggeration, that "of the present condition of the Indians of this province 80 per cent. of the improvement has taken place within the past 25 years."

The Abenakis of St. Francis have, of course, during their residence of more than two and a quarter centuries in Canada, absorbed a considerable amount of French blood, as have also the Hurons and Mohawks of the Province of Quebec.

Physical characters. The Naskapi, according to Turner (1883) are, both men and women, not quite so tall as the Indians of the southwest of Ungava. The Montagnais, according to Boas (1895) are considerably shorter than the Micmacs. They are also more brachycephalic (the average cephalic index of 79 individuals was 81.5; of these 16.5 per cent. were below 79 and 21.7 per cent. over 84). Of 220 Micmacs and Abenakis the average cephalic index was 79.8; below 79 there were 44.3 per cent., and over 84 only 7 per cent. The Micmacs and related tribes (the Eastern Algonkians generally) are rather tall. The average stature of 79 Micmacs and Abenakis (Boas) was 1717 mm. (5 ft. 7 in.), with 7.6 per cent. below 1660 mm. (5 ft. $4\frac{3}{10}$ in.), and 45.7 per cent. above 1730 mm. (5 ft. $7\frac{1}{10}$ in.). The average stature of the Micmac and Abenaki women was 1579 mm. for full-bloods, and 1577 mm. (5 ft. $\frac{1}{10}$ in.) for falf-bloods. The male half-bloods averaged 1727 mm. (5 ft. $7\frac{3}{10}$ in., somewhat taller than the full-bloods. The half-bloods seem more variable than the full-bloods. In their earlier years the Indians are taller than the *métis*, but near puberty the latter catch up.

The tall stature and lower indices of the Micmacs and related tribes (taken in connection with the same phenomenon in the more ancient skulls from this area of North America), seem to justify, ac-

cording to Dr. Boas, belief in an admixture in times past of Eskimo (dolichocephalic) blood in the Indian tribes of New England and the Maritime Provinces, parts of Quebec, and even Ontario, a view supported by archæological evidence.

Temperament, character, etc. The general reputation of the Montagnais is stated by Turner (1883) to be "quiet and peaceable." The Naskapi seem to be "more demonstrative." They are said to ridicule men who allow their women to rule them, etc. "Either sex can endure being beaten, but not being laughed at; they rarely forgive a white man who laughs at their discomfiture." Of these Indians in general Chambers (1896) says: "So far as morality and respect for law and order are concerned, these Montagnais and Nascapees of Labrador will now, as a rule, compare favorably with those boasting a loftier Christianity and a higher plane of civilization." Although they fondly cling to many of their old beliefs and superstitions "Christianity and the northerly advance of civilization have done much for these poor people." In 1808 Mackenzie declared that in the Montagnais he found "concentrated all the vices of the whites and Nascapees, without one of their virtues." They were "neither Nascapees nor whites, but a spurious breed between both."

The songs and dances known to have existed among the Micmacs indicate that, although their environment was not always one of plenty and abundance, they could at times be merry of heart and soul. The sense of humor in their myths and folk-lore is also notable. Maclean (1896) describes the Micmacs of Quebec, New Brunswick, Prince Edward Island and Nova Scotia as to a large extent "honest and industrious," but often much given to drunkenness and parasitism upon the whites of the towns. Those of Nova Scotia seem to have the best reputation, being "generally self-supporting, and reputed an honest, industrious and law-abiding people." Poverty and drunkenness appear to be the chief troubles of the Micmacs. The Abenakis are credited by the older chronicles with being of a gentler and more docile disposition than the Algonkians further west. The "Abenakis" of the river St. John were described in 1881 by Mr. Edward Jack as "a civil, harmless people, not nearly so much addicted to strong drink as they once were." Before being affected by contact with the whites the condition of these "Abenakis" is stated thus by Mr. Montague Chamberlain (1895): "They were honest, truthful and just; hospitable to a fault and unswerving in their fidelity to their friends. They are still hospitable, and the best of them are honest and faithful." While possessing marked reserve, bashfulness in the presence of strangers and keen sensitivity to ridicule, "when among intimates they converse with ease and volubility; repartee is much enjoyed, and their conversation is spirited, and not infrequently very mirthful."

Intellect, senses, etc. Before the arrival of the missionaries and the commencement of their work among them, the Montagnais, etc., are described, but with some exaggeration, as Algonkians of the lowest type, suffering from malnutrition and all its effects. Their ability as canoe-men, their skill in hunting to-day are, however, praised by the whites. Chambers (1902) says: "In the waters that are the highways through their northern hunting grounds they are the most skilful canoe-men and best of guides. Ashore, in the practically trackless forest, they are the most polite and obliging of servants. No domestic was ever more particular about the comfort of her mistress

than these Montagnais are in promoting that of their patrons in camp or canoe." According to Turner (1883) the Naskapi Indian is "not the physical superior of the Eskimo," and he has less ability to endure fatigue, but is, perhaps, as able to bear the effects of cold. Enmity and hatred among them chiefly arise through the sexual passion. Men exhibit jealousy less than women. According to Turner, among the Naskapi, women are less demonstrative than men, who, "after a protracted absence from each other, often embrace and shed tears of joy." The Naskapi, although not such good marksmen as the Eskimo, excel the latter in rapid firing. The feeling for cruelty now vents itself on the wolverine, which the Naskapi is said to take delight in torturing. In wrestling, of which they are fond, they fail to defeat the Eskimo, who are physically stronger. They do not readily swim; and have invented a kind of "swimming board" for use in the hand. That the intellect of the Micmacs and allied tribes is of a higher order than has generally been attributed to them is shown by the contents and motifs of many of their myths and legends, songs, etc., some of the last exhibiting a remarkable purity of thought and diction. Of the Passamaquoddy song telling of the attack of the squirrels on the Lappilatwan-bird, Professor Prince says that he can find "no parallel in any other literature." The summer-song, and the song of the loves of the leaf and the fire-bird are, likewise, noteworthy. Professor Prince (1902) says of the Micmacs that "their grade of intelligence is much lower than that of the other members of the same (Abenaki-Wabanaki) family, but they still have a vast store of folk-lore, legends, and poems." Rand gives a higher position, apparently, to the Micmacs than does Prince, and ascribes to them great knowledge of plants and animals, topographical lore and memory, etc. Many Micmacs and individuals from closely related tribes have been expert guides, canoemen, etc., for the whites. They are also exceedingly skilful with the spear as fishers, and with the gun and rifle as hunters. The moose-calls of the Micmacs and the wild-goose call of the Naskapi and several other hunting devices of these Indians are worth recording.

Health and disease. The Montagnais and related tribes, even in the early days, when the missionaries first met them, were subject to such diseases as resulted from lack of nutritious food. They had been driven from more satisfactory habitats by the Iroquois, and often felt the effects of famine. They had also to compete with the Eskimo, to whom Turner (1883) ascribes "greater endurance and perseverance." The prevailing diseases among the Naskapi are those of the lungs and the bowels, due to exposure to extremes of wet and cold, and the inhaling of the smoke and foul air of the wigwam. Half the illnesses that afflict them "are due to gluttony." Turner also reports that "indolent ulcers and scrofulous complications are frequent." For remedies they resort to the shaman, with his drum and incantations, and to "potions compounded by the white trader, in which they have unlimited faith. They are fond of the steam bath and possess the characteristic Indian "sweat-house." Some of the Montagnais (e.g., the Attikamegs, of the St. Maurice basin, in 1670) have been practically exterminated by the smallpox.

In the legends of the Passamaquoddies and related tribes, *K'seenoka*, "Disease," is represented as being the poohegan, or "guardian spirit" of a witch, named Kwagsis ("Fox"), who was sent by a great

chief to afflict the "Giant Witch" with sores and boils, and aches and pains. The "Giant Witch," however, was cured of all his diseases, by Kwiliphoit, the god of medicine who sent him, by the humming-bird, the healing plant *keekayween' bisoon*. The extra-individual and "magic" origin of disease is typified in other incidents in the tales of these Indians. Resort to cure by the devices of the shaman was widespread among the Indians of the Eastern Provinces. Drunkenness and diseases, due to immoral relations with the whites, together with the troubles from malnutrition, are their chief afflictions in modern times. Where they are at all in favorable circumstances, these Indians are not dying out rapidly, but rather holding their own. Turner (1883) reports of the Naskapi that during the two years he was with them the mortality appeared to be low, and births exceeded deaths. The Dominion statistics for 1904 indicate that in each of the Provinces of Quebec, New Brunswick, Nova Scotia and Prince Edward Island the number of births among the Indian population exceeded the deaths. There appears also to have been an actual increase in the total number of Indians in Quebec and Nova Scotia, and a small decrease in those in New Brunswick and Prince Edward Island.

Occupations, industries, arts. The Naskapi are and have been chiefly hunters and fishers, the former more characteristically. The deer, the bear, the wolf, the beaver, the wolverine, and other small game are killed for their skins or for food purposes (the caribou "provides them with the greater part of their food and the skins afford them clothing"). The bow and arrow, formerly much in use among the Naskapi and Montagnais, has been practically driven out (except the blunt arrow for killing ptarmigan, rabbits, and those used by boys in shooting at board images of animals, etc.) by the white man's gun. Small cross-bows (imitated from the whites) are also used by children, along with their own bows and arrows, to shoot birds. Among the characteristic weapons and implements of the Naskapi, as described by Turner (1883) are the lance or spear (used particularly for deer), the caribou-snare, the beaver-net, etc. Snaring methods of taking game were formerly much more in vogue. Other implements and tools in use among the Naskapi are the 'crooked knife," skin-scrapers, awls, ice-picks, ice scoops and shovels, etc. For purposes of travel and transportation these Indians have the snow-shoe (in four styles) the toboggan and the birch-bark canoe (two sorts). The Naskapi seem to be much less interested in or expert at fishing than hunting. According to Chambers, "the Nascapees cared little for fish or fishing, so long as game was plentiful." Nevertheless, the Montagnais have furnished to the world in *ouananiche*, the name of an important game fish.

The Micmac and related tribes were also essentially hunters and fishers, their situation enabling them to pursue both occupations, which are, consequently referred to in tales and legends. As spearers of salmon, takers of cod and pollock, killers of moose, etc., they have long been famous. In their hunting and fishing they have been more influenced by long contact with the whites than the Naskapi and Montagnais, but have also given more to the whites, particularly the Canadian French, as is proved by the entrance into the European languages of America of such words as *caribou, killhag, nigog, pokeloken, pung* and *toboggan, sagamore, togue, touladi*, etc. It was

from the old Micmacs that the whites borrowed the toboggan. Some of these Indians, like the Naskapi and Montagnais (here, however, the environment was less favorable) showed no marked tendency towards agriculture, although in parts of the Micmac area corn, beans and squashes were cultivated. What Gatschet (1897) says of the Passamaquoddies applies, or did apply, to some other tribes. "Fishing is one of their chief industries, but in this they now follow entirely the example set by the white man; they care nothing for agriculture, and their village at Pleasant Point is built upon the rockiest and most unproductive ground that could be selected." The agriculturally-disposed section of the Montagnais at present consists of those of mixed blood. Root-grubbing, peeling of the inner bark of trees, gathering and drying berries, etc., were the commonest provender-occupations, outside of hunting and fishing. The Indians of the Eastern Provinces manufactured considerable bark and woodenware (the French-Canadian word for a large wooden spoon, *micouenne* is of Micmac origin).

The artistic sense of the Naskapi expresses itself in the ornamentation of their skin clothing, etc. (paint, beadwork), the buckskin garments are decorated by means of paints (native and obtained from the trader) applied with bits of bone or horn of a peculiar shape, quite complicated patterns being sometimes laid on.

The highest limit of art among the Micmacs and closely related tribes is reached in the pictography on birch-bark, in quill and beadwork, basketry, etc. Some of the tribes had also a sort of mnemonic wampum record (strings of shells). These things made easier the acquisition of the Micmac hieroglyphs of Kauder (1866) in which quite an amount of religious literature has been published. Body-painting and personal adornment with shells and feathers were in vogue in earlier days. Though these Indians have been much influenced by the introduction of ideas and materials from the whites, their manufactures of to-day (canoes, vessels of bark of all sorts, baskets, various souvenirs and knicknacks for the tourist and summer-visitor) show that they have not altogether forgotten their ancient arts and industries.

Games and amusements. The Naskapi, according to Turner (1883), are very fond of a sort of game of draughts or checkers which they play day and night,—"some of the men are so expert that they would rank as skilful players in any part of the world." They have also a "cup-and-ball" game. They had a number of dances and festivals. Their only musical instrument is the drum. The children have rattles, dolls and other toys.

The Micmacs and closely related tribes had a sort of dice-game (pre-Columbian) known as *wolteskomkwon* or *wodtestakun*, the invention of which is attributed to Glooskap, also another called *wobunamunk*, said to have been invented by the turtle. Bone disks and counting-sticks were in use with these games, which were played with a wooden bowl (or, later, the "dice" were thrown on a blanket), etc. These Indians had also a sort of football game called *tooadijik*, and one lacrosse known as *madijik*. It is said during the four days after weddings games were played, among them the dice-game, football and lacrosse. The Micmacs, etc., had also numerous dances and festivals of a more or less social or entertaining nature. References to games and gambling occur often in the myths and legends. Like

many other Indians, some of the eastern Algonkians have taken readily to the playing cards of the whites.

Social and political organization. The Montagnais and Naskapi seem to have been polygamous in the early days, with very loose sexual morality, ability to maintain them being the limit of the number of wives taken. Turner (1883) says of the Naskapi that "their sexual relation are very loose among themselves, but their immorality is confined to themselves." Polygamy is still common (marriage takes place early), divorce is easy, and, as with the Montagnais, women are decidedly social inferiors. Among the Micmacs and closely related tribes the position of woman seems not to have been very high (although female chiefs are occasionally mentioned). The marriage ceremony among the eastern Algonkians was simple, the feast or festival in connection therewith being the principal thing (they lasted sometimes for a whole week). With some of the Abenaki tribes more detailed marriage ceremonies (influenced by white customs possibly) came into use. The children of the Eastern Algonkians were well-behaved and chastisement was very rare or absent,—so also disputes between children and among youths.

The Naskapi and Montagnais seem to have had special family rights in hunting-grounds (inviolable by others). These rights were vested in the woman, the men acquiring them only by marriage. Descent in the so-called "Abnaki tribes" appears to have been reckoned in the female line. Their animal totems seem to have been numerous (bear, beaver, otter, partridge, etc.).

Among the Naskapi and the Montagnais, and probably also among some of the more southern Eastern Algonkians the custom of killing the old people prevailed and they are said also to have been sometimes eaten by their friends (the hearts of warriors were also devoured to inspire courage).

To-day the chiefs of the Eastern Algonkians are elective (under the influence of the missionaries and the government to some extent). According to Rand, the Micmac council now has in it representatives of ten different tribes. The characteristic council of the old men (among some of the New Brunswick Indians appointed by the chief) was presided over by the *sakem* (our *sachem* and *sagamore* are both loan-words from Micmac, etc.), or chiefs, elected by the people at large, and limited in power by actions of the council. The death of a chief was marked by appropriate ceremonies and likewise the installation of the new one. According to Prince, "the members of one tribe alone could not elect its chief · according to the common laws of the allied nations, he had to be chosen by a 'general wigwam' "—the Micmacs, Penobscots, and Maliseets thus helped choose a chief for the Passamaquoddies, and so on. This was in the days of the "confederacy." The largest developed social center of the individual tribes appears to have been the stockaded village of the Micmacs. Gatherings of several of the tribes at fixed places for various purposes were quite common,—islands often served for such meetings. Their summer camps were really often stockaded "villages" with a dance-ground in the center.

Religion, superstition, etc. According to recent authorities, the Montagnais Indians, especially those toward the interior, still continue many of their old heathen practices. They originally had the common Algonkian belief in manitous, spirits or mysterious beings.

both good and evil, but now, somewhat influenced by the teachings of the whites, they have a "bad spirit" and a "good spirit," the latter being so good that he is neither feared nor worshiped, although to him is often attributed the creation of the earth and the making of man, the other a busy being, spending time and labor in seeking to frustrate and undo the good works of the other. Mackenzie (1808) reported the Montagnais and Naskapi as believing in a deity who created the animals and allotted them to the Indians, who invoke him in time of need,—this god was "no longer than their little finger, dressed in white, and called *Kawabapishit* (or the White Spirit)." They held in special regard the bear and the moose, the former being the object of peculiar rites both among the Montagnais and the Naskapi. When the first bear of the season had been killed a great festival was held in honor of Kawabapishit,—in the centre was placed the skin of the animal, "stuffed with hay, and the head and paws decorated with beads, quills and vermillion." The bones were subsequently ceremoniously suspended from a pole. The skulls of bears were placed one above another on poles with pieces of tobacco in the jaws. The heads of some other animals (also of the pike) were sometimes suspended in similar fashion. With the Naskapi, according to Chambers, "the painted skin of a bear forms an essential part of the outfit of their conjurers or medicine men." The animals all have their own spirits, which live on after death, clothed in other material forms, so that the number of the species is not diminished by the Indian slaughter of beasts of the chase. Although the Indians revere the bear so much, he is, nevertheless, the one they most desire to kill (hand-to-hand contests are even reported). From a wish not to offend the spirit of any animal they may kill, the Indians never throw its bones to the dogs, but bury them in the ground, sink them in deep water, or reduce them to ashes in the fire.

The Montagnais and Naskapi have always been noted for their "jugglery," or shamanism, still flourishing among the pagan Indians and not unknown among the Christian at the present day. The medicine-man practices his *ikanze*, or "sorcery," in a special "lodge" of small dimension, in which he invokes the spirits of all sorts, who visit him there,—even Kawabapishit is seen and conversed with. The processes and implements employed include bodily contortions (till exhaustion is induced), drum and rattle, groaning and chanting "magic formulae," etc. Some of these shamans have impressed the whites by their "spiritualistic" performances, prophecies and the like. The prayer of the shaman for a good hunting-season is stated by Mackenzie (in Chambers) thus: "Great master of animals among the clouds, bless us, and let us continue to make as good a hunt as usual."

The Montagnais and Naskapi, since the arrival of the whites and the missionaries, have adopted interment for the disposal of their dead to a large extent,—in earlier days scaffold burial and suspension from trees were in vogue. According to Turner (1883) the Naskapi have no such dread of a corpse as have the Eskimo, but will often rifle the graves of the latter, or even strip the clothing from an individual recently deceased.

Upon the Abenakis, Micmacs and closely related tribes the teachings of the whites with whom they have been so long in contact have exerted considerable influence, particularly in the matter of religious

ideas, even where the Indians have not been converted to Christianity. Of the "Abenakis" (properly Maliseets) of the River St. John, near Fredericton, Mr. Edward Jack (1892) says that they called the "Great Spirit" *Ketsi Niouaskoo*, and the "Evil Spirit" *Matsi Niouaskoo*,—adding that "one of my Indian friends said to me he had read about the latter in his catechism, and that he is the devil." In Micmac *mundoo* (the Algonquian general term for "spirit," mysterious being) now signifies "devil," and several words for "God" have arisen,—*Nixkam*, "Our Father;" *Nesulk*, "Our Maker;" *Ukchesakamou*, "Great Chief." The older Etchemin and Sheshatapoosh vocabularies give for "God" *saisos* and *shayshoursh*, respectively, which are evidently corruptions of the *Jésus* of the French missionaries. The so-called "evil spirit" is said to have been the one chiefly "worshiped" by the Indians of Acadia. The Micmacs and related tribes were profound believers in the powers of the "wizard" or "sorcerer," of whom the earlier chroniclers had so much to say. Tales of his power of transformation, ability to "curse" and cast spells, sink into the earth, communicate at a distance, fly through the air, remain under water, etc., abound. These "medicine men" were formidable opponents of the Christian priests, as the tale recorded by Prince and Leland, of "the wizard and the Christian priest" indicates. Rand, in 1850, said "the present generation appears to be as firmly rooted in the belief of supernatural powers exercised by men as ever their fathers were," and Prince, in 1902, notes that this belief still survives among these Indians to a large extent, "though subordinate of course to the Catholic doctrine, which nearly all of them (Passamoquoddies) profess." The Abenakis of St. Francis, Que., are very closely related to the Penobscot Indians of Maine, and the older religious beliefs and superstitions, now abandoned, correspond to those of that people.

In their adoption of Christianity, the Indians of the Eastern Provinces have practically all accepted Catholicism, very few Protestants being found among them.

Mythology and folklore. The mythology and folklore of the Montagnais and Naskapi Indians, like their language, are closely related to that of the Cree and cognate tribes of the Hudson's Bay region. Turner (1883) reports that the Naskapi "older men have a great stock of stories, and many of the women are noted for their ability in entertaining the children, who sit, with staring eyes and open mouth, in the arms of their parents or elders." Among the creatures figuring in their animal-stories are the wolverine (the embodiment of cunning and mischief), the reindeer, the squirrel, the otter, the wolf, the bear, the rabbit, the frog, the muskrat, the beaver, the martin, etc. In one legend the beaver and the muskrat are represented as creating the white man, the Indian, the Eskimo, the Iroquois and the negro,—the muskrat was the mother, the wolverine the father of all. After these children grew up they separated and scattered over the country as they are found now. The prominence of "starvation" in the stories of the Montagnais and Naskapi is accompanied by the persistence among them of anthropophagous practices, in most cases "hunger-cannibalism." Belief in the *witiku* (the *wendigo* of western Algonkians), or man-eating demon is strong with the heathen, and in many cases also, with the Christian Indians. Many instances are cited where Indians are said to have gone mad

suddenly, and turned into *witikus*, with an insatiable desire for human flesh. One can see in these beliefs a reflection of the environment of these Indians, who time and again must have been subject to famine and liable to extinction for lack of food, particularly when the game animals migrated to long distances from their usual habitat, or were themselves stricken by some disease or other. Lunatics and epileptics, people who suddenly lose their reason for a time, are still regarded by some of the Indians of the interior as wendigos, and are killed by stealth. Chambers informs us that these man-eating monsters, called by the Naskapi *atshem*, are believed to appear in the forms of sorcerers, man-eating moose, or as creatures rivaling the classic Cyclops and the Homeric Polyphemus. *Windigo* river has received its name from the fact that the Indians avoid it, believing that it is the "hunting ground" of a monster of this sort. The most notable figure in the mythology and folklore of the Micmacs, and related tribes is *Glooskap* (in Passamaqoddy *Kulóskap*, Penobscot *Klûskâbe*), corresponding to the Ojibwa *Manabush*, or *Naniboju*, the Cree *Wisaketchak*, etc., and like these, appearing sometimes in the light of a trickster, deceiver, or even buffoon. His name really signifies "the liar," some say because he promised to return, and has never done; but others, with Prince, hold that he is so termed, "not because he deceives or injures man, but because he is clever enough to lead his enemies astray, the highest possible virtue to the early American mind." The "epic of Glooskap," as it has been styled, tells how he created man and became his friend, did many great things for him, made and named the animals (afterwards conquering and transforming some of them) victoriously fought and destroyed giants, sorcerers, monsters of all kinds ("cleaned up the world"), found the summer, etc., and afterward, angered at the ways of men and animals, left the world, sailing over sea in his canoe, promising to return some day. The departure of the culture-hero caused the inhabitants of the world to lose much that was common to them in habits, languages, ideas, and resulted in the separation of man from the animals and the differences now existing in the habits of the beasts, birds, fishes, etc. Another prominent figure in Micmac mythology is *Lox* (Abenaki *Alaskan*), the wolverine, a great mischief-maker, and deceiver. Others of importance are the rabbit (who is often very cunning), the serpent (who cohabits with women), the partridge (a "great hero"), the martin (servant of Glooskap), the bear, the badger, the woodchuck, the whale, the beaver, the tortoise, the loon (magician and friend and messenger of Glooskap), the owl (counsellor and friend of Glooskap), the flying-squirrel, the fish-hawk, etc. Figures of a somewhat different sort are the thunder-bird; *Wuchowsen*, the "wind-bird;" the giant-bird, *Kulloo; Kewok*, formless and icy-hearted; the *Chenoo*, or northern giant; *Kulpujot*, a shapeless being, whose turning over (his name signifies "rolled over with handspikes") twice a year produces flowers. Many of the characters in the legends of the Micmac and related tribes are of a very curious nature. There are many stories of dwarfs and giants. In some cases a close approach is made to the European folk-tale. As may be seen from the examples in Leland and Prince, as well as in the collection of Rand, witchcraft lore is abundant. The story of how the baby conquered Gluskap deserves a place in the world's best literature of childhood. "Fairies," tree-spirits, water-spirits and monsters, etc., are the subject of many stories.

In some of the tales cannibalism (especially by wizards) is referred to, and even cannibalistic feasts are mentioned, but there is no particular reason to believe that anthropophagy was ever common among them,—hunger and ritual account probably for most cases occurring.

Language. The speech of the Montagnais and Naskapi (and of the practically extinct Skoffie) is closely related to that of the Crees, with which branch of the Algonquian stock it belongs. Turner (1883) attributes the differences between these tribes, in the matter of language, "wholly to environment." The oldest specimen we possess of an Algonkian text is one of the "Montagnards," as they were known to Champlain, who met them at their great trading-place (Tadousac) at the mouth of the Saguenay. The changes in the language since his day are not nearly so great as some writers have imagined (this is shown by reference to the vocabularies dating from 1808, published by the Massachusetts Historical Society). Chambers (1896) describes the Montagnais as "an exceedingly expressive language, and very rich in varieties of inflection." The verbal forms, like those of some other Algonkian languages are exhaustive. The dialect of these Montagnais Indians once extended, apparently, high up the St. Lawrence (perhaps as far as Montreal), and Father Le Jeune, in 1636, states that "whoever should know perfectly the language of the Quebec Indians would, I think, be understood by all the nations from Newfoundland to the Hurons,"—this is probably somewhat exaggerated. Father Le Jeune reported likewise that between the language of the Montagnards and that of the Nipissiriniens (the so-called "true Algonquins") "there is no greater difference than between dialects spoken in different provinces of France." The Montagnais is, with certain varieties of Cree, the only Algonkian language in which the letter *r* is in normal and extensive use.

The language of the Canadian Abenakis of St. Francis has been recently investigated by Professor J. Dyneley Prince, who finds it very closely akin to that of the Penobscots of Maine, indeed, "we have to deal with a dialectical differentiation which must have taken place within a period of 222 years, *i.e.*, from 1679 to 1901, during which time practically no communication has taken place between the Maine Indians and their Canadian cousins, except the visits of a few wandering hunters." The main differences are of a phonetic nature, the Penboscot being more archaic. Penobscot has also preserved the obviative *l*, and kept intact to a greater extent the "original pure polysynthesis." The vocabularies have not deviated widely. The Akenaki, however, has retained the ancient nasal sound, which seems to have practically disappeared in Penobscot. The Abenaki has also changed the system of intonation, which the Penobscot, and the Passamaquoddy, have retained with greater purity. The voice *timbre* of the Abenakis is also lower. Abenaki contact with the French may account for some of these changes. Abenaki, like Penobscot (and Passamaquoddy) lacks "the so-called sur-obviative or third person of Cree and Ojibwa." The following sentences from Prince will indicate how close is the relationship between Abenaki, Penobscot and Passamaquoddy:

1. *English*: My brother told me long ago there quarreled certain wizards.

2. *Abenaki*: Nijia ndonhdokaokw nauwat kizgat nozigad'n awodowak m'deaulinwak.

3. *Penobscot*: Nijia ndonhdonhkeukw nauwat kizgong'sigad'n awodohid'wak mdeaulin'wak.

4. *Passamaquoddy*: Nziwes ntulag'nod'mak piche kiskakesigd'n madndoltitit mteaulinwuk.

The Micmac language, as compared with such a standard Algonkian tongue as *e.g.*, the Cree of Ojibwa, shows marked divergence in vocabulary and certain grammatic and phonetic peculiarities, which suggest (the same may be said of the Blackfoot at the other extreme of the Algonkian area) a disturbance due to the former presence, perhaps, of some non-Algonkian form of speech in the Micmac country. Concerning the relation of the Micmac to those of the cognate tribes Professor Prince says (1902); "Their language differs so greatly from the dialects of the Penobscots, Abenakis, and Passamaquoddies that the members of these clans always use English or French when communicating with their Micmac neighbors, while an intelligent Passamaquoddy can without difficulty understand a Penobscot or Abenaki, if the dialect is pronounced slowly." The Abenaki (and Penobscot) the Maliseet (Etchemin, Passamaquoddy), and the Micmac—with closely related dialects now or formerly existing in what was called Acadia and part of the region to the west and north—constitute a branch of the Algonkian stock; and also a confederacy, in former times, said to have included also the Delawares or Lenâpe. To this confederacy the name *Wabanaki* (*Abenaki*), now retained as a tribal appellation by the Canadian Abenakis, was applied as a generic term, though there is some dispute as to its exact significance. Gatschet in 1897, applies the name *Abnaki* to the Penobscots of Oldtown, Me., the St. Francis Indians of Quebec, the Passamaquoddies of Maine, the Milicites (or Etchemins) of the St. John's River, N.B., and the Micmacs of Nova Scotia and eastern New Brunswick, etc. These are "the surviving Abnaki peoples."

As a specimen of the Micmac language the following translation of the first verses of the Gospel of John may serve:

1. Tan umskwes poktumkeaak Kulooswokun ahkup, ak Kulopskwokun tegwaooobunul Nikskamul, ak Kulooswookun Niskamawip.

2. Na Negun tan umskwes poktumkeaak, tegwaooobunul Niskamul.

3. 'Msit cogooaal weje-kesedasiksubunigul Negun ootenink, ak tan cogooa Negum moo kesedooksup, na moo kesedasenooksup.

4. Memajoookun ootenink ahkup, ak na memâjooenook oowosogwegumoooowna.

5. Ak wosogwek wosadek bogunitpaak iktook ak bogunitpaak moo weswadoogoop.

Within the Micmac area there appear to have some slight dialectic variations at least; but, according to Rand, the diversity includes only the use and pronunciation of a few words. The Micmacs of Cape Breton pride themselves on the purity of their language at the expense of the Micmacs of Nova Scotia, and vice-versa; so too those of Prince Edward's Island and Mirimichi.

For further information concerning the Indians of the eastern Province of Canada reference may be had to the works cited under

the various tribal names in Pilling's "Bibliography of the Algonquian Languages" (1891) and to the following others: Montagnais, Chambers, "The Ounaniche" (1896), and the list of authorities therein. Naskapi: Turner, Rep. Bur, Ethnol., 1889-90. Micmac, etc.: "Leland, Algonquian Legends of New England" (1885); Leland and Prince, "Kulóskap, the Master" (1902); Prince, various articles in the proceedings of the American Philosophical Society (1897, 1900), American Journal of Philology (1888, 1901), Amercian Anthropologist (1902), etc.; Hagar, various articles in American Anthropologist (1895), and Journal of American Folklore (1896); Montague Chamberlain, "The Abenaki Indians" (1895); and Jack, "The Abenaquis of the St. John's River," in Transactions of the Canadian Institute, Toronto (1891-92), and other writings of the last two authorities.

4. CENTRAL ALGONKIN.

By William Jones.

Introduction.

This paper is nothing more than a general sketch. It deals in brief outline with some of the larger aspects that made up the social, material, and religious life of the Ojibwas. The basis of the paper throughout rests on the results obtained during a period of about ten months of work in the field. Some of the statements are based on observation, some on the verbal information given by the Ojibwas themselves, and some on the references told of in myth and tradition. The references of myth and tradition are valuable in that they deal with events and conditions of an ancient life; with former customs which may survive only in a small remote group of silent hunters; and with the explanation of the work of nature and the origin of things, thus betraying the character of the old philosophy of the Ojibwas. It seems best in so short a description to avoid as far as possible the use of Ojibwa terms.

Society.

The social life of the Ojibwas was in many ways the same as that which prevailed among other Algonkin tribes who lived in the territory southward. There was a large number of clans, and some of them seemed to have been grouped under a feeble form of phratry.

Marriage was between a man and woman of different clans, and was usually attended with an exchange of presents between the families of the bride and groom. It was usual for a man to marry the widow of his brother, and a widower might marry the sister of his dead wife. Children followed the clan of the father. There is reason to believe that the giving of a name once had an intimate relation with the clan. But at present there is little or no connection between the name and the clan. Now-a-days a child obtains its name from an old man or an aged woman who has been chosen by the parents to act the role of a sponser. And the name given the child generally though not always bears some reference to the manitou especially revered by the sponser. For instance, had the man in his youth and during a fast dreamed of the e[illegible] and had thereby experienced an

emotional thrill which conveyed a deep sense of mystery, and if afterwards he had had occasion to believe that the sky was the source of his life and the cause of bountiful gifts, then was it likely that the name he gave would have some particular connection with the sky; for it would be his aim to place the child under the same power which he had found so benevolent to him. Such, for example, is the origin of a name like Mica'kigijik (Misha'kigijik), which means *Flood-of-Light-pouring-from-the-Sky.*"

Government.

The political organization of the Ojibwas was loose, even at the time of the first coming of the French. There was a general council with vague and limited powers, and it was possible for every man, if he liked, to become a member of the council. In this body, which was controlled by social customs and religious practices, was vested the government such as it was. It was by the council supported by public assent that a chief was selected. His power was even vaguer than that of the council, and he was less able to work his will against an existing custom. Some chiefs were able men politically and had also been successful leaders of war parties. It was common, on the death of the chief, to hand the office over to his son, particularly if the son had displayed courage, was of pleasing personality, and had given evidence of political capacity. Some chiefs have had much homage paid them bv their people.

Such a council and such a chief were limited to a group. By a group is meant a body of Ojibwa that held sway over a given district and who went under a common name; as for example, Bawi'ti-gowiniwag, *men* or *people of the rapids* was the name of the Ojibwas at Sault Ste. Marie; they were called Saulteurs by the French. There was neither a general council nor a head chief for the whole people. Some clans like the Crane and Bullhead have sometimes been regarded by their members as the leading clans of the tribe; and chiefs of the Crane clan, more especially those at the Sault, have considered themselves the head chiefs of all the Ojibwas. But it is doubtful if either assumption was ever recognized by the other groups of the tribe.

The question of justice was bound up with the social customs that regulated the clan. The individual was lost in the clan, and a man could not avenge a personal injury without running counter to the bond that linked individuals together in a clan. An injury to an individual was an injury to the clan, and a satisfaction given for the injury was a satisfaction rather to the clan than to the individual.

Property.

Property rights were vaguely defined. There were some things which could come under one's sole possession. Such were: personal belongings, like wearing apparel and objects of decoration; weapons, and the various contrivances used in the quest of food; snow shoes, canoes, toboggan and dogs, all of which were both a means of travel and of getting food; meat of every kind of game killed by the hunter, and maple sugar, cereals, and all foods obtained and prepared by women; a cache where any of these things were stored, and the pack containing them which had been left on a portage; and finally the

lodge where one lived. Every one had a common right to use any part of the land not already in use by another; the ultimate title to the land rested in the tribal group. An exclusive right to the use of the land was recognized; for example, one could hold without interference, and for an indefinite period the spot on which the lodge stood, and the plot of ground under cultivation. An exclusive right to the use of a portion of a rice bed was allowed, but it was temporary. A woman might select a patch of rice before it was time to harvest, and bind the tops of the stalks standing near together. The patch might be hers until she had harvested the rice, and then her exclusive right to its use came to an end. For the time being, the patch of rice stood in much the same relation as the place of a trap or a net rather than in that of a plot of ground under cultivation.

Possession had an intimate connection with occupation. For instance, the implements used in the chase, the canoe, the toboggan, and dogs were generally the peculiar property of the man; and on the other hand, the lodge with its house-hold effects, maple sugar, cereals, and skins belonged to the woman. In the event of separation of man from his wife, the child went with the mother.

Dwellings.

There were two characteristic forms of the Ojibwa dwelling, the bark house and oval lodge. The inside structure of the bark house was a frame of upright posts set in the ground; a post generally forked at the top, stood at each corner, and a higher post stood at the centre of each end; in between the posts stood poles; a large pole connected the two end posts and formed the ridge while smaller poles joined one corner post with another; smaller poles served for the rafters. All the poles, big and small, were held in place by cords made from the fibre of the bass and linn, and from the root of the spruce; sometimes use was made of pegs. The bark covering the frame was from elm or cedar; it was stripped in sheets, and was laid on horizontally, and overlapped from the bottom up; the bark was held in place by cord and by another frame on the outside. There were two forms of the roof, oval and gabled; the gabled roof was more common. There was usually but a single door, and it opened at one of the ends, and out in the direction away from the prevailing storms; a skin or a blanket hung like a flap over the entrance; the door was boarded up with bark when the occupants went away to be gone for a long time. Near the centre and towards the door was the fire; the smoke lifted through an opening at the top. The space between the fire and the wall was the living place; sometimes it was covered with mats spread on a bed of balsam boughs; and again a raised platform ran around the two sides and the end. The size of the houses varied with the number of people dwelling in them; they were probably never so large as the communal houses found among other Algonkin tribes who dwelt southward.

The oval lodge was built on a frame of two sets of poles. The poles of one set were placed upright in the ground; they generally went in pairs and stood at opposite sides of the frame; their tops were bent over to meet and when bound together formed an arch; the arches forward and rear were lower than those in the centre; additional poles arched toward the centre from the front and rear. The

other set of poles was laid horizontal to the arches and helped to brace the frame; the fastening of pole to pole was done with native cord. The covering of the oval lodge varied. The Ojibwas of the south made use of flag-reed mats, and those of the north used sheets of birch bark stitched end on end. Both kinds of covering were used in the districts where the materials of both could be had. The cover of reed or bark overlapped and was held down by cord and leaning poles. Strips of elm and cedar bark often formed the covering of the wall; they generally stood on end and overlapped at the sides; and they usually required an external set of arches to hold them in place. The fire-place, the arrangement of the space between the fire and the wall, and the appearance of the interior were much the same as in the bark house.

The bark house was characteristic of the village and of a settled abode; it was the home in the milder seasons of the year. The oval lodge might be seen at all times in the village, but its special use was as a home in cold weather.

Other forms of the Ojibwa dwelling were the conical lodge and a long lean-to with gable roof. The conical lodge was like that of the plains, and was built on a frame of upright poles meeting at the top. The architecture of the lean-to resembled that of the bark house; but the lean-to was low, long, and generally with a door at each end. The covering of both kinds of dwelling was usually of birchbark, but where flag-reed was obtained, mats were used with the sheets of birch bark. Such dwellings were more common with the Ojibwas of the north shore of Lake Superior.

Food.

The Ojibwas have always been a typical people of the woods. Those of the north shore of Lake Superior had few settlements, for they led a hunting life. One or more families disappeared in the bush, and did not emerge except to dispose of furs or to attend a general gathering. Many of these wandering fragments penetrated the district of Hudson's Bay and came into lively contact with the Crees. Some got round to the farther shores of the Lake and strayed off towards the Lake-of-the-Woods, and the country west and north. The voyageurs followed in their wake, and the trading posts they established often formed the nucleus of a community of these wandering hunters. The Fort William Band was one of the largest of the offshoots from the Ojibwas of the Sault.

The Ojibaws south of the Straits of Mackinaw, round about the Sault, and off the south shore of Lake Superior led part of the time a sort of sedentary life. They had villages, and cultivated the ground for maize, pumpkins, and beans. Most of them were probably acquainted with wild rice.

At the same time much of the food and the greater part of the clothing of all were obtained by hunting and fishing. Among the animals that made up the source of most of their clothing and a good deal of their food were the moose, elk, deer, bear, beaver, muskrat and rabbit. Some of the Ojibwas hunted the buffalo and caribou. The principal fish for food were whitefish, trout, pike, pickerel, and sturgeon; and of birds preference was given the goose, raven-duck, mallard, wood-duck, and fall-duck. The fall-duck was especially desired because late in the fall a great deal of grease was obtained

from it. Great quantities of sugar were obtained from maple and birch in the season when the sap was running and stored away in birch bark boxes. Strawberries, raspberries, and blackberries were a food only so long as the season lasted, but huckleberries and blueberries could be dried in the sun and preserved for future use.

Modes of Killing Game.

Game was obtained in a variety of ways. Bear, beaver, otter, mink, muskrat, and the like were caught by a wooden trap sprung by trigger and catch in combination with a weight. Moose, caribou, elk, and deer were slain with the bow and arrow; they could be overtaken by canoe when swimming, and killed by cutting the throat; a woman could kill a moose or a deer by punching an opening between the ribs with a paddle; the hole let in the water which caused the animal to weaken and drown. Buffaloes were driven into enclosures and shot to death with the bow and arrow. Rabbits and partridges were caught with the snare. Fish were caught part of the time in weirs and all the year with hook, spear, and net; fish were also shot with the arrow. Ducks were often taken in the same nets set for fish; in the rice fields late in the fall they were easily approached by canoe and slain in great numbers with the bow and arrow or simply with the paddle used as a club; they were then heavy with fat and were slow to rise. Eagles were clubbed; bait was set for them in a thicket where it was made hard for the bird to escape before the arrival of the hunter.

Cooking.

Most of the food was cooked. Meat was boiled, or roasted. Birds were boiled, or roasted, or baked in a bed of ashes and live coals; a common way of baking was to enclose the bird in a ball of clay, and then lay the ball in the bed of hot ashes. Gull eggs were boiled, or baked in ashes. Cereals were boiled, or roasted, or parched; the parching was done in a vessel, or near or in a bed of hot coals; corn might be roasted on the ear.

Tradition tells that boiling was done in earthen, wooden, and bark vessels; that the water was heated by the fire beneath or by hot stones put into the vessel; and that the bark vessel was generally of birch and would not flame if put over the fire with the water already in and if the fire was a bed of live coals.

It was considered best not to let the food become well or overdone; for it was believed that food lost strength in the cooking, and that the longer it cooked the less nourishing it became.

A favorite kind of food for a long journey was made from meat that had been roasted on a frame over a slow fire, and finished drying in the sun or in the smoke of the fire of the lodge. It was more to be relished if mixed with tallow, especially with that of a bear; it was even more choice if maple sugar and pounded rice or pounded corn were added to the mixture.

Fire.

The Ojibwas knew of two methods of making fire. One way was to spin the end of a dry stick, usually of cedar, in the socket of a dry block of the same wood; the stick was twirled by means of a bow, the cord of which went once round the stick; the top of the stick fitted into

the socket of another block; the top block was gripped with one hand and against the back of the hand was braced the chest, while with the other hand the bow was sawed parallel to the blocks, causing the stick to twirl; the live embers dropped into a lower trough where they ignited with the punk. The other method of making fire, and the one more common, was to strike one piece of flint against another; the tinder was preferably the punk of birch.

Clothing.

Men and women wore much the same style of moccasin. The sole and upper of the ancient moccasin was of one piece. The seam at the back and down in front was gathered, and from this fact an attempt has been made to derive the meaning of the term Ojibwa. If the definition be true, the modern Ojibwa are not conscious of it; and it is only the older heads who can see a connection, but usually not till it is pointed out to them. The old moccasin had a top which fell down at the side and parted at the heel and instep; each flap was appropriately called an ear, and was usually decorated with porcupine quills, and later with beads; the "ear" was longer pointed in front. A thong through the top of the instep passed under the "ears" and went round the ankle.

In the instep of the modern moccasin is a tongue which runs half way down the foot, the lower part of which is generally decorated with beads. The top of the moccasin is usually double. One part of the top is like the "ears" of the old moccasin, and almost always is decorated with beads; and the other part is a gaiter which may extend half way up the knee, and is wrapped by a thong that passes through at the instep.

Leggins were worn by men and women. Those of men reached nearly up to the hip. They hung by a thong which passed from the top of the outside and went over the hip to the belt. The leggins of women reached barely up to the knee. They were held up by a garter at the top.

Men wore loose shirts. The sleeves of some extended as far as the wrist. There were three styles of breechclout: a cover between the legs with flap overhanging before and behind; a cover with no flap overhanging either in front or back; and a flap hanging down in front, but with no cover between the legs.

Women wore two general styles of dress. One was a loose single garment that opened at the neck and arms, and reached below the knees; it was worn with a belt. The other was a skirt with a short loose jacket. Often both styles were combined and multiplied according to the severity of the weather.

The women did their hair up at the back into a stiff slender knot. They covered it with a wrap which in turn was coiled tight with ribbon. The knot was round and often a foot long. From near the bottom hung loose ends of the ribbon which nearly touched the heels. The ribbon was of various materials; the most beautiful was of woven beadwork.

Robes for both men and women were of skins with the hair left on. By far the greater part of the clothing was made from the dressed skins of moose, deer, elk and caribou. To dress a skin it was first soaked in water alone, or in a preparation of brain boiled in water; it

was then stretched on a rectangular frame of four poles fastened at the corners with thongs. The frame was leaned against a solid support, and the hair was then scraped off by means of a short, round, thick-handled tool with a short blade lashed to the bent neck of the handle; it was worked like a hoe. The skins of small animals were frequently stretched over the smoothed surface near the end of a log. To give color the skin was smoked in a smudge, that of sumache was accounted among the best.

Weaving.

The heddle loom was used in the making of belts and garters. The loom was carved from a solid piece of wood, or made from birch bark; the edge of the bark was braced between splints, usually of pine, to keep it from coiling. The shuttle was the finger or hand. In beaded work the needle became the shuttle.

A bag was woven with cord made from the inner bark of bass and cedar, and from the fibre of wild hemp. The work was done on a frame of two sticks set upright in the ground; the warp hung down and the woof moved from left to right around the sticks. Excellent bags with beautiful designs in geometric figures were made.

There were two general types of mat, one made of flag reed and another of the inner bark of cedar. Both kinds were made in the same way; they were woven from an upright frame of two poles with an horizontal pole connecting them at the top. The warp hung down from the pole, and the woof was worked from the top, moving from left to right. The mats were often colored with vegetable dye.

Basket work of a simple character was done by the Ojibwas of the south. The weave was generally of the plain checker work with the warp and woof of the same dimension. Common materials were the splints of ash and the osiers of willow and dogwood. The making of baskets was probably never very extensive among the Ojibwas. It was much easier and more convenient to fashion pails, boxes, and the larger vesels from the bark of the birch. And for the reason that it was possible to make a durable vessel from birch bark, the carving of wooden bowls was perhaps not on so large a scale as among the more southern Algonkins. But it was necessary to carve spoons, and this was done from various kinds of wood.

Transportation.

Transportation on land was mainly by pack carried on the back. The tumpline of the skin of a moose or caribou passed over the arms and across the chest when the burden was light, but when it was heavy the line went over the forehead. The contents of a pack were in a bag, bundle, or in a wooden carrying frame, and the pack rested on the small of the back. The carrier rose with the pack on hands and knees.

The toboggan made transportation easier when the snow was on the ground and the lakes and rivers were frozen over. There was a saving of labor and time when dogs were used with the toboggan.

The snowshoe made travelling easier in winter. There were two general styles of snowshoe: one was long with the end transverse, or sometimes pointed and often raised; another was short and rounded,

and was called bearfoot because of the track it left in the snow. Both kinds were usually netted with sinew and buckskin. Sometimes the "bearfoot" snowshoe was netted with bark.

Transportation by water was done with birch bark canoe and paddle. A canoe sixteen feet long was regarded a big canoe. It was built on a cedar frame of long horizontal slats between the ribs and birch bark. The ribs were of a single piece, and went up under the gunwale. The bark was stitched with spruce root and gummed with pitch. It was usual for a canoe to have five thwarts: one near each end, two towards the middle, and one at the centre. The gunwale was wrapped tight with spruce root.

The Ojibwas south of the Straits of Mackinaw used a dugout canoe made from the single trunk of a tree.

Games.

The Ojibwas found amusement in a great variety of games. The men played a rough, strenuous game of ball which has since been borrowed by the white man and developed into the sport now called lacrosse. The ball was a wrapping of cord, and was covered with buckskin gathered at one point. Frequently the ball was wooden and had a hole at opposite sides to make it whistle when going through the air. The ball was picked up from the ground, caught on the fly, carried on the run, and thrown by the use of a stick with a small net pocket at the end. The handle and the pear-shaped frame of the pocket were of the same piece. The pocket was of buckskin netting. The game was played between two opposing sides, and a score was made when the ball passed through a wicker goal from the field. There were two goals, one at each opposite end of the field. A less frequent kind of goal was a pole standing in the centre of the field. To score it was necessary to hit the pole with the ball.

A noisy variation of the game was played by women. In place of the stick with a net pocket was a plain, straight stick; and instead of the ball was a small, double sand-bag of buckskin.

There were several forms of the throwing stick, and the object sought for in them all was distance. Bets were won and lost on a throw, not only among the players, but among the people who followed looking on.

And then there were many games where the element of chance prevailed, such as in the various forms of the moccasin game, and in the different ways of playing with dice.

Just as everywhere children played they were big. The girls fondled dolls and copied the activities of their mothers and big sisters; and the boys acted in play the parts of men and early fell into the ways they were to pursue in later life.

Weapons.

The Ojibwas were hard fighters. They beat back the raids of the Iroquois on the east and the Foxes on the south, and drove the Sioux before them. The plain bow and feathered arrow was one of their most effective weapons. Hickory and ash were common materials for the bow, and a wrist guard of buckskin kept the rawhide cord from cutting. Arrows were generally of dogwood, but they were also

made from other kinds of wood. For the right-handed, the arrow rested on top of the left hand and on the left side of the bow; for the left-handed the arrow was on the other side of the bow. The release was generally from the thumb and forefinger, and the cord was pulled back by the next two fingers.

The smashing weapon at close quarters was a war club with a knob drooping over at the end. Frequently a blade with two edges projected from the knob, turning the weapon into a kind of pickax. The flat "rabbit hind leg" club was mainly a ceremonial object.

Picture Writing.

The Ojibwas made use of rude pictures drawn on birch bark to express thought. The pictures in most instances were realistic representations, and they were sometimes symbols of an object, an idea or a group of ideas. Their essential function was to help the memory, for by a single sign one was able to recall the words and the air of one or more songs. And by arranging the signs in a consecutive order one could recall the incidents of a hunt, or remember the episodes of a myth. They also served as a means of intercommunication, but this was a less frequent function. It was possible only when the signs conveyed the same meaning for more than one individual, and this was not always the case. The pictures were regarded with a sincere feeling of reverence, and it was believed that they were endued with magic power. Hence it was common to use them as charms to ward off danger and disease.

Religion.

There was a firm belief in a cosmic mystery present throughout all nature; it was called manítou. It was natural to identify the manitou with both animate and inanimate objects, and the impulse was strong to enter into personal relation with the mystic power. It was easy for an Ojibwa to associate the manitou with all forms of transcendent agencies, some of which assumed definite characters and played the rôle of deities.

There was one personification of the cosmic mystery, it was into an animate being called the Great Manitou. There was no tangible description of the divinity, but it was gathered from implied statement that the being was human and had the mental and physical attributes of a masculine character. It is possible that the influence of Christian missionaries may have had a good deal to do with the creation of the personification; for in the Ojibwa mind there is no difference between the Great Manitou and the God of the Christian missionaries; furthermore, it is common to associate ethical ideas with the personification. In the records of the old Ojibwa life ethical ideas were not necessarily connected with the cosmic mystery. For instance, a man married a woman from another clan not because he felt a conscious desire to act in accord with the manitou, but because it was the custom; the test of his morality was the care he took to conform with the custom.

The mythology of the Ojibwas is rich in characters, and a list of the deities is by no means short; a few of them may be mentioned:—

The great character of Ojibwa mythology was Nänabuco (Nänabushuo), who was of miraculous birth. While yet a youth he became

the creator of the world and everything it contained. He became the author of all the great institutions in Ojibwa society and was the founder of the leading ceremonies. Another divinity was the lord of the spirit world. Among some Ojibwa he was an elder brother of Nänabuco; among others he was a nephew that had been a wolf before his death at the hands of the water manitous. The giant Macos (Mashos) was lord of the Great Lakes. He had only to tap his canoe and in an instant he was half way across the water of Lake Superior, which the Ojibwas of the north shore are fond of calling the Ojibwa sea. Another giant, Windigo by name, was a malicious monster who found delight in roaming about in search of men to devour them. Four great deities dwelt at the four ends of the earth, and each had his own peculiar power and office.

There were other transcendent agencies ranging all the way from definite personifications to forces that shade off into inarticulate spirits. In the less definable group are classed the forces of the material and spiritual worlds, whether animate or inanimate, whether human or non-human. But whether or not the forces expressed, or lack articulate description, they are all alike in that they were endowed with the common mystic property; they are unlike in so far as they possessed the property in varying degrees, and it is this difference of possession that make them manitous of a high or low degree.

Religious Practices.

There were four kinds of practices which wrought a deep influence upon Ojibwa life by reason of their intimate association with the religious beliefs of the people. The practices were that of healing the sick, the *wâbanōwiwin*, the *tcîsa'kîwin*, and the *midëwiwin*.

In the first office one sought to heal the sick by means of medicine and by the exercise of magic. The medicine consisted mainly of roots and herbs and was often administered after the chanting of sacred songs. In another way the healer sought to accomplish his purpose by the use of a rattle and with some short, round, slender bones. He put the bones one by one into his mouth, and, so it is said, swallowed them to find the cause of the disease. He worked the rattle about over the patient, and after a time spat out the bones into the palm of his hand. A great deal of faith was placed in the successful healer. It was believed that the disease was due to the malignant effect of some mysterious force, and that it was possible to get rid of the effect of the force by the use of magic. The herbs, roots, bones, rattle and songs were held to be endued with the mystery, and so were the means of driving out the cause of the disease.

In the *wâbanōwiwin* a person showed how deft he was in sleight of hand performances, how good he was at handling fire without being burned, and how skilful he was in all sorts of tricks. It is said that this same person dealt in witchcraft and was therefore to be feared. Songs went with the *wâbanōwiwin*, and they were sung to the beat of the hand-drum. The singing was done at night, the time when the strange performances took place. Anyone could go into the lodge to hear and to see after paying a small fee like a handful of tobacco.

A person who practiced the *tcīsa'kīwin* claimed to have the power of prophecy. He foretold if the sick would recover; if a journey would be prosperous; if a raid would end with successful issue; where

game could be found in abundance. He told whether distant friends or relatives were yet living; what was going on among a far-off people; if a witch was in the community or far away. This oracular speech was given from a cylindrical lodge open at the top. The sway of the lodge to and fro as if beaten by violent wind was taken as a propitious sign by the faithful who stood outside. The mingling of strange voices heard above the lodge was regarded as the utterances of manitous. It is said that the great turtle was the leading manitou of this office. Nobody had so much influence as one who did the *tcîsakîwin*.

There were two general forms of the *midêwiwin*. One form was individual and without public ceremony and was concerned with divination and with the use of magic applied particularly to the getting of food. The other form was social, with a society of men and women who were bound together by vows of secrecy. It had formal ceremonies that were conducted with an elaborate ritual. Entrance into the society was by initiation after a period of instruction in the knowledge of mysteries. The payment of a fee went with the initiation; it was in the form of tobacco, food, and clothing; and the size of the fee depended much upon the wealth and social standing of the individual and upon his personal relationship with the tutor. The social side of the *midêwiwin* was by no means free from the practice of magic, but its special function was concerned with life after death. It was believed that the soul followed a path to go to the spirit world, and that the path was beset with dangers to oppose the passage of the soul; but that it was possible to overcome the obstacles by the use of formulas which could be learned only in the *midêwiwin*.

It was believed that man went through life with more than one personal soul, and that one of them remained with him after death. It was thought that every living creature possessed a soul, and that to get control of the soul made it possible to get control of the possessor of the soul. It was on such a theory that the Ojibwas hunted for game.

5. THE IROQUOIS.

By David Boyle.

Although much has been *written* regarding the origin of the Iroquois as a people, we *know* absolutely nothing. It has been claimed that they came from west of the Mississippi; from the southwest—perhaps Kentucky or Tennessee—is meant; and it is asserted that their ancient seat was on the north side of the St. Lawrence, somewhere below or north of the city of Quebec. It will be observed that in each case, the crossing of a large river is involved, but it is tolerably safe to say that we shall never be absolutely certain what river that was. When there is no literature, tradition is utterly unreliable concerning matters of this kind, and often in others.* Tradi-

*"Our Indians of the Northern Department have no chronicles, no annals, no written monuments, nor record of any kind whatever. They do not know even their own or their children's ages, or did not, until our arrival amongst them." Sketch of the Northwest of America by Mgr. Tache, p. 119, 1868.

The Indians referred to here as being of the "Northern Department," were those of what we now call our North West, and it is quite safe to regard the statement as of general application.

tion may, and often does, contain statements based on fact, but the fact is generally unascertainable, unless we have similar information from other quarters with which to make comparisons. In process of time the statements become distorted, and there is seldom any method, or any means by which it is possible to straighten them. The Indians themselves, in such a case as the special one under discussion, can do nothing to assist. Philology has failed to afford any satisfactory clue, notwithstanding a recent claim that some kinship has been discovered between the language of the Iroquois and that of that Dakota.* This, if substantiated, would lend color to the western origin theory, unless it could be shown that the Dakotas had left the main stock in the east, but the weight of opinion is in favor of the theory that the Iroquois came south-west from the north shore of the lower St. Lawrence.† The principal authority for the story of the Lawrencean origin is David Cusick, a Tuscarora, of whom Horatio Hale said "His confused and imperfect style, the English of

*Dr. Brinton refers to the now extinct tribes of Virginia as "a fragment" of the Sioux or Dakotas.

When in Washington four years ago, I was introduced to a well educated Dakota, who was, I think, connected with the Smithsonian Institution, as an interpreter. I mentioned the matter to him just as I had read about it, but he ridiculed the idea. This, however, does not prove anything, except that there would not seem to be even a tradition among his people that they had ever come from the Iroquois, and I know of no tradition among the Iroquois that the Dakotas ever separated from them. Even tradition would not be proof in matters of detail, but might mean something in a general way.

†Mr. James Mooney, an unusually careful and authoritative ethnologist, very concisely sums up the case as it has hitherto presented itself, and met with general acceptance.

"Tradition and history alike point to the St. Lawrence region as the early home of this stock. Upon this point all authorities concur. Says Hale, in his paper on Indian Migrations: 'The constant tradition of the Iroquois represents their ancestors as emigrants from the region north of the Great Lakes, where they dwelt in early times with their Huron brethren. This tradition is recorded with much particularity by Cadwallader Colden, Surveyor-General of New York, who, in the early part of the last century, composed his well known "History of the Five Nations." It is told in a somewhat different form by David Cusick, the Tuscarora historian, in his Sketches of Ancient History of the Six Nations, and it is repeated by Mr. L. H. Morgan in his now classical work. The League of the Iroquois, for which he procured his information chiefly among the Senecas. Finally, as we learn from the narrative of the Wyandot Indian, Peter Clarke, in his book entitled 'Origin and Traditional History of the Wyandots," the belief of the Hurons accords in this respect with that of the Iroquois. Both point alike to the country immediately north of the St. Lawrence, and especially to that portion of it lying east of Lake Ontario, as the early home of the Huron-Iroquois nations.' Nothing is known of the traditions of the Conestoga or the Nottoway, but the tradition of the Tuscarora, as given by Cusick and other authorities, makes them a direct offshoot from the northern Iroquois, with whom they afterwards reunited. The traditions of the Cherokee also, as we have seen, bring them from the north, thus completing the cycle. 'The striking fact has become evident that the course of migration of the Huron-Cherokee family has been from the northeast to the southwest—that is, from eastern Canada, on the Lower St. Lawrence, to the mountains of northern Alabama.'—Hale, Indian Migrations.

"The retirement of the northern Iroquoian tribes from the St. Lawrence region was due to the hostility of their Algonkian neighbors, by whom the Hurons and their allies were forced to take refuge about Georgian Bay and the head of Lake Simcoe, while the Iroquois proper retreated to Central New York. In 1535 Cartier found the shores of the river from Quebec to Montreal occupied by an Iroquoian people, but on the settlement of the country seventy years later the same region was found in possession of Algonkian tribes. The confederation of the five Iroquois nations, probably about the year 1540, enabled them to check the Algonkian invasion an dto assume the offensive. Lin-

a half-educated foreigner, his simple faith in the wildest legends, and his absurd chronology, have caused the real worth of the book, as a chronicle of native traditions, to be overlooked."* Notwithstanding this opinion, Dr. Hale caw fit to credit Cusick with general truthfulness respecting the movements of the Iroquois until they reached what is now northern New York State, at the beginning of the 17th century. It was not long after this that they came into contact with the French, since which time the doings, of not only of the "Five Nations," but of their congeners the Hurons, the Attiwandarons or Neutrals, the Eries or Cats, the Tuscaroras, and the Andastes or Conestogas, have become historic, so that little need be said here regarding them, after this occurred.

But it may be worth while to revert to the traditional origin of the people, according to Cusick (1826). There is absolutely not a word of proof, nor can there be, in the very nature of things, confirmatory of his statements.*

It is almost certain that a people removed from its ancestral seat will, for many centuries, betray evidences in language, as well as in customs, of its former long-continued existence under different conditions, yet nothing of the kind has ever been noted among the Huron-Iroquois to show a former, long continued residence away down near the Gulf of St. Lawrence, or even between the river and Hudson Bay. Not a single superstition or example of their folklore shows that any association ever existed between them and the Eskimo, who must have been their neighbors, either occasionally or permanently, at such a time. Their tales contain no references to the moose, or to fauna of the sea such as the whale† and porpoise which frequent the gulf; yet one would suppose that all these animals, on account of their size, if for no other, reason, would have found place in the mythology of people who originated on the north shore of the river, below Quebec. On the contrary, we do find among the Huron-Iroquois almost affectionate mention of the "three supporters," or the three sisters—maize, beans and squashes, none of which grows successfully, if at all, so far to the north-east, and reference, to which, points rather. either to the present places of abode, or to some more western or southern region. In confirmation of this, we have the additional facts that the pagan Iroquois yet maintain the "Green Corn Dance,"‡ the "Husk Mask Dance" and a secret society known as the Husk Mask Society."‖

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guistic and other evidence shows that the separation of the Cherokee from the parent stock must have far antedated this period."

As a summary of the bare assertions made by various "authorities," to propagate, and establish the Lawrencean fabrication, the foregoing is excellent. Mr. Mooney does not express his own belief in it otherwise than as any of us might do in a general way, without personal investigation, and simply depending on the accuracy of those who professed to have given some attention to the matter.

*For an analysis of his story, see p. 150.

*Although it is extremely absurd to mention the names of George Buchanan and David Cusick in any connection, one cannot but be reminded here of what a critic has said respecting the introductory portion of Buchanan's History of Scotland. "It is nothing but a tissue of fable, without dates or authorities, as, indeed, there were none to produce." Cusick made his own dates.

†Frequent references to whales, moose, caribou and even smaller animals are found in the myths of our Atlantic Coast Indians; *e.g.*, "He put his bow against the whale" . . . Legends of the Micmacs, by Dr. Rand, p. 285.

‡Ontario Archæological Report for 1898, pp. 124-6.

‖The same Report, pp. 163-4.

It may be asserted that there is nothing at all improbable in the belief that such ceremonial associations have originated since the removal of the people to a corn (maize)—growing part of the country, but associations of this kind, connected as they always are with religious usages—being, in fact, the chief outward manifestations of primitive forms of religion—why, it may be asked, is there not even a hint remaining among the Iroquoian people, of the dances indulged in by them when they lived in a higher latitude and under altogether different conditions? Ceremonies of this kind occur at least annually, sometimes oftener, so that the performance of them is less likely to have become forgotten than that of a migration, but according to Cusick and those who accept his statements, whether wholly or in part, we have a circumstantial and highly improbable story of one of a series of movements without a vestige of corroborative evidence. It may be added that even if such a movement ever took place, it was not by any means a flight, but must have occupied many years, and was therefore less likely to impress itself on the aboriginal mind as an *event*.

But where tradition has to be reckoned with, it is sometimes possible, and nearly always profitable to compare stories that have originated in different quarters; and experience has taught us that when the origin, or even the early history of a people is concerned, that people is not, itself, necessarily, the best authority, and a similar affirmation may be made regarding even the most intelligent representative of any people. This is notorious.

Besides the doubt that must ever attach to the lower, north-side-of-the-St. Lawrence theory, we must consider what is of quite as good authority, namely, the stories of those who were the neighbors of the Huron-Iroquois; stories compelling us to conclude that, wherever the latter came from, they had been on the south side of the St. Lawrence for many years before the date usually assigned to their appearance there, if we may trust the frequent mention of the "Mohawks" or Meg'weks or Kwedecks in a merely incidental way, and not at all for the purpose of proving any statement to this effect.

Mr. Charles Godfrey Leland, and Prof. John Dyneley Prince give the weight of their authority to the statement of a correspondent.* that "In former days the Wabanaki (Abenaki) nation, the Indians called Meg'wek, or Mohawks, and other members of the Iroquoian six nations were wont to wage bloody and unceasing warfare with one another. The bitterest foes of the Wabanaki were undoubtedly the Meg'wek or Mohawks, who on the slightest provocation would send bands to harry them and destroy their crops."

Elsewhere the same scholarly writers say the Mohawks also made raids on the Passamaquoddies and on the Penobscots,† and this must have been when as we are told elsewhere, "The Mohawks and Micmacs both once inhabited these lower Provinces," and "When they quarreled and fought" until "ultimately the latter drove out the former,‡ the first statement being seemingly confirmed in another legend,

*Kuloskap The Master, by Charles Godfrey Leland, and John Dyneley Prince: introduction by Professor Prince (p. 24), quoting from manuscript of Louis Mitchell relating to conditions previous to the coming of the Europeans. †P. 27 and p. 28 respectively, in the Introduction of Micmac Indian Legends.

‡Andrew Paul, in Dr. Rand's Micmac Indian Legends, p. 139.

where it is stated that, "On the two opposite banks of the Restigouche, near its mouth, were two towns, one inhabited by Micmacs, and the other by Kwedeches. They were at peace with each other, and frequently attended each other's festivals."*

It was not in the nature of things that these two peoples could live very long on neighborly terms, and the legend in all probability is an enlargement of some ancient statement respecting a time during which the "Nations" were on good terms for a short period; possibly, indeed, when each was feigning friendship, for future vengeful purposes, a belief we are warranted in holding in connection with such an opening as the following sentence to Rand's Legend XV: "This is a tale of the wars between the Micmacs and a tribe of Canadian Indians, called by the former Kwedechk."†

So far there is not a word said as to the time when the Mohawks made themselves "at home," in the Maritime Provinces, either permanently, or temporarily. If in the former way, they probably occupied the interior of the country, because, as far as we know them, the Huron-Iroquois were rather a land-loving than a water-frequenting bodv of people. We have no such records of their canoeing skill as we have respecting that of the Ojibwas and of other branches of the Algonkin stock. But they were expert archers, and, as such, are often mentioned in the legends. The bow and arrow, however, they gave up very soon after the arrival of white men in the country. A few references to these weapons, therefore, would lead us to suppose that, at the very latest, the traditional events must have happened shortly after the date of European settlement, but the general tenor of the tales indicates a time long antecedent to any knowledge of the white man, even by hearsay.

It would be easy to quote numerous incidental references in these legends to the Iroquois, under the names of Mohawks, Meg'weks, Kwedeches and Kwedechks, but this seems unnecessary, until we come to the stories of the great war, which led to the expulsion of those people from Acadia. The account of this event is given in Legend LI, thus: "In ancient times and during these wars, a celebrated chief arose among the Micmacs, whose name was Ulgimoo, of whom many strange tales are related. He drove the Kwedeches out of the region on the south side of the Bay of Fundy, they having been compelled to cross the bay in their flight from the enemy, and he urged them on farther and farther towards the north, finally driving them up to Montreal."‡ Here, "Montreal" means where Montreal now is. Similarly, another legend says the Mohawks found shelter at the lake of Two Mountains. The use of both names must be based on recently acquired knowledge. We are not obliged to assent to the expulsory part of the story, but what do demand attention are the frequent incidental, or circumstantial references to the presence of the Iroquois in the Abenaki country, among not only the Micmacs, but among the Maliseets, the Penobscots and the Passamaquoddies, for the common enemy is mentioned in their traditions also. But we

*Rand's Legends of the Micmacs.

†Same volume, p. 126.

‡When the members of any Indian tribe or "nation" recount the deeds that occurred in the old-time wars, the reciters almost invariably accord the victory to their own people. We are not without similar examples among historical writers everywhere.

have something which, comparatively, at least, may be of a little value.

In Professor J. Dyneley Prince's translation of "The Passamaquoddy Wampum Records,"* we read "Many bloody fights had been fought, many men, women and children had been tortured by constant and cruel wars, until some of the wise men among the Iroquois Indians began to think that something must be done, and that whatever was to be done must be done quickly. They accordingly sent messengers to all parts of the country, some going to the south, others to the east, and others to the west and northwest. Some even went as far as the Wabanaki. It was many months before the messengers reached the farthest tribes. When they arrived at each nation, they notified the people that the great Indian nations of the Iroquois, (Mohawk and others) had sent them to announce the tidings of a great Lagootwagon or general council for a treaty of peace. Every Indian who heard the news rejoiced, because they were all tired of the never-ending wars. Every tribe, therefore, sent two or more of their cleverest men as representatives to the great council."

Now, this either refers to the Hiawathan invitation, or it does not. If it does, it is remarkable (subject to correction) that in no tradition of Iroquoian origin, is there any reference to other than the five nations being concerned; as far as I know, it is not even hinted that others were invited,† and it is somewhat curious that *the* great chief who had made such a hitherto unheard-of proposal, was not mentioned, but this may not count for much.

If this peace proposition was other than that usually credited to Hiawatha, and if it preceded his, then he does not deserve so much praise as is lavished upon him by most writers.

Although, as Hale says,‡ that 'In the mere plan of a confederation there was nothing new," and that "there are probably few, if any, Indian tribes which have not, at one time or another, been members of a league or confederacy," it would seem as if the event referred to was that of the formation of the Great League, the K'chi Sagem (Big Chief) of which lived at Kanawak (Caughnawaga, according to Cusick.§

Now, the remarkable thing about all this is the total want of allusion in Huron-Iroquois myth, or folk-lore, or historic tradition, to the Wabanaki peoples on the one hand, and the frequent references to the Iroquois as Kwedeches, Meg'wek, and Mohawks by the Wabanakis on the other. The former suggests a "conspiracy of silence."

What proof can be offered that before the publication of the Cusick story, a single person of the Huron-Iroquois stock ever asserted, or even hinted that the "priscan home" of his ancestors was

*Appendix to Kuloskap the Master, New York and London, 1902.

†In course of time, the Tuscaroras, who were of the same kin, did come into the league, and so did fragments of some other tribes, as, for example, of the Tuteloes, and Saponies of Dakota lineage, and the Mississagas, Delawares, Nanticokes and Mohegans of Algonkin stock, but there is not a word about the Wabanaki, as represented by the Penobscots, Maliseets, Passamaquoddies or Micmacs. The most easterly mentioned were the Mohegans, whose ground was on the lower reaches of the Hudson River.

‡Book of Rites, p. 21.

§Professor Prince's translation of the Passamaquoddy Wampum Records, Kuloskap the Master, p. 345. The mention of Caughnawaga is probably a recent interpolation.

somewhere on the St. Lawrence below Quebec or between it and Hudson Bay?* This ascribed seat of origin has always appeared to some of us as an absurdity, based wholly on the historic statement, that the French under Cartier met one hand of Iroquois at Stadaconé (Quebec), and another at Hochelaga (Montreal). What even honest and intelligent members of the Six Nations, or of their congeners, may have affirmed at any time since Cusick's "tale" was published, is utterly valueless. The Jesuit missionaries, if they ever heard about the ancestral home of the Hurons and Iroquois having been so far north and east, or anywhere else, do not say very much about it, and such a situation is one of the last on the continent that scarcely anyone, even a wild and unreasoning theorist, would suggest, however it may have answered the purposes of a temporary home.

It has already been noticed that we do not find among the myths of the Huron-Iroquois even incidental or circumstantial references to the flora or fauna of a latitude so high as that of "between Quebec and Hudson Bay," while, on the contrary, we meet with just such allusions regarding other places far away to the south.

There are perhaps few white men living who are better able to enter into the spirit of the ancient Wyandots than Mr. Wm. Elsey Connelley of Topeka, Kansas. He has saturated himself with the folk-lore of those people, as it has percolated through their living representative "refugees" in his state, and he has such a thorough knowledge of the old tongue as now spoken, that he is not likely to be lead astray in his interpretations. In his volume, Wyandot Folk-lore† containing an Historical Review, and twenty-five folk-tales, there is much of interest, and not a little to confirm the belief that this, one of the very oldest (it is said) of Huron-Iroquois tribes had its "priscan home" not on, or near the St. Lawrence, although the author of the book holds a different opinion.

But Mr. Connelley's belief in the generally accepted theories is not held by him unreservedly, for he says: "It has been the opinion of writers upon the subject, that the Wyandots migrated from the St. Lawrence directly to the point (north of Toronto) where they were found by the French. Whatever the fact may be, *their traditions tell a different story.*" It is the purpose of what follows to re-enforce what has already been gathered from Micmac folk-lore by a few gleanings from Wyandot myth. A belief common to the Iroquois was that there were "Little People" whose Indian name, Yagodinenyoyak,

*Since this was written, Dr. W. M. Beauchamp's very excellent History of the New York Iroquois has appeared, and on page 133 he refers to the statement of Nicholas Perrot, an old time French interpreter, that "The country of the Iroquois was formerly Montreal and Three Rivers. Their removal was in consequence of a quarrel . . . between them and the Algonkins. . . This explains why these [the Algonkins] also claim the island of Montreal as the land of their ancestors."

It explains more, for it indicates that which is most likely, considering all the circumstances, viz., that the Iroquois were aftercomers. In any event, it does not set up a claim that the locality was what Dr. Brinton called the "priscan home" of the Iroquois. It was the last home they remembered.

Much more to the point is the tradition mentioned by Lafitau, and quoted by Dr. Beauchamp, that "The Mohawks assert that they wandered a long time under the conduct of a woman named Gaihonariosk; this woman led them about through the north of America, and made them pass to a place where the town of Quebec is now situated."

Omitting the woman, a story of this kind might indicate some hazy reminiscences of the wanderings referred to in this paper, and of the expulsion of the Iroquois from Acadia by the Micmacs.

†Crane & Co., Publishers, Topeka, 1899.

means Stone-Throwers,* who delighted in playing pranks, many of which were played with a good object in view. Two of these pygmies (they were always born as twins) killed the Witch Buffaloes in charge of the salt springs at what is now Big Bone Licks, Boone County, Kentucky, when the Wyandots lived there.†

In a case of this sort the reference to a particular locality differs from those of a similar kind that have already been criticised, because the point of the story lies in the fact that taking all the other circumstances into account, the event could not have happened anywhere else; for example, in a preceding tale‡ we have, "The Wyandots destroyed the caves of the giants. They then crossed the river and continued their journey. They came to the point where Montreal now stands." Montreal, according to my view, being mentioned simply because it fitted in with the now prevalent belief acquired, perhaps, even by an old but comparatively recent Wyandot, and based on the Cusick fabrication, perhaps, too, because Montreal may possess some charm as a large city in a foreign country, and we know that "Far away fowls have fine feathers," even to an Indian's eye. That this is an interpolation seems plain from the fact that near the beginning of the story, p. 84, we are told that "Ages and ages ago the Wyandots were migrating from a distant country. They were moving all the villages. In the course of their migration they came to a large river with exceedingly steep and rocky shores. This river belonged to some giants, and these opposed the crossing of the Wyandots." This description of the river corresponds rather with that of the Niagara than of the St. Lawrence. When the author says the Wyandots were making their way by Niagara Falls and Toronto to the Blue Mountains on the shores of the Nottawasaga Bay, they would not necessarily come near the Falls, and would not see any "steep and rocky shores" nearer than Queenston and Lewiston, nine miles from the lake shore trail, while by the southern trail they might very naturally be alarmed by the appearance of the river banks—precipitous walls from 100 to 150 ft. in height. The proof here is plain that the Wyandots, when passing the falls, were travelling northwards.

As another evidence of how the nature of a narrative may be modified quite unconsciously by lapse of time and consequent change of circumstances, the introductory story informs us that when the first people, who were Wyandots, as a matter of course, lived in heaven, the daughter of the Big Chief became ill, and the advice of the medicine man was, "Dig up the wild apple tree; [why wild?] what will cure her she can pluck from among its roots." The tree may have been of the kind mentioned, but it is just as likely that the reference to it arose from the narrator's own experience, or from that of some former story teller, gained in a more southerly clime. We may dismiss anachronistic and other slips of this kind, by merely referring to a remark made one morning very early to Mr. Connelley, by a Wyandot named Matthias Splitlog, who, on seeing a comet, said, "There is the chariot [!] of our Grandmother, The Little Turtle."

Story XVIII. "The Lazy Hunter," referring to one who wished to get married, has every appearance of unadulterated aboriginality, and in it are several references to the opossum which point clearly to a residence not between Quebec and Hudson Bay, yet in Story XXII the statement is made that the first knowledge of medicine was com-

*Ontario Archaeological Report for 1898, pp. 164-5.
†Wyandot Folk-Lore, p. 89. ‡The Flying Heads, p. 85.

municated to the Wyandots by some bears that carried a man and his wife off to the Red Mountains in the north, wherever they may be. Still, it is not asserted that the Red Mountains were north of the St. Lawrence.

We have the authority of Dr. S. P. Rand for the statement that "the tradition among the Micmacs is that their fathers came from the southwest," and that "the old people up to a very late date spoke of their home in the southwest,"* and this appears to me as a much more likely event than their coming from any section north of the St. Lawrence, where it is said they and the Iroquois had become bitter enemies, because of the common cause usually assigned in such cases, namely, a quarrel between two boys, one of whom was shot, hence, and so on. The southwest origin was claimed by all the Abenaki tribes, and a similar origin is here asserted for the Iroquois, partly because of the anomalous conditions associated with the Cusickan literary monstrosity, and partly because what I regard as evidence points altogether this way.

If we had never heard of the apocryphal origin, it would appear as if from what we now know, our theory might have taken some such form as this:

"The priscan home" of the Huron-Iroquois, as well as that of some other peoples who subsequently found their way northwards, was probably in Kentucky and Southern Ohio.†

For some reason it is quite clear that one great dispersal, or various minor dispersals of these people have taken place. The Huron form of the language being recognized by philologists as the oldest and, consequently, the purest, the Hurons may reasonably be supposed to have migrated first, or among the first, and to have isolated themselves in the Blue Mountain country, north of Toronto, where they found, or were afterwards joined by, the Ouendats (Wyandots), Petuns, Tionnontates, or Tobacco Nation, some of whose names naturally suggest a southern origin of the agricultural industry they carried with them, and established in their new abode.

Other migrations brought the Attiwandarons and Eries, respectively, to the north and south shores of Lake Erie, while what was then, perhaps, or afterwards became the main body, set out to the northeast, following, in all probability, the course of the Ohio as far as possible (either leaving behind them, or dropping by the way, bands subsequently known as the Cherokees,‡ Tuscaroras, Andastes, and, perhaps, some others now extinct), then striking more easterly until they reached Acadia, now New Brunswick and Nova Scotia, finding their way eventually to the north shore of the St. Lawrence river, or gulf—the latter, most likely, whence they eventually spread westwards to Stadaconé (Quebec) and Hochelaga (Montreal). From the latter point it would be but a short step to northern New York.

*Micmac Indian Legends, Foot-note p. 110.

†The word Ohio itself lends color to our supposition. Horatio Hale in The Book of Rites, p. 176, discussing its meaning says, "It is derived from the word wiyo (or wiio) which signifies in the Seneca dialect *good*, but in the Tuscarora, *great*. It is certain that the Tuscaroras have preserved the primitive meaning of the word, which the Hurons and the proper Iroquois have lost." Otherwise, it would seem difficult to account for this name being given to the river—a name from the language of a people on the Gulf of St. Lawrence, or even in northern New York.

‡It is contended by some that the words Iroquois and Cherokee are mere variants.

Among other reasons for the conclusion that the Iroquois are most probably of southern origin, it should be mentioned that the Attiwandaron country, on the north of Lake Erie is, par excellence, the mound and other earthwork district of this province, and that next to it, but a long way behind it, in this respect, ranks the old abiding place of the Hurons near the Georgian Bay.* In the whole double range of counties in southern Ontario, from the St. Clair and Detroit rivers on the west to Lake Ontario and the Niagara on the east, examples of such works are found. If this fact has any significance it is surely in the line of connecting those who made the earthworks with the people who formed similar structures farther south. Had the Iroquois come to this part of the country from the northeast directly, or indirectly, they would scarcely have brought with them this custom. It is surely, therefore, much more reasonable to suppose that they reached the district in question by entering it either from the eastern or western extremity of the lake after a northerly course, than to claim that subsequent to their wanderings with the main body of the "nation" or "nations" from the lower St. Lawrence, or from between Quebec and Hudson Bay, they took to the performance of what must have been to them a totally new kind of work; and on the assumption that the Attiwandarons formed part of the great migration by way of Acadia, this would be still more absurd. The conditions rather point to an independent movement before or after the northeast march took place up the Ohio Valley, unless, indeed, the separation happened on the way. In any event, the peoples were long enough apart to account for the north Erie branch being known to the Hurons as "those who speak not quite the way we do."

One might even be tempted to theorise a little in detail respecting the comparative periods when these migrations occurred, e.g., that the Hurons seceded first, taking shelter on the southern end of the Georgian Bay, Lake Huron; followed, perhaps, after a considerable interval, by the Wyandots; that those who settled on both Erian shores also set out before the main body, and that they who took possession of the northern shore preceded their congeners on the other side. Neither would it seem very wild to suppose that the enmity existing between the Micmacs and the Iroquois (if they were ever neighbors in their southern or southwestern homes) was the main cause of the northern migrations on the part of both—one party pursuing the other; indeed, it was probably for some such reason that all the secessions took place. But speculations of this kind are merely amusements. In the whole history of the Huron-Iroquois there are only a few—a very few—explainable statements worthy of recognition as facts, and it was an attempt to enlarge on these that led to the clumsy, stupid, and almost wholly incredible story from the pen of the Tuscarora, David Cusick, in 1826.

To record the movements and the doings of these people after the period when they came successively into contact with the French, the Dutch and the British, would be to write a very large portion of the history of Canada and the United States.

Fortunately for the British, the Iroquois as they were represented by those in the province of New York became our allies, not because

*The hilly nature of what is now in the county of Simcoe, did not, perhaps encourage the construction of mounds, or render embankments necessary.

they loved us more, but that they loved the French and the Dutch less. They dearly loved a scrimmage, and for scouting purposes they were unsurpassed. Lithe, sinewy and enduring, habituated to hardship, and at home in the forest, they were able to perform tasks for the accomplishment of which white men, especially European white men, were quite unfitted, and it is somewhat doubtful whether they have ever received all the credit they deserved for the part they took in our military engagements.

Most of the present-day Iroquois reside on three reserves, viz.: in Tuscarora township, Brant county; at Deseronto, Tyendenaga township, Hastings county; at Caughnawaga, Laprairie county, opposite Montreal; and there is a large band of Oneidas at Delaware, near London, Ontario.*

Many of these people farm in a simple way, a few somewhat extensively, but some of them act as guides to tourists and travellers "doing" the lake country.

Schools on all the reservations afford means of education, and a considerable number of the people can read and write. Some of the more intelligent natives are themselves teachers, and others act in various official capacities either privately or in the civil service.

Of the three thousand or so on the Tuscarora reserve, about two thousand profess christianity—Episcopalian, Methodist, Baptist and Seventh-day Adventist (!). The rest are pagans. At Deseronto they are Methodists; at Caughnawaga all are Roman Catholics; and the Kent county Oneidas are Protestants.

Those who desire to learn particulars respecting the history of the Canadian Iroquois cannot do better than consult the recently issued and very excellent volume by the Rev. Dr. W. M. Beauchamp, and published as Bulletin 78, by the University of the State of New York.

As a matter of course the doctor's book relates especially to the New York Iroquois, but the history of our own Iroquois who, indeed, form the main body, is so indissolubly connected with that of the former, that the story of the one, until near the close of the eighteenth century, is the history of both.

Iroquoian Tribes: The Iroquoian stock, taking the name from the celebrated Iroquois confederacy, consisted formerly of from fifteen to twenty tribes, speaking nearly as many different dialects, and including, among others, the following:†

Ontario, Canada: Wyandot, or Huron (see footnote, p. —; Tionnontati, or Tobacco nation; Attiwandaron, or Neutral nation; Tohontaenrat, Wenrorono. Iroquois, or Five Nations, New York: Mohawk, Oneida, Onondaga, Cayuga, Seneca. Northern Ohio, etc.: Erie. Southern Pennsylvania and Maryland: Conestoga, or Susquehanna. Nottoway, Meherrin?. Eastern North Carolina: Tuscarora. Western Carolina, Cherokee.

The Cusick Story.

The following synopsis by C. S. Rafinesque, of Cusick's so-called "Chronology of the Onguys or Iroquois Indians" will give readers

*The Oneidas here do not reside on a "reserve," as they have paid for the land, and exercise the full rights of citizenship.

†Compiled from Brinton and others.

some idea respecting the way in which the Tuscarora historian (!) handled his subject.

"Anterior to any date, the Eagwehoewe (pronounced Yaguy-hohuy) meaning real people, dwelt north of the lakes, and formed only one nation. After many years, a body of them settled on the River-Kanawag, now the St. Lawrence,* and after a long time a foreign people came by sea, and settled south of the lake.

"1st date. Towards 2500 winters before Columbus' discovery of America, or 1008 years before our era, total overthrow of the Towancas,† nations of giants come from the north, by the king of the Onguys‡ Donhtonha, and the hero Yatatan.

"2nd. Three hundred winters after, or 708 before our era, the northern nations form a confederacy, appoint a king, who goes to visit the great emperor of the Golden City, south of the lakes, but afterwards quarrels arise, long civil wars in the north, etc. A body of people escaped into the mountains of Oswego, etc.

3rd. 1500 years before Columbus, or in the year eight of our era, Tarenyawagon, the first legislator, leads his people out of the mountains to the River Yenonatateh, (now Mohawk) where six tribes form an alliance called the Long-house, Agoneaseah—afterwards reduced to five, the sixth spreading west and south. The Kautanoh, since Tuscarora, came from this. Some went as far as the Onauweyoka, now Mississippi.¶

"4th. In 108, the Konearawyench, or Flying Heads, invade the Five Nations.

"5th. In 242, the Shakanahih, or Stone Giants, a branch of the western tribe, become cannibals, return and desolate the country; but they are overthrown and driven north by Tarenyawagon II.

"6th. Towards 350, Tarenyawagon III defeats other foes, called Snakes.

"7th. In 492, Atotarho I, king of the Onondagas, quells civil wars, begins a dynasty ruling over all the Five Nations, till Atotarho IX, who rules yet in 1142. Events are since referred to their reigns.

"8th. Under Atotarho II, a Tarenyawagon IV appears to help him to destroy Oyalk-guhoer, or the Big Bear.

"9th. Under Atotarho III, a tyrant, Sohanrowah, arises on the Kaunaseh, now Susquehannah River, which makes war on Sahwanug.

"10th. In 602, under Atotarho IV, the Towancas, now Missisaugers, cede to the Senecas the lands east of the River Niagara, who settle on it.

"11th. Under Atotarho V, war between the Senecas and Otawahs of Sandusky.

"12th. Towards 852, under Atotarho VI, the Senecas reach the Ohio River,‖ compel the Otawahs to sue for peace.

*If they came from the south, according to what I regard as evidence, this river was more probably the Kenawha or Kanawha, which empties into the Ohio from West Virginia, opposite the city of Gallipolis.

†Cusick, elsewhere, says these were the Mississagers,—Mississagas?

‡Iroquois, Onguys means people.

¶Algonkin tribes lying on or near the Ohio called it the Mississippi, as they regarded it the chief river in connection with the portion south of its confluence with the main stream.

‖This, and the mention of Kentakeh (Kentucky) in the following sentence, show a glimmering of traditional knowledge respecting the south country.

"13th. Atotarho VII sent embassies to the west; the Kentakeh nation dwelt south of the Ohio, the Chipiwas on the Mississippi.

"14th. Towards 1042, under Atotarho VIII, war with the Nanticokes and Totalis (Tutelos).

"15th. In 1143, under Atotarho IX, first civil war between the Arians of Lake Erie, sprung from the Senecas, and the Five Nations. Here end these traditions."*

This curious book, printed only about nine or ten years after the issue of Cusick's "Ancient History of the Six Nations," was no doubt a welcome addition to Mr. Priest's melange attributing all sorts of remarkable connections with the American Indians, involving Chinese, Japanese, Scandinavians, Welsh, Irish, Scottish, Italians, Romans, Egyptians, Libyans, Tartars, and, as a matter of course, The Lost Ten Tribes of Israel.

Rafinesque, who condensed the Cusickisms, was a man of some note in his day, although he did not stand in high repute among men of science.

INDIAN MUSIC.

By A. T. Cringan, Mus.B.

During recent years a commendable interest has been manifested in the collection and preservation in tangible form of folk songs of many different nationalities of widely varied degrees of civilized development. In England the "Folk Song Society" is actively engaged in searching out aged country people who can sing the songs peculiar to their district. Many of these have been transcribed from the lips of the "oldest inhabitants" to the printed page, which it would have been impossible to secure had the attempt been longer delayed. The Government of the United States has recently taken practical steps towards the collection of Indian music by appointing a specialist whose time shall be devoted to this important object. The Vienna Academy of Sciences is engaged in a comprehensive search for phonograms of languages and dialects to be employed in the study of comparative philology. "Already its collection includes popular songs of Gypsies and Arabians, favorite airs of Red Indian tribes, the idioms of Negroes and Malays, and so on. It is sending out voice-hunting expeditions every year, and its agents are now scouring Australasia, Roumania, Istria, and other localities." In Canada a satisfactory start has been made along similar lines. Eight years go Mr. David Boyle represented to the Hon. G. W. Ross, then Minister of Education for Ontario, the desirability of securing a number of the songs peculiar to the Iroquois, and of publishing them in the annual "Archæological Report." As a result thirteen melodies of a most interesting nature were secured as the nucleus of a collection which now includes about one hundred typical Indian songs available in printed form. On the first experiment being made, the songs were sung by Ka-nis-han-don, who had been selected for this purpose, by the Indians of the Grand River Reserve, as the most competent exponent of their tribal songs. The attempt was made to note the melodies while being sung, but this was found to be a most laborious method alike for singer and writer. During subsequent meetings the songs were re-

*From "American Antiquities and Discoveries in the West." By Josiah Priest, Albany, 1835.

corded automatically by means of the graphophone and examined at leisure by the transcriber. By this means it was made possible to secure an absolutely correct transcription of a much larger number of songs than could have been secured by the method first employed. Had the collection been undertaken at a later date many of the most interesting melodies would have been forever lost, as Kah-nis-han-don, who alone was considered able to give them correctly, has since joined the great majority in the "Happy Hunting Grounds."

In a study of Indian songs it must be constantly kept in mind that their transmission through successive generations has been entirely oral. The Indian of the past has never even thought of musical notation in connection with his tribal melodies. With other peoples, whose music possesses many features in common with the Indians, the case is entirely different. The Chinese, for example, possess a musical literature dating from 1,100 B.C. In addition, "from time immemorial Chinese music has been under the direct supervision of the State in order that the introduction of any tones contrary to law might be prevented." The Indian has likewise jealously guarded his songs against the introduction of foreign innovations, but, it cannot reasonably be supposed that the form in which they are now used is that in which they first were heard. Even civilized peoples, aided by the printer's art, have been unable to retain their songs in their original purity. Take such well-known examples as "Old Hundred," "God Save the King," or "Home, Sweet Home." Of these many variations from the original are to be found in editions published during the life of the present generation. A striking example of the modification effected by time is afforded in the case of our Canadian national song, "The Maple Leaf." At the reception to the Duke and Duchess of York, in 1901, two widely different versions were sung by the adult and children's choruses respectively, on the same afternoon. The method of transmission of the melodies of the Indians from one to another is simple, but effective. Each tribe possesses its own characteristic songs, sometimes numbering several hundreds. Among their braves there are usually a few singers who pride themselves on the excellence of their singing and the correctness of their melodies. These are the music teachers who are entrusted with the important duty of imparting their musical treasures to the younger members of the tribe, who may be fired with the ambition to excel in song as in the more arduous activities of their national life. Many of these Indian musicians display a phenomenal capacity for memorization of speech and song. In company with Mr. Boyle I had, several years ago, an exceptional opportunity of witnessing a most remarkable illustration of the extent to which this power has been developed. At the ceremony of "Burning the White Dog," which we were permitted to attend, the headman (Kah-nis-han-don) had to recite a large number of set speeches and songs, peculiar to the ritual, occupying over two hours in delivery. During this time he was almost constantly engaged in singing or speaking, yet no noticeable halt for a word was ever made. Throughout the entire ceremony he was closely observed by the onlookers, many of whom were equally familiar with the ritual, still, we were informed that every note and word had been rendered with absolute correctness.

With the Indian, music is something more than a mere amusement. It is associated with every phase of his life and plays an im-

portant part in the ritual of each of his many ceremonies and feasts. He has songs associated with the conferring of a name upon his infant son, songs adapted to the various games in which he delights from infancy to old age, songs to aid him in wooing the dusky maiden of his choice, to cheer him on his long and arduous excursions when on the hunt, or to inspire him with courage when engaged in deadly conflict. Should he desire to intercede with the Great Spirit for bountiful corn harvests, or to return thanks for such blessings already received or for success in battle, he finds in song his most potent means of expression.

A careful analysis of the Iroquois songs already secured reveals many striking peculiarities of rhythm and tonality. As the trained musician can readily recognize the distinguishing characteristics of the representative masters of the German, French, Italian, English, Scottish, or Slavonic schools of composition, so, also, may he recognize the music of the Indians through certain rhythmic and tonal peculiarities of a clearly defined character. The music of the Indian, like himself, is decidedly unconventional. On listening to the songs which accompany any important ceremonial, one is apt to imagine that the music consists of a jumble of unconnected sounds, more harsh than musical, but this feeling is gradually dispelled as the ear becomes familiarized with the musical idioms, and the mind begins to realize their underlying sentiment. The manner in which the melodies are rendered has much to do with the confusion of mind inseparable from a first hearing. The Indian vocalist makes no pretension whatever to skill in the art of voice production as we understand it. His ideal of the quality most desirable in vocal excellence may be expressed in a single word,—loudness. The environments associated with the performance of his melodies are such as to make this quality absolutely indispensable. Many of the ceremonials, of which the songs form an essential feature, are conducted in the open air, to the accompaniment of the howling of the wind combined with the vigorous beating of rattles and drums. To be heard the singer is compelled to shout with the utmost lung-power, and he who best succeeds in this respect is acclaimed the premier vocalist of his tribe. No human voice could withstand the strain consequent on this extreme exertion, sometimes continued through several hours, and retain its musical qualities unimpaired. The extreme upper notes of the melodies are frequently sung out of time as a result which sometimes leads the uninitiated to conclude that the Indian uses a scale comparing intervals not found in the music of civilization. That this is not the case is proven by a close examination of the melodies already secured and published. So far, no melody has been discovered containing any tones foreign to the major and minor scales common to the music of all civilized nations. The peculiar tonal effect produced by Indian music consists, not in the addition of tones to recognized scales, but in the omission of some of the tones of which these consist. On listening to a number of characteristic Indian melodies, one may be pardoned should he conclude that they are based on the Pentatonic, or five note scale common to the music of the Hindoos, Chinese, Negroes and Celts. Many of them are really so, but others are proved on closer observation to be even more primitive in construction. In discussing the tonality of the Indian melodies, comprising the first group, secured in 1898, with Dr. Hugh Clarke, Professor of Music in the University of Pennsylvania, he expressed the opinion that "The Indians, in common

with other primitive races, had employed the Pentatonic scale for the simple reason that it avoided the use of the interval of the semitone which they probably found rather difficult to sing." In a number of the songs already investigated it is found that in addition to the tones which necessitate the use of the semitone, or minor second, those which entail the interval of the major second are also absent. If Dr. Clarke's contention regarding the minor second, to which the writer agrees, be correct, the same primitive reasoning may have applied to the use of the major second. This is only slightly less difficult of intonation than the former, but neither is quite so easily produced as are the intervals of the major and minor third, which, with the perfect fifth, constitute the common chord. That this simple combination of the first, third, and fifth tones of the scale formed the germ from which the earlier Indian melodies were developed is a conviction that becomes more conclusive as investigation proceeds. In a number of the melodies, considered by the Indians themselves to be the most ancient, no other tones than three comprising the Tonic Chord are to be found. This is sometimes major, sometimes minor, both being freely employed. The interval of the major second was probably first employed on the introduction of the sixth degree of the scale, which occurs in many of the more ancient songs as the single addition to the tones of the Tonic Chord. The addition of the second degree would have served the purpose equally well, but this is not found in any melodies unless in combination with the sixth. The addition of the sixth and second degrees completed the Pentatonic scale in both major and minor forms and would tend to familiarize the ear with the closer interval of the major second. In common with many other nations the Indian may have found this simple five-toned scale a sufficient means of musical expression for centuries before venturing on the introduction of the interval of the minor second consequent on the employment of the fourth and seventh degrees which complete the major scale. These must have been introduced with caution and the fourth undoubtedly preceded the seventh as it is frequently met with in songs which do not contain the seventh, while the latter is found only in combination with the former. The seventh, or leading note, is used very sparingly in the major mode, and in the minor mode its use is confined to a very limited number of melodies, chiefly those used exclusively by the women.

The rhythm of Indian music is in many instances exceedingly complicated. The conventional rhythms and four-bar phrases of ordinary music are ignored. Phrases of five and seven bars in length are employed freely, and of regular music cadences there are few. The Indian has no consciousness of their need, therefore, why should he use them? His melodies are not set to words arranged in stanzas of nicely adjusted metrical proportions which entail a musical cadence at the conclusion of each line. On the contrary, he ends his song at any convenient point, whether at the end of a musical phrase, or the middle is of no consequence provided it is concurrent with the finale of the dance or ceremony which it accompanies. His method of emphasizing the conclusion is much more emphatic, to him at least, than any conventional musical cadence could possibly be. This consists of a loud whoop usually commencing high in pitch and gliding throughout the compass of a complete octave. Syncopated rhythms are much in evidence in the majority of Indian melodies, and grace notes are employed with the greatest freedom.

6. THE BLACKFOOT INDIANS.

By Clark Wissler.

The plains area of North America was inhabited by people dependent upon the buffalo. The flesh and by-products of this animal furnished them food, shelter and the common implements of life, thus characterizing a special culture known as that of the Plains Indians. In the Dominion of Canada the best representatives of this type are the Blackfoot, who formerly ranged from the Missouri to the Saskatchewan Rivers. In language they are Algonquin, and, presumably, came out of the wooded lake area to the east into the open country of the west, as did their kindred the Arapaho and Cheyenne, where they gradually adopted the culture of the Sioux tribes. At present they are confined to reservations in Montana and Alberta. One of the interesting problems in the ethnography of the Plains is the tracing out of the dissemination of culture among the various linguistic stocks that found their way into that region from time to time, and in this connection the Blackfoot are of special interest as one of the latest arrivals. My present purpose is, however, to give a brief description of this tribe that may serve as a characterization of Plains culture

Food.

In former times the flesh of the buffalo and the deer were the chief food of the Blackfoot. Birds, fish, and other small game were eaten in times of necessity only. Frogs, reptiles and insects seem never to have been part of their diet. The habit of eating great quantities of meat seems to have survived, for though they can now obtain from the traders' stores flour, potatoes and other kinds of food, they prefer fresh beef, of which they consume a great deal. When one is travelling with these people he finds them always in discontent when there is no meat, even though there may be an abundance of other kinds of food at hand. The large game animals in this region beside the buffalo were the antelope which was found on the open plains, the elk and mountain sheep in the mountains and foot hills and occasionally in winter moose that wandered down from the north.

We have no information at hand as to the methods used in hunting these animals before the introduction of the horse. As they were obliged before this to hunt with spears and bows and pursue the buffalo on foot, it may be that the Blackfoot became a plains people after the introduction of the horse. We are not able to determine the time of the introduction of the horse, but know that they were well supplied with these animals before 1800, because Mackenzie, in speaking of the Blackfoot, says, "They are the people who deal in horses, and take them upon the war parties towards Mexico, from which they enter into the country to the south-east, which consists of plains."* There are other facts, however, which seem to indicate the presence of the Blackfoot in the buffalo country before the introduction of the horse. According to their own traditions the buffalo and the antelope were usually killed by driving them over a cliff or ledge. The buffalo drive was practiced by all of the tribes of the plains and has been described by various writers, among whom is Father De Smet.†

*Voyages from Montreal, etc., 1801, p. lxxi.
†West Missions and Missionaries. N.Y., 1859.

From all accounts it seems that the Indians of the plains usually erected an enclosure of brush and trunks of trees, into which the buffalo were driven and afterwards killed with arrows or spears, but the country in Montana and Canada between the Missouri and Red Deer Rivers is crossed by a number of streams running eastward from the mountains, along the courses of which are to be found steep, rocky ledges. Instead of making an enclosure in which to drive the buffalo the Blackfoot rushed the animals from the edge of one of these ledges, trusting to the rocks to kill a large part of the herd. However, they knew of the other method, and sometimes placed such an enclosure around the space below the ledge, but in every case they rushed the herd into the enclosure from the top of a cut-bank, or ledge. Several ledges on the Blackfoot reservation in Canada were pointed out to the writer as the locations of former buffalo drives. One of these is a ledge about 50 feet in height with rocks below. From the top, the prairie stretches away with an even surface so that one may approach the ledge without noticing it, until within 100 yards. Even then it looks like a small depression because the hills of the other side of the valley seem to be a continuation of the ground upon which one stands. From the edge of the cliff across the prairie extends a V-shaped row of stones. The Blackfoot claim that the leaders of the buffalo herd, when running, were always disposed to follow some line, mark or trail and that these rows of stones guided the herd toward the edge of the cliff. When buffalo were grazing within several miles of the drive, some young men would be sent out on foot to work quietly around the herd, causing them to move toward the drive. When they came near the lines of stones all the men of the camp came out and surrounded the herd, approaching them from the rear and side, rushed in whooping and shouting, causing the frightened animals to rush toward the cliff and to destruction. The writer made a superficial examination of the ground at the base of one of these drives and found the soil, to the depth of several inches, full of arrow points and other stone implements, from which it appears that these drives were used for a long time. Judging from the accounts of the old men, buffalo drives were seldom used after the introduction of horses and firearms.

The drive furnished the camp with a great deal more meat than was needed, consequently the bulk of it was dried and made into pemmican. The large muscles of the buffalo were cut up and hung upon poles to dry, after which they were taken down and pounded between stones until reduced to small particles. These were mixed with smashed choke-cherries, flavored by leaves and stems of the wild peppermint, and the whole packed in parfleches. Some buffalo tallow was melted in a spoon of sheep horn and poured over the pemmican in the parfleche, and as this cooled and hardened it sealed up the contents, protecting it from insects and moisture. During the butchering time after the buffalo drive the people ate the livers, the hearts and small intestines. The latter were cleaned, blown full of air, the ends tied, held over the fire until they burst, and then eaten. Pemmican was eaten from the parfleche without further preparation or used for making soup by boiling in water. The Blackfoot were also very fond of marrow and extracted it by breaking the bones with stone hammers.

Flesh of other animals, such as the antelope and elk, was usually eaten fresh and seldom made into pemmican. From statements of people now living, we infer that the antelope and the elk were hunted

for their skins rather than for their flesh. The mountain sheep was sought for its horns, which were used for spoons and dishes.

While the chief food of the people was the flesh of the buffalo, they ate at all times of the year, either alone or in combination with meat, various vegetable foods. The so-called sarvis berry (Amelanchier alnifolia) was the most plentiful in that region and was eaten fresh or dried and stored for winter use. There are several other varieties of berries that were used in the same manner, such as the buffalo berry (Shepherdia argentea), and the berry of a willow. The berries were usualy gathered by the women in small bags of raw hide and poured on a skin of the buffalo or spread upon the ground in the camp and smashed by beating with sticks or stones. The pulp thus produced was dried in the sun and stored in raw hide bags. Berries with large pits such as the choke-cherry (*Prunus Virginiana*) were smashed with stones and treated in the same way. This method of treatment reduces the bulk of the fruit so that a great quantity can be stored in a small bag, which is an adaptation to the necessity of rapid transportation.

It seems that edible roots formed a considerable part of the food of the Plains Indians, but the most important of the food plants did not grow in the Blackfoot area. The kamas root used by the tribes west of the Rocky Mountains was accessible to the Blackfoot on the eastern slope, consequently during the kamas season the Blackfoot moved to the foot hills of the mountains, where the women were engaged in root digging. For this purpose a digging stick was used, which was nothing more than a straight, sharpened stick. The method of preparing kamas is the same as employed elsewhere, namely, roasting in a pit for twenty-four hours or more, after which the roots are spread in the sun and dried for storage and transportation. The prairie turnip (*Psoralea esculenta*), according to the statements of the Piegans, is rarely found north of Sun River, but in former times the people made journeys to the south for the purposes of gathering these roots. They were dug with digging sticks, carried away in bags and stored without further preparation. A number of other roots seem to have been used occasionally and in times of famine. It should be borne in mind, however, that practically all of the vegetable food named above was never eaten alone, but as part of a stew or soup made of buffalo or deer meat.

There are no evidences that the Blackfoot ever practised agriculture as the means of increasing their food supply. While the climate of the region in which they lived was not favorable to agriculture, the presence of the buffalo and the ease of their capture made the practice undesirable. That the Blackfoot knew of agriculture and the methods of raising corn is certain, because their myths contain accounts of tribes who raised and stored this cereal and the narratives of the war-path mention the conquest of people who knew how to raise corn.

However, one plant was cultivated, a kind of tobacco used entirely for ceremonial purposes. This plant, according to Grinnell,* is, when mature, about ten inches high, with a long seed stalk growing from the centre. This writer gives a brief account of the ceremonies accompanying the annual sowing of the seed. His account agrees fairly well with the information secured by the writer. It is interesting to note that there was no tending or care of the crop after it was sown,

*Blackfoot Lodge Tales, 1903, p. 268.

for the whole tribe went on their annual migration and did not return until time for the harvest, when another ceremony took place. These ceremonies have been described by Maximilian,* Prince of Wied, and by Sims, as observed among the Crow Indians.†

The gathering of vegetable food determined to a considerable extent the annual migrations of the Blackfoot, for while they followed the buffalo from place to place they arranged their journeys so as to bring them around to the localities in which the various vegetable foods were abundant and in season.

There is no evidence that the Blackfoot were ever acquainted with the art of pottery. They may have known how to make cooking vessels since the memories of persons now living fall short of the time when pots of brass and iron were introduced by the Europeans. However, there are traditions among the people that meats were sometimes boiled in a fresh skin, supported by four sticks, in which meat, water and hot stones were placed. This was a common method among the Indians of the Plains before the introduction of kettles. The most common method of cooking the meat of the buffalo was by boiling and the custom was then, as now, to keep the kettle over the fire continuously, so that any member of the family might eat when he so desired and so that a guest could be provided for immediately upon his entrance into the lodge. As previously stated, dried vegetable food was boiled with the meat, forming a part of the stew or soup. Meat seems never to have been roasted, except by hunters or war parties, and then only when there was no time for boiling. Grinnell gives an account of a method of cooking the eggs of water fowl in a pit by means of water and hot stones,‡ which is somewhat similar to methods employed by tribes west of the mountains.¶

Clothing.

While at the present time all of the divisions of the Blackfoot wear the clothing of the whites they formerly dressed in skins of antelope, elk and buffalo. The ordinary man's costume when in-doors consisted of a belt, gee-string and breech cloth.

When out of doors a pair of long leggings, moccasins and a loose shirt were added and over these wrapped about the person was a robe of buffalo or elk skin. It was not uncommon, however, for a man to go about the camp with no other addition to his in-door costume than a robe. In athletic contests, in battle and in chasing buffalo, the costume usually consisted of moccasins and breech cloth. The women wore loose dresses of elk or buffalo-cow skin reaching about half way over the knees to the ankles. They wore moccasins similar to those of the men and leggings reaching to the thigh where they were held in place by strings, or garters, and sometimes supported by cords attached to the belt, or waist cord. Robes were also worn by the women, and both men and women wore broad strong belts outside of their garments to which were attached knives and other useful or ornamental objects. The dresses of the women were usually made of two elk skins, from which all the hair except that upon the tail had been removed. In making a garment, the two skins were brought

*Travels in North America, London, 1843.
+American Anthropologist, N.S., Vol. VI., pp. 331 *et seq.*
†Blackfoot Lodge Tales, 1903, p. 207.
¶James G. Swan: Three Years at Shoal Water Bay.

together so that the extensions for the hind limbs overlapped each other, the tails coinciding. Leaving an opening between the tails long enough for the head to slip through, the two skins were sewed together along the upper edges of the leg pieces. At the bottom the two skins were sewed up at the sides to the point where the skin begins to come outward to the extensions of the hind limbs. Through these openings the arms were passed. When the completed garment is seen on a woman, the skin from the front limbs of the elks hangs down on each side almost to the ground while in front and behind the skirt scarcely reaches the ankles. Out from the shoulders and down from the arms to the elbows hangs a cape like extension, made by sewing together the skins of the hind limbs. The skirt, or that part of the garment below the belt is usually covered with strings of deer skin from four to ten inches in length, giving the whole a fringed appearance. The shirts of the men were made in the same way except that the tails of the animals were removed. The edges of the skin at the bottom and around the arm holes were often notched and fringed. While the dresses of the women did not have true sleeves, the shirts of the men were so arranged that the extension from the arm and in front of the shoulder could be held in place by bringing together at regular intervals the loose edges of the skin and tying them with strings, provided for that purpose, thus producing a kind of sleeve, open underneath. The leggings of the men were usually made of a single piece of skin with the seam at the outside of the leg. They were long and cut so as to fit the thigh and the hip, reaching almost to the belt at the sides of the body. The moccasins for both men and women were of the same general pattern. According to the information of the old people now living, moccasins were formerly made without soles and of a single piece of skin with the seam at the heel; the type of moccasins worn by the eastern Algonquin Tribes and the Athapascans. For a long time, however, they have used soles of raw hide with soft tanned skin for the uppers. Summer moccasins were made of skin from which the hair had been removed, while the winter moccasins were generally made of buffalo skin with the hair inside. The moccasins and clothing of children were modeled after those of adults; though as a rule children did not wear clothing until eight or ten years of age, at which time they were provided with small robes and moccasins, leggings, etc. Thread was made by drawing shreds from a piece of dried sinew, moistening it in the mouth, and twisting by rolling between the palms of the hands while one end of the thread was held by the teeth. The moistening of the sinew causes it to expand, and as the thread dries in the stitches it shrinks drawing them in tight.

The methods of putting together garments and sewing, described above, did not differ from those employed by other Indians of the plains, but each tribe practiced a few special forms of ornamentation so that it was possible to distinguish the work of one tribe from that of another. While at the present time the decorative art of the Blackfoot is decidedly inferior to that of the Dakota and the Crows, the writings of the first explorers of the North West give them the first rank. Catlin says that there was no tribe on the continent that dressed more gorgeously than the Blackfoot, unless it was the Crows. However, he saw no great difference between the costumes of the two.* Maximilian also states that the costumes of the Blackfoot were

*North American Indians, 7th Edition, p. 30.

highly pleasing in decoration.* The shirts of the men were decorated with a band of quill work extending from the shoulder down the top of the sleeve, and another extending some distance down the breast and back. A similar band extended along the seam of the legging. The quills for these bands were usually worked upon a separate piece of skin and when completed, sewed to the garment in the desired place and it was not uncommon for the quill work to be removed from one garment and placed upon another. The distinguished men wore large circular designs upon the breasts of their shirts and similar ones upon the back. At present they maintain that this was a very ancient and original ornamentation devised by them, and while Catlin has drawn a number of portraits of the Blackfoot on the Upper Missouri, in which he represents these ornamentations as now made, Maximilian states specifically that the Blackfoot borrowed them from the Assiniboine. He says further that the Assiniboine wore leather shirts with a large round rosette on the breast, which is made from porcupine quills of the most gorgeous colors, and they often wear another piece of similar ornamentation on their backs.† Later De Smet testifies to this as a characteristic of the Blackfoot.‡

Distinguished men also wore fringes of white weasel skin along the seams of their leggings, sleeves and over the breast and back. They also wore head dresses of raw hide covered with strips of the same material, and often provided with a pair of buffalo horns placed in the position they bear to each other on the head of the buffalo. The man's robe was sometimes decorated with bands of quill work extending lengthwise.

The dresses of the women were formerly worked in quills across the breast, back and arm pieces in broad bands following the outline of the garment. After the introduction of glass and porcelain beads these garments were beaded in the same manner. The moccasins of both sexes were ornamented on the toes and the instep, by two kinds of designs, a rosette, and a curved design. According to the old people the latter is the more ancient. At the present time ornamentation in porcupine quills is exceedingly rare, beads having almost displaced this original material.

Skin Dressing.

As the Blackfoot depended almost entirely upon the skin of the buffalo and deer for clothing, and made no attempts at weaving, the dressing of skins was a very important industry. When the skins were first removed from the animal they were stretched on the ground, hair side down and held in place by wooden pins. The surface was then moistened with water, and the flesh and connecting tissue scraped away by means of a fleshing tool, an instrument shaped like a chisel with a loop at the top to engage the wrist. The scrapings obtained at this time were rich in fat, and were usually saved for making soup. It is a common incident in the mythology of these people for a poor person to beg for these scrapings. The skin, now

*Travels in North America, p. 248.
†Travels in North America, p. 194.
‡Letters of Father De Smet, 1905, Vol. II., p. 523.

cleaned, is worked down to the desired thickness with an adz shaped tool made of elk horn, formerly tipped with stone but now with metal. By this process the hide is reduced to a uniform thickness throughout. When using this scraper the women stand upon the skin and stooping over hold it in both hands with the handle almost parallel to the surface of the skin. Shavings from an inch to two inches long are removed at each stroke. If the hair side of the skin is to be dressed also, it is turned over and the hair is scraped away with the same instrument. The next step in the process is to rub into the pores of the skin an oily substance made from the brains of animals, after which it is left to dry and the heat of the sun causes the oily matter to soak into the skin. After a time the skin is made wet with warm water and rolled up into a tight roll, after a while it is taken out and stretched to its original form by pulling with the hands and feet. If the skin is large, two or more women are required to perform this operation. The next and the last step is the drying process.

A rope of twisted thong is made into a loop and tied to a lodge pole. Then the skin is pushed through the loop and vigorously sawed back and forth in all directions. The friction causes sufficient heat to evaporate all the moisture and to evenly distribute the oil in the skin until it becomes soft and of a clean white color. It is then ready for use.

Shelter.

The lodges, or tipis, of the Blackfoot were precisely like those of the Sioux and other Plains Indians, consisting of poles and covers of buffalo skin. The number of poles varied according to the size of the lodge, usually ranging from thirteen to thirty-two.* As these people travelled a great deal in regions where suitable wood for lodge poles could not be found they had need of poles that could be easily transported, and cut them slender and straight, of pine or spruce varying in length from twelve to fourteen feet.† In traveling the smaller ends were fastened to the pack saddle and the buts allowed to drag in the rear of the horse. The lodges were owned by the women, who always put them up, took them down and attended to their transportation. The erection of the lodge was begun by tying three poles together, standing them up in the form of a tripod, one leg of which formed the post of the door, then laying the other poles on in order, passing around in the direction of the sun, and tying them at the top by a turn or two of the long free end of the cord with which the first three were tied; the cover was then spread out on the ground, and one pole fastened to its middle, by which it was raised, put in place and pinned together over the door by seven or more slender sticks. The lodge was made symmetrical by drawing out or pushing in the bases of the poles until the whole assumed a true conical shape, when the edges of the lodge were staked down with pins about eighteen inches long. The lodges varied a great deal in size ranging from eight feet to twelve in diameter and from nine to twelve in height. While there was always an opening at the top where the poles cross, through which the smoke of the fire could escape, the true smoke-hole was between the crossing of the poles and the door and was protected by two ear-like flaps, each held in place by a pole standing on the outside of the lodge. By moving these poles about.

*Hector and Vaux, Trans. of Eth. Society, London, Vol. I.
†Blackfoot Lodge Tales, Grinnell, p. 199.

the smoke-hole could be opened and closed at pleasure, and the flaps so adjusted as to prevent the wind from blowing the smoke down into the lodges. While all these were characteristics common to the Indians of the plains, the Blackfoot had a few special ways of arranging and decorating their lodges.

The stakes were usually made of birch or choke-cherry wood and ornamented by cutting away the bark so as to leave four rows, or bands, near the top. The spaces between the bands were usually painted red. Inside of the lodge, opposite the door, extending half way around was a lining of buffalo or other skins, reaching upward to the height of four or five feet. This lining was usually decorated with long narrow designs running parallel to the poles of the lodge. The fire was usually a little forward of the centre of the lodge so as to bring it under the smoke-hole, and just back of the fire-place was a small altar made by scraping away the surface-soil to the depth of one or two inches, usually in the form of a rectangle, in the centre of which was a little mound upon the top of which incense was burned for religious purposes. Back of this, next to the wall and directly opposite the door was a space of two or three feet reserved entirely for ceremonial and religious objects and no one was permitted to stand on this spot or pass between it and the fire. The beds were arranged on the ground around the sides of the lodge, separated from the reserved space at the rear by back rests made of willows tied together with sinew and supported by tripods. While these back rests were used by other Plains Indians the ornamentation of the Blackfoot tripods was peculiar in that it was produced by cutting away the bark so as to leave designs in black and white. The intervening surfaces of the wood were sometimes painted.

The door of the lodge always faced the east, and the man of the family sat on the left, or the south side, nearest the back rest, next to him his wife and next to her the children or the younger members of the family. The other side of the lodge was reserved for guests or the unmarried adult sons of the family. The religious and ceremonial objects of the family, hung from the back wall or lay upon robes placed upon the ground in the space between the back rests, while personal property was tucked under the sloping sides of the lodge between the bed and the south side of the door. Among the Blackfoot it was regarded as very impolite to pass in front of a man when in the lodge and for anyone to pass between a distinguished man and the fire when he was smoking was a grave religious offence. For this reason male guests were given places near the back rest so that there need have been no occasion for anyone when leaving the lodge to step between the guests and the fire. Should there have been several guests they were usually given seats corresponding to their rank or the esteem in which they were held by the host. Should one of the guests have desired to leave the lodge he must either have passed behind those between himself and the door or else have taken the pipe from their hands and passed between it and the fire. If the guests were women unaccompanied by men they were given seats next to the wife of the family. As soon as a male guest entered the lodge, the host filled a pipe which he lighted and passed to him and he in turn after a few puffs passed it back to the host and so on.

Older people and especially widows lived in small lodges. This was apparently not from necessity but from choice, since it was regarded as a proper way of expressing their sorrow or condition in life.

Transportation.

Before the introduction of horses the Blackfoot travelled on foot, carrying burdens on their backs and making use of the dog-travois. The principal parts of the travois are two poles tied together near the small ends and held in position by a cross frame so that the whole resembles a letter A. The cross frame is made in two ways, as two parallel bars with a number of short cross pieces tied to them by thongs somewhat in the form of a ladder, or as an oval-shaped frame made by bending a flexible twig into a loop and netting across with thongs of skin, giving the whole the appearance of a netted wheel. Sometimes the two cross bars in the former type are joined by similar net work. The top of the frame rests on the dog's shoulders and is held in place by straps passing around his body in front of and behind his four legs, while the ends of the poles drag behind on the ground separated by the frame between them. When horses were introduced the travois were enlarged without change. At the present time the horse-travois is much used for hauling wood and supplies from the trader's stores. In former times the aged, the sick and young children were placed upon skins on the travois and protected from the sun or rain by a canopy of the same material. All the adults and the able-bodied members of the band rode horses on saddles of their own construction, made by stretching fresh skin over frames of elk horn or wood. According to Hector and Vaux the saddles and other riding gear of the Blackfoot were elaborately ornamented with quill work and beads.* Formerly the only bridle used for horses was a long rope consisting of a single strand of buffalo skin, or several strands of the same material plaited, one end of which was looped and passed around the lower jaw of the horse, the loose end being held in the hands of the rider. Quirts were used by both the men and women, those of the women usually having handles of elk horn with lashes of raw hide, while those of the men had heavy wooden handles often elaborately carved and decorated. These had loops at the ends of the handles to go over the wrists of the riders. The travois was the property of the woman and all transportation of baggage was under her care. She usually made all transportation appliances, including the saddles of the men.

The people have no traditions of transportation by water, though they knew of people who did use canoes, and they seem never to have used the bull-boat, a kind of tub made of skins used by the Sioux and other Plains Indians. When crossing rivers the skin covers of lodges were folded into large dish-shape bundles, supported by cross pieces of wood, forming a kind of raft, upon which children, old people and baggage were placed and ferried across by women swimming at the side. It it not certain that the Blackfoot ever wore snow shoes for winter travel. Some individuals claim to have heard their ancestors speak of their use, but their information is too vague to be given much credit.

From the time of earliest contact with the whites the Blackfoot were noted for their wealth in horses. MacKenzie says:

"They are the people who deal in horses and take them upon the war-parties towards Mexico; from which, it is evident that the country to the southeast of them, consists of plains, as these animals could

*Trans. of Eth. Society, London, 1861, Vol. I.

not well be conducted through an hilly and woody country, intersected by waters."*

Umfreville observes: "In their inroads into the enemies' country they frequently bring off a number of horses which is their principal inducement for going."†

That they were good travellers is evident from all accounts. We are told:

"They are real Bedouins of the prairies, having always parties on the move in every direction; making rapid journeys sometimes to the British, and sometimes to the American parts for the sake of gathering news concerning other Indians, or of the buffalo."‡

As a rule the horses were the property of the men. The woman owned her steed, pack horses, etc., which were usually females, but the herd belonged to the man. The best horses were brought in at night and picketed near the lodges of their owners. During the day the herd pastured at will near the camp. The bringing in of the herd seems to have been left to the women. No system of branding was used, but each person knew the individualities of his animals so that he could recognize them at sight. Some owners had a preference for horses of one color and prided themselves upon being the owners of many white horses, etc. We have no evidence that conscious selective breeding was practiced or that castration was known.

Warfare.

It is difficult to secure accurate information concerning the types of weapons used by these people before the introduction of fire-arms. From the examination of specimens of ancient and recent manufacture and information from the people themselves, the writer infers that there were two types of bow in use. One was cut out of a single piece of wood, straight in the middle for about two-thirds of its length, with ends curved. The other was a sinew backed bow, made of a single piece of wood backed with sinew and bent in a double curve. The arrows were made with a single shaft of willow, three-feathered and pointed with bone or stone. Some of the old men state that bone was more often used than stone. In the Blackfoot country two types of arrow points are found, one very small usually not more than a half-inch long, and the other long and slender, varying from one and a half to three inches in length. The Blackfoot claim that they never used these small arrow points, but that they were carried in by the Snakes and other tribes living beyond the mountains. Although the writer has no accurate data as to the relative number of the two types of arrow points that are now found in this region, his own observation indicates a great number of the smaller type and a great scarcity of the larger. A systematic examination of the ground around the old buffalo drives might settle this point satisfactorily.

War clubs with stone heads were used, but usually the stone was spherical instead of pointed like those of other tribes. The head was sewed up in a skin cover, an extension of which formed the sheath for a wooden handle two feet or more in length. The stone was not held rigidly to the handle, but hung loose, making it more effective when striking a blow. While the people made use of the

*Voyages from Montreal, etc., p. lxxi.
†Present State of Hudson's Bay, etc., 1790. p. 200.
‡Trans. Eth. Soc., London, 1861, Vol. II. Hector and Vaux, p. 257.

metal tomahawk and tomahawk-pipe introduced by the traders it is not certain that this type of weapon was known to the Blackfoot in earlier times. The more common form of war-club was a riding whip with a strong heavy handle, which served both as whip and weapon as necessity demanded.

Lances were used at one time, but seem long ago to have become ceremonial and conventional objects rather than weapons. However, the knife was a special object of veneration. The traditions make constant mention of a white stone knife which seems to have been a large leaf-shaped flaked tool of white flint-like material hafted in wood, bone or wrapped with skin. For the last sixty years or more, large double edged, pointed knives of metal have been carried by both sexes. In many cases these have come to have ceremonial attributes with more or less elaborate rituals pertaining thereto.

Since the introduction of horses into the great plains the wars of the Blackfoot seem to have been occasioned by raids for the capture of horses. According to traditions, such expeditions were made against the Snakes, Flatheads, Crows and Assiniboines. These raids were common in the seventies, the last one of which we have certain information was made by several members of the Blood tribe who went to Ft. Belknap Reservation in Montana in 1887. They were discovered and killed by the Assiniboines and Gros Ventre.

In horse stealing it was customary for a few individuals to go out alone. They frequently set out on foot and travelled by night until they located a camp, then watching their opportunity they crept around the horses grazing near the camp or inside of the camp itself, cut loose the tied horses and drove or led away as many as possible. This usually led to pursuit and running fights with various results. It was not uncommon for a whole band to go in pursuit of the thieves and trail them to their own camp, which naturally led to a contest between the two bands. Of course, it is to be understood that wars for revenge were sometimes undertaken, but these were less frequent than is often assumed and such revenge was usually in retaliation for loss inflicted upon the members of a horse-stealing expedition. In this way the practice of horse-stealing kept the Indians of the Plains in constant petty warfare. So far as known the Blackfoot never carried on a systematic military campaign against other tribes.

The Blackfoot practiced scalping, counted coup on the enemy, held the victory dance, kept tally of the exploits by symbolic designs, etc., like the other Plains Indians. However, they seem to have given more attention to the capture of horses and more honor to the successful horse thief than any other tribe. Going on the war-path for the mere sake of securing scalps, or the man hunt, was not a common practice among the Blackfoot.

Social and Ceremonial Organization.

The social organization has changed greatly in the last forty years, and has, no doubt, undergone a gradual change from a rigid clan system to a loose band organization since these people left the woods to roam on the plains. As it now stands they are composed of three tribal divisions, viz.: Northern Blackfeet, Bloods and Piegans. There is a feeling among the Piegans, at least, that the first is the original main body from which the others separated a long time ago.

In conversation they usually designate to which of these three a person belongs. The general independence of the three tribes is evident from the practice of holding separate sun dances, etc., but they have no traditions of actual intertribal warfare. Each tribe is composed of bands each with a headman, or chief. The members of the band look upon themselves as blood relatives, but discriminate between adopted members and blood relatives. Marriage is forbidden between members of the band as blood relatives, but not between the members as such. The husband marries into a band, and so lives with his wife's people to whose band the children normally belong. Men and women each have their individual property, according to convention, and, as a rule, the daughter inherits the mother's property, and the son the father's. When there are no children the property of each goes back to the nearest relations. The father usually exercises the right of naming the child.

Each of the three tribes was directed by a council composed of the heads of the bands, and this body elected one of their own members to serve as tribal chief. When camping together a circle was formed, each band of the tribe having a fixed place in the circle.

While it was common for a man to have more than one wife, he looked upon one of them as the true wife, and spoke of her as the one who sits next to him, because her place in the lodge was next to the head of the family. As a rule, every man of distinction had at least two wives. Adultery was not common, and women were punished for this offence by cutting off their noses, so that they might bear the mark of their shame all their lives. Divorce was not common.

The social, political and religious activities of these people were so interwoven that one of these subjects can not be discussed without treating of the others. In the first place, there were a number of societies possessing rituals and regalia appropriate to their functions. The most important societies are the so-called Age Societies, or Military Societies, the membership of which comprises practically all males over eight years of age. These societies were known collectively as the All-Comrads, and from one point of view might be considered as separate ranks, or degrees, of the same organization. At the present time these societies are well preserved among the Bloods, and are as follows: Mosquito, All Brave Dogs, The Braves, Black Soldiers, Raven Bearers, The Dogs, The Horns and The Catchers. The members of the first named society are boys about eight years of age, who pass from one society to the other in the order named above, until the highest is reached. There seems to be no fixed time for a member to pass from one society to the other, but, as a rule, this transferring occurs every four years after the rank of the All Brave Dogs has been passed. In former times there seems to have been a greater number of societies for young men, and a higher rank for very old men, known as the Bulls. This highest society seems to have passed out of existence a long time ago, and among the Bloods its functions are performed by the Horns.

While the women can not become members of these societies there is an adjunct of the Horns among the Bloods known as the Matoki, that is strictly a woman's society. In most cases the members of the Matoki are the wives of the members of the Horns and the character of the ceremony is such that they both seem to have had a common origin.

The various societies of the All-Comrads have religious functions, and especially the Horns, but there exists among the Piegans a strictly religious society known as the Crow-has-Waters. The significance of the term is that the members of the society have rights and formulas conferred by powers residing in the water upon Crow Indians who in turn transferred these rites to a few Piegans living among them. Some thirty years ago one of these Piegans returned to his people and introduced this society among them. Both men and women may be members, but the men seem to be the active members. Each member has a small bundle containing a few skins of birds or mammals to which belong short rituals containing a few songs.

About forty years ago a society for young and middle aged men, known as the Hair-Parters was introduced from the Gros Ventres among whom the same society is generally known as the Grass Dancers. This seems to be a social organization without religious significance.

The Black Tail Deer Dance is a religious organization bearing traces of the Ghost Dance Religion, and was introduced from the Kootenay about 1890. Its rituals are supposed to give its members power in hunting, but the ceremonies are characterized by trance and hypnotic phenomena.

There seems to have been a number of societies in former times that have passed out of existence or have been displaced by those introduced from other tribes. Among these were two peculiar organizations known as the Ghost Dancers and the Brave Dogs. The former was in no way connected with the Ghost Dance religion recently practiced by the Plains Indians. The latter seems to have been limited to a membership of two, and was characterized by the fact that these individuals were never permitted to turn back from a danger of any sort.

One of the most striking characteristics of the Blackfoot Indians is the possession of a great number and variety of rituals and bundles. These bundles seem to be entirely secondary, while the rituals, and especially the songs which they contain, are looked upon as the real point of contact with religious power. It is their belief that all rituals and songs were given to individuals in dreams or states of trance by the power of the universe appearing in the form of animals, and sometimes in the form of heavenly bodies. It is important to note that practically in every case the ritual was transferred to a single human being who in turn had the power to transfer it to others. Sacred bundles were often duplicated, while their rituals remained about the same. The most important are the Beaver Bundles, Medicine Pipes, Painted Lodges, Buffalo Rock Bundles, Sacred Turnips, and the Sacred Spear.

In some respects the Beaver Bundles are the most elaborate, while they bear the least resemblance of any to Plains culture. They contain the skins of animals, chiefly the beaver, and are accompanied by a ritual containing seventy to one hundred and forty songs, the number of which is usually a secret because of a taboo against counting them. Each bundle is owned by a single individual, who is supposed to know the ritual and to be able to perform it at any time.

There are a great number of special lodges with bundles and rituals, generally known as the painted lodges. There are, at least, forty-three of these, all of which have characteristic differences in the

number and character of their songs. Some of them confer power to attain success in war, others success in healing the sick, and still others success in promoting the welfare of the people. The decorations on the outside of these lodges are usually symbolic, and represent some phases of the ritual.

In addition to this large number of special medicine bundles, almost every man possesses one or more individual bundles, most of which have rituals composed of at least four songs. These individual bundles may be considered as war-charms, because they were used for that purpose in the past. When a young man became old enough to engage in military expeditions, he went to some noted medicine man and made application for such a bundle. The medicine man then transferred to him a small bundle containing skins or feathers of animals from which he claimed to have received a ritual and songs which he in turn taught the applicant. Then if the young man should prove very successful his bundle would be a special prize, and would be handed down from one generation to the other, often with additions to its ritual until it became a very important medicine object.

One of the most interesting points in the elaborate development of the ritual among the Blackfoot is the idea that the chief power of the ritual is contained in songs. The objects in the medicine bundle are of minor importance. Bearing in mind the fact that there were several hundred different bundles, all of which had a great many songs, and that all of these songs were different, we have a condition requiring a great amount of study on the part of the medicine men since they were supposed to know all the songs belonging to the medicines and to be able to perform their rituals. Thus the important part of a man's education was the learning of songs and rituals.

All the Indians of the Plains maintained a religious festival known as the Sun Dance, and while there were various minor tribal differences the ceremony had everywhere the same general characteristics. Sun worship, or the worship of the power in the sun, may be regarded as the chief element of their religion. The Sun Dance among the Blackfoot was peculiar in that the chief personage in the ceremony was a woman especially noted for piety and marital virtue. The Sun Dance was also the only ceremony in which the whole tribe participated. They came together in the summer, usually during the berry month, camped in a circle and proceeded to erect in the centre of the camp a peculiar circular structure of poles, which they speak of as the lodge of the Sun. During the interval of preparation the medicine woman feasts in her tent, and on the evening of the fourth day proceeds to the place where the Sun lodge is to be erected, and just at sunset all the poles are raised into place and the structure completed with all the dispatch possible. For several days following the chief medicine men of the tribe are stationed within this structure, where they receive and bless all the people who come to them. During this time the various All-Comrad Societies perform their rituals, and individuals who have been successful in war recount their deeds. When the Sun lodge is erected, offerings of clothing and other objects are made to the Sun. There seems to be an idea among these people that gifts of old worn-out clothing are often more acceptable to the Sun than anything else, because the Sun usually appears to mankind as a poor, poverty-stricken, helpless old man begging for a little cast-off clothing.

The future land to which the spirits of the dead go is believed by the Blackfoot to exist somewhere in the vicinity of the Sand Hills. The idea of the condition of the dead differs somewhat from the ideas held by other tribes, since among the Blackfoot the future life is not one of happiness, but of indifference. The people of the spirit land are supposed to lead the life of ghosts, and to be always surrounded by illusions. For example, they are said to be always hunting buffalo which, pursued for a while, suddenly vanish and leave behind the skeletons of mice. This may be the reason why the constant prayer of the Blackfoot is that they may live long, but, on the other hand, they have some anxiety to reach the future land in order that they may meet their relatives who have gone before. It is not uncommon for a dying person to be given messages from the living to friends and relatives long since dead. Formerly the dead were placed in trees or upon high points of land, where, in many cases, a lodge was erected and fitted up with all the common utensils of daily life, and the body deposited in its bed as if in sleep.

Religious Ideas.

At present it is generally agreed that the American Indians did not have the conception of a single personal God, but abstracted the phenomenon of nature and expressed it by terms analgous to our word power. The Blackfoot seems to look upon this power as pervading the whole world of human experience, and as the cause of all that there is. Every object in the world, especially every living object, is regarded as possessing the means of manifesting this power in some way. As he looks about him he sees animals and men possessing kinds of power that would be very useful to him, and, in consequence, sets about making sacrifices and prayers that he may receive some of this power. For example, he has observed that the owl has great power over darkness, and he sometimes makes sacrifices and prayers directly to the spirit of the owl for some of this power to be transferred to himself. If an owl should appear to him in a dream and teach him some songs and rituals he would accept this as a real manifestation of power. It is sometimes said that the Indians of the Plains worship the sun, but this is not strictly true, for the Blackfoot at least look upon the Sun as simply one manifestation of the power of the universe. Another peculiarity of this belief is that the individual is given no credit for intelligence and ability, because anything that he may do is the result of the direct transference of power to him. For example, I was told that the white man who invented the phonograph was nothing more than a fortunate individual who prayed to the power of the universe for the ability, and that this power took pity on him and told him in a dream to take certain pieces of wood and metal, and put them together in a certain way. According to this view the individual counts for nothing and deserves no credit, except in so far as he is the fortunate individual to be favored. Consequently, the religious activity of a Blackfoot consists in putting himself into a position where the power will take pity upon him and give him something in return. At the time of the Sun Dance men sometimes practiced self torture to this end, because their great suffering was supposed to excite the compassion of the power.

Art.

The decorative art of the Blackfoot consists chiefly of quill worked and beaded designs, and of painted designs upon raw hide bags representing geometric forms peculiar to the Plains Indians. While several of the Plains Tribes have introduced into this art a special form of symbolism, the Blackfoot either never practiced such symbolism or else lost it before the subject was investigated by enthnologists. They look upon geometric designs as objects copied from other tribes. Even in the time of Maximilian* it was asserted that the circular designs upon a man's shirt were borrowed from the Assiniboine. A considerable number of designs are recognized by the Blackfoot as Gros Ventre in type. It seems probable that the Blackfoot copied the objective aspect of the decorative art of the Plains Indians, without appreciating its symbolism. However, the Blackfoot have symbolic designs expressing religious ideas, but the character of this art is realistic in contrast to the geometric character of decorative art. The best examples of these designs are the decorations on the "painted lodges," representing stars, trails, animals and men. In general, it appears that the Blackfoot represent plains decorative art in its objective aspect only.

Mythology.

As may be expected, the myths of these people show evidences of mixture of cultures. In the story of the Old Man we have the characteristics of the trickster of the Columbia River Region, and the Coyote of the Plains, but the Old Man is regarded by the Blackfoot as a trivial character. Some observers have confused this Old Man with a term used in praying to the sun, where the latter is addressed as old man in a different sense. The raven is a character often met with in their mythology, but seems to be confused with the Thunder Bird, a kind of an eagle being of the Plains Indians. However, the raven is not regarded as the creator of the world as is the case in other parts of Western Canada. The greater part of the mythology of the Blackfoot consists of mythical accounts of the beginings of medicine bundles and societies and these accounts are important parts of the rituals for the same. They are usually recounted in the ceremonies and the ceremony in turn is usually a kind of dramatic rendering of the incidents recounted in the myth. While these myths possess certain minor characteristics that may be recognized as Blackfoot, their plots are practically identical with myths found among the Arapaho and the various divisions of the Sioux. A comparative study of the mythology of the Arapaho, and the Blackfoot leads to the conclusion that the latter acquired the greater part of their ritualisic mythology from the Gros Ventre, with whom they lived in peace for many years. On the other hand the Blackfoot have been in contact with the Cree from whom they seem to have borrowed rituals and myths relating to the treatment of disease. However, it is impossible to come to any satisfactory conclusion as to the sources from which the Blackfoot mythology has been derived, because the Gros Ventre and the Cree are also of Algonquin stock from which it follows that the three tribes had a common origin, but there is rea-

*Travels in North America, p. 248.

son for believing that the Gros Ventre, as a part of the Arapaho, acquired the culture of the Plains first and then passed it on to the Blackfoot. It is interesting to note that in like manner the Sarcee, an Athapascan tribe, lived with the Blackfoot so long that they acquired the Plains culture.

7. THE KOOTENAY INDIANS.

By Alexander F. Chamberlain.

Habitat, tribal names, etc. The Kootenay or Kitonaqa Indians inhabit a pear-shaped region, having its apex at about 52° n. lat. in British Columbia, and extending at the base into northern Idaho and Montana, including the country about the Kootenay Lake and the head-waters of the rivers Kootenay and Columbia, lying between the Rockies and the Selkirk range. Their traditions suggest that they are comparatively modern intruders into this area from some quarter to the east of the Rockies, possibly around the head-waters of the Saskatchewan. The origin of the name Kootenay,—the Indians themselves use the form Kitonáqa or Kutonáqa,—is unknown It appears first as *Cattanahowes* on the map accompanying Mackenzie's *Voyages* (1801), and has been spelled since in a great variety of ways. Other former names of the Kootenay are Flatbows, Skalzi, Lake Indians, etc.

The Kootenay number about 550 in British Columbia and nearly as many in United States territory, the largest group being connected with the Mission of St. Eugène in the Upper Kootenay country The tribal or local divisions of the Kootenay are as follows:

I. Upper Kootenay tribes including: 1, *Aqkiskɛnukinik*, "people of the two lakes," settled about the upper Columbia lakes, chiefly at Windermere; 2, *Aqk'amnik*, "people of Aqk'am (Ft. Steele)," the Indians about Ft. Steele and the Mission of St. Eugène; 3, Yak'et aqkinuktleet aqkts'makinik, "people of the Tobacco Plains," called also Aqk'aneqonik, "Creek Indians," who live in Tobacco Plains to the south. II. Aqkotlatlqo, Indians of the Lower Kootenay, partly in British Columbia and partly in Idaho. III. Aqkiyenik, "people of the leggings," the Indians of Lake Pend d'Oreille.

Relations with other peoples. Of the Salishan tribes to the west, north and south, the Kootenay have had more or less close relations with the Shuswap, whom they call TlitkatuwumtlaEt, "No shirts," because, when first met, they had no buckskin shirts like those of the Kootenay; the Okinagan, or Okinaken, also called KokEnuk'ke; the Colville Indians, called Kqoptlenik, "those dwelling at the Falls;" Kalispelm, called Kanuktlatlam, "those who compress the side of the head,"—in allusion to their head-flattening custom. Of the Shahaptian stock, the Kootenay know in particular the Nez Percé, whom they call Säptet, said to mean "grass-basket makers," and the Yakima, called Yaäkima, for which a folk-etymology, "foot bent towards the instep" is offered. Of the Siouan stock they are more or less acquainted with the Assiniboins, or Stonies, called by them TlutlämaEka, or "Cut-throats." and also Gutlúpuk, and the Sioux, known as Katskagítlsak, "Charcoal legs."

Of Algonkian peoples they know especially the Blackfeet or Sahantla, "Bad People," and the Crees, called Gútskiáwe, "Liars." The Athaphaskan Sarcees, to them known as Tsuqo, or Tcoko, and also Saksíkwan, come likewise within the range of their acquaintance. At the Columbia Lakes a small colony of Shuswaps (Kinbaskets) has existed for a long time within Kootenay territory.

With the Blackfeet and some others of the plains tribes, the Kootenay used to hunt the buffalo and at various periods alliances of some importance must have existed between these Indians and the Kootenay. The Kootenay name of the Blackfeet hails from the time when these two peoples indulged in the fierce wars still remembered by some of the survivors of the days when these hereditary enemies so often took the war-path. Some intermarriages, however, have occurred between the Kootenay and the Blackfeet, besides alliances due to slavery, adoption, etc. Intermarriages have also taken place between the Kootenay and the Colville, Shuswap, Yakima, and even Cree. The Chinaman is known to the Kootenay as Gooktlam, "Tail-head," and the Indians share the feeling of the whites towards him. The negro, for whom the Kootenay have some dislike is simply Kämkokokotl, "Black." For white man the Kootenay employ the term Suyäpi, which is identical with Nez Percé sueapo, and is probably a loan-word.

In the palmy days of the fur-trade the Kootenay country was visited by individuals belonging to many Indian tribes, other than those noted, and the name "Kanaka," borne by a Lower Kootenay, indicates that the Hawaiian employees may also have left traces of their presence among these Indians.

The Kootenay word for "Indian" is aqkts'makinik, the etymology of which is uncertain.

Physical characters. The Kootenay are among the tallest and best developed physically of the Indian tribes of British Columbia. Of the adult males measured in 1891 by the present writer, two-thirds had statures lying between 1660 mm. (5 ft. 5 in.) and 1779 mm. (5 ft. 10 in.) and one-fourth exceeded 1739 mm. (5 ft. 8½ in.), the average being 1690 mm. (5 ft. 6½ in.) One individual, a fine specimen of young manhood, son of an Upper Kootenay father and a Lower Kootenay mother, had a height of 1846 mm. (6 ft. ½ in.) The only three females measured (aged, respectively, 14, 18 and 40 years) had statures of 1557 mm. (5 ft. 1 in.), 1570 mm. (5 ft. 1 4/5 in.) and 1582 mm. (5 ft. 2¼ in.) According to Deniker's classification, the Kootenay males belong among the peoples of "more than average stature" and very nearly among the peoples of "high stature."

The cephalic indices of 70 males (five years of age and upward) ranged from 72 to 86; there were 21 cases above 80 and 8 below 75, while between 75 and 80 inclusive there were grouped 41 cases. The Kootenay thus tend to be mesaticephalic, with indications of the intermixture of a brachycephalic (short-headed) type. Of the indices of the 14 females measured, 12 were over 80, and 6 reached 85, while 2 were only 76,—this shows a decidedly brachycephalic type as compared with the males. The cephalic indices of the half-breeds (white-Kootenay), of whom 10 were measured, show for both sexes together a range from 70.5 to 84.9. The lowest cephalic index met with among the Kootenay was 70.5, in the case of the 14 year old daughter of a white father and a Lower Kootenay mother; the high-

est was 86.6, in the case of a nine year old girl from the Columbia Lakes tribe, whose seven year old sister had an index of 82.2.

The average weight of 13 adult males (in their very light summer clothing) was 151 pounds, the two heaviest (the tall young Indian just referred to and another) tipping the scales at 177½ and 177 pounds. The few young children weighed seemed below the average for similar ages among the whites. Between 10 to 20, however, the Indians kept up to the white average in weight, or rather somewhat exceeded it. The writer's guide, who was 22 years old, weighed 177 pounds and was 5 feet 7 inches tall. The limbs of the Kootenay appear to be in general well-shaped, but the hands are sometimes rather large and the legs in some cases bandy, the last possibly due to horse-riding, etc. The face is not infrequently spoiled by a disproportionally large mouth and thick lips, while the medium-sized ears are lengthened and distorted by the use of heavy earrings. The nose is often rather flat and the nostrils sometimes so large as to give rise to nick-names among the Indians themselves. The face gives the impression of being broader than it really is and the cheek-bones are often quite prominent. The forehead is generally broad and straight, and the chin well-formed in both sexes. The eyes are characteristically dark-brown, the hair straight and black (lighter in children and adults habitually bareheaded). A few cases of "wavy" hair were noted, and one Indian was nick-named "Curly-head."

In spite of the custom of removing hair from the face and the body prevalent among these Indians several individuals (generally old persons) were met with who possessed small beards and moustaches.

The skin-color of the Kootenay is the "brown" or "red" characteristic of the North American Indian and easily distinguishable from the "yellow" of the Chinese found in the country. From these also the Kootenay are marked off by their general appearance. The so-called "Mongolian eye" is not common among them.

In matters of physical endurance (e.g., walking, horse-riding, etc.), the Kootenay probably equal (or even surpass) the whites, but in wrestling, jumping and other tests of strength, where "knack" counts for a good deal, they appear to lag behind, more, perhaps through lack of knowledge and application than from absence of strength *per se*.

Temperament, character, etc. While the Kootenay furnish examples of outbreaks of anger, jealousy, etc., there are probably not more numerous than would occur in an equally large group of whites under like circumstances, though the absence of certain conventional restraints may seem to increase their magnitude and importance, and allow them fuller and more complete expression. The writer had personal experiences of several instances of Indian moroseness, resentment, anger and petulance. On the whole, however, the Kootenay (especially the young men) gave evidences of a gay and lively temperament and a capacity for heartily enjoying themselves. They possess a certain sense of humor, and their feeling for the ridiculous, leads them to laugh at and make fun of the mistakes and blunders, and even the mishaps and accidents, of their fellows and of such strangers as may be among them. They are also fond of playing tricks which make the victim anticipate great

danger, when only a "scare" is intended. They find much ground for amusement in the mistakes made by the whites in their efforts to learn the Indian language, especially when the mispronounced word suggests another,—a sort of unconscious pun. Their sense of humor appears also in their comments upon the whites and their actions, in the descriptions of the characters in myth and legend, etc. The well-known dignity attaching to chiefs and other prominent personages among the American Indians can also be observed among the Kootenay, as well as the expression of this dignity when "offended," although the most noteworthy example of this that came to the writer's knowledge was in the case of the leader of a small party of Blackfeet who were on a visit to the Kootenay.

The Kootenay possess real affection for children, and it is by no means uncommon to see a man carrying a little child, or allowing it to play with him in right childish fashion. It is only since contact with the whites that some of these Indians have taken to chastising severely their offspring. The embarrassments of love-making affect the young Kootenay much in the same way as they do the white youth, as the writer had occasion to note in the conduct of the young Indian who was his guide,—he happened to be courting a maiden of his people, which fact was revealed by his features and his actions as surely as it would have been in the case of one of our race. He blushed frequently, as an Indian can. The writer was much impressed by the fidelity and sense of personal attachment evidenced in his guide who was continually with him for several months.

At the moment of separation this young Indian was affected to the point of tears and the farewell was one to be long remembered.

The good-nature and rather high morality of the Kootenay were noted by the whites who came into contact with them in the first half of the nineteenth century, later on, the Lower Kootenay, who seem to have been less yielding to missionary influence, came to have not so good a reputation with the whites as had the Upper Kootenay. In 1888 the Indian authorities of the Dominion described (with some exaggeration) the latter as "a strictly moral, honest, and religious people." And in 1845, Father De Smet spoke equally well of the Kootenay among whom he labored as a missionary. The Upper Kootenay have resisted the temptation of strong drink better, perhaps, than almost any other Indian tribe of the country, and the morality of their women is distinctly higher than exists among many other tribes. for they have made special efforts to preserve them from the evil influence of lewd white men and the dissolute Indians of neighboring stocks.

Intellect, senses, etc. The Kootenay may be said to possess quick judgment, alert perception, good memory, and a rather high general intelligence, with a noticeable sense of curiosity, at least in regard to the actions and achievements of the whites. The Kootenay children at the Mission school of St. Eugène, near Ft. Steele, in the Upper Kootenay country, exhibited a marked capacity for learning to read and write the English language in a very brief period of time, and, even where no school influences have at all made themselves felt, there exists among these Indians considerable ability (the writer secured several hundred specimens made for him by various individuals) in drawing with pencil on paper. This fact is all the

more interesting since few picture-writings (if any) and other pictographic records are reported from the Kootenay. The writer believes, however, from stray observations of Indians and whites, that it is possible that these Indians may have had something like the "calendar records" known to the Plains Indians and described by Mooney and Russell as existing among the Kiowa, Pima, etc. The brief description given by one individual would perhaps justify such a statement. The Kootenay have a "map-sense," and can both understand and interpret the chief features of the maps of the whites, and draw crude ones themselves of their own country, its rivers, etc.

The Indians' knowledge of their environment, the fauna and flora of the region, etc., is quite extensive. The writer's Kootenay guide, a young man of 22, was able to give the native names of some 100 species of plants, many of which are, or were used for medicinal or industrial purposes. He also, at one sitting, gave the Indian names (with brief descriptions) of 13 varieties of fish, and 91 species and varieties of birds, besides the appellations and descriptions of the animals, etc., of the country. His descriptions of the various sections of the Kootenay region, of the rivers, lakes and mountains were always accurate enough, and his sense of locality was marked.

The senses of the Kootenay do not appear to exceed those of the whites except where practice and special "education" have made their influence felt. This is most noticeable in the case of sight and hearing. The taste of these Indians leads them to sometimes tolerate the "soap-berry," but not nearly so much as do their neighbors, the Shuswap; it is very unpalatable to the whites. The taste of whiskey is also considered "bad," and the "soap-berry" was sometimes described as "tasting like bad whiskey." The same term (kwistlâqane) is applied to "salt" and "vinegar." The writer's Indian guide developed a strong liking for orange marmalade, the taste of which appealed to him. For sugar, in any form, these Indians have a great desire. They have also taken to tea as a drink. Coffee and cocoa they likewise drink readily enough in addition to numerous "teas" and other herbal concoctions of a more or less medicinal nature in use among them from earlier times. The sense of smell plays a larger rôle among the Kootenay, perhaps, than with many of the other Indian tribes of the country. Several plants are admired for their scent or perfume. One they apply to their nostrils, or where it abounds, roll about on the ground, sniffing its fragrance with evident delight; another they put into bags to use as pillows; a third is thrown on the fire to make "a good smell."

The color-sense of the Kootenay, as revealed by their color-names, seems to be fairly well developed, and they have at least seven different color-names for describing horses. Color-names are also quite extensively used in the descriptions of birds, etc.

An interesting side of the Indian mind was the perception by many of the members of the tribe of the object and intentions of the writer in investigating their language, customs, etc., and the recognition of the value of placing these on record before the extinction of the race. The sympathetic cooperation of the writer's guide and a number of other Indians was very encouraging, although their insistence upon his "getting everything right" was sometimes embarrassing.

Occupations, industries, arts. In earlier days the Kootenay were famous hunters and joined the Blackfeet and other tribes in the great annual buffalo-hunt on the plains beyond the Rocky Mountains, memories of which still survive among them. They are still skilful in the hunting of bears, wolves, deer and smaller animals, whose flesh serves them for food, while the skins are disposed of largely to the white traders. Before entering upon the great winter hunt, the Upper Kootenay used to have a festival celebrated some time in December. This the Catholic missionaries have very aptly replaced with Christmas ceremonies, accomplishing the result by a not too sudden transition. The hospitality of the season was reenforced by the custom of the tribe by which the hunter distributed the produce of the chase among his relatives, friends, etc. Since the introduction of fire-arms, the old bow and arrow has practically disappeared (but some of the older men may still be seen with bow and quiver, and the children use small bows and blunt arrows to kill birds, etc.) It is said that in former times the "fool hen" was lassooed with nooses, and water-fowl, captured by means of a fibre net attached to a pole.

Fishing is still a chief occupation of the Lower Kootenay in particular, the Upper Kootenay, except during the salmon-season, being less devoted to it, probably on account of their present situation and their closer relation to the whites. Among the ways of fishing known to the Kootenay are the following: With hooks (formerly of bone or gooseberry spines), through the ice with hook and line, driving the fish into the shallows by pounding on the ice, gaffing (now much used with modern appliances borrowed from the whites). The Lower Kootenay, who make much use of dried fish as food, obtain fish in large quantities by means of basket-traps and dams or weirs of sticks and wicker-work. Spearing fish was also much practiced by the Kootenay and at least three sorts of fish-spears were in use among them.

The Lower Kootenay, who are less subject to the influence and control of the whites, are more given to river-life than the Upper Kootenay. Both now own many horses, but the former have become more sedentary and some of them, *e. g.*, Isidore (chief in 1891) even possess good ranches. Many of them make a living by acting as surveyors, transporters, guides, etc., for the white population, miners and others. A few "prospect" for gold.

The "lodges" of the Kootenay were of two sorts, the skin-covered tepee of poles, called aqkitlanam, and the tanatl, or tent of rush-mats. Communal dwellings were unknown.

Three names for canoes are current in Kootenay: tcík'eno (canoe of pine or spruce bark), statlam (dug-out), a word borrowed from one of the neighboring Salishan tongues; yäktsometl (other than dug-out canoes). The typical canoe of the Kootenay, called yäktsometl, is of the so-called "Amur river variety," being pointed at both end under water. They are very skilfully navigated by the Indians.

The "axes" of the Kootenay were made in early days of flint or of elkhorn; knives also of like materials; needles, awls of the small leg-bones of animals, etc. Hammers of stone have not yet disappeared altogether; for pounding a roundish stone wrapped in skin was often used. Tobacco-pipes of stone, little ornamented, were

formerly much more in use, the material being procured largely from the Lower Kootenay country.

The only general musical instrument of the Kootenay is the drum (made of skin stretched over a stick bent into a circle), now common only among the Lower Kootenay, and manufactured by the Aqkayeⱡik tribe. Formerly the Kootenay are said to have possessed a sort of reed pipe and a bone flute. In their gambling songs sticks are beaten upon a log.

The art of basketry was formerly much more cultivated by the Kootenay, and is passing away altogether among the Upper Kootenay tribe. Water-tight baskets (of varied form, size, stain and ornamentation) of split roots are still made by the Lower Kootenay. Baskets, etc., are also made of birch bark.

From skins treated with deer's brains moccasins, shirts, etc., are made. The dress of the Lower Kootenay is more primitive than that of the Upper. Even when they assume the dress of the whites many Indians continue to wear the old breech-clout. Wolf-skin bands around the forehead were an ancient head-dress. Others were caps of skunk-fur, and of the feathers and skin of the loon. Hair-dressing in braids (now three, formerly two) is common. Among personal ornaments and charms were noticed the following: Ear-rings of shell, necklaces of bear's teeth and other amulets, feathers of the owl, chicken-hawk, etc.; strings and strips of cloth, silk, fur, ribbons, etc., the most prized being strips of weasel fur. At present personal ornamentation of this sort is rather profuse (finger-rings are now also much in vogue). In earlier times necklaces made from a certain shell found in the rivers of the Lower Kootenay region were much worn. Since contact with the whites bead and silk ornamentation of clothing, etc., has become wide-spread. Face-painting is still much in use among the Lower Kootenay. The Kootenay have the reputation of being enormous eaters, and have come to be fond of the flesh of horses, cattle, etc., even, in some cases, where no white man would touch it. They are also to be counted among the peoples of the globe who consider the louse infesting the human head a dainty morsel.

Of the plants of their environment they have made considerable use for food (service-berry, wild gooseberry, huckleberry, strawberry, soap-berry; wild onion, root of orange lily and several other plants; mushroom, lichens, tree-moss, gum and inside bark of larch; various tea-shrubs and tobacco herbs), economic (several plants, including "Indian hemp," for fibre, strings, etc.; lichens and roots for dyes), and medicinal purposes (for sore eyes birch bark, Oregon grape root, dogwood, etc.; for consumption, coughs, etc., various "tea-plants," etc.; for wounds, cuts, bruises, decoctions of several barks, leaves, etc.)

Health and disease. The hygienic institution of the "sweat-bath" was in full flourish among the Kootenay, the name of the "sweat-house" being wiseyatl. Among the Kootenay venereal diseases are not at all common. The most prevalent affections are consumption (and related diseases) and eye troubles, the latter due to the smoke of the lodges, etc.; scrofula, running sores on the face and neck, are also not uncommon. Goitre, warts, toothache (not frequent) were also noted. Two deaf and two blind Indians were met with and several "hermaphrodites" were said to exist among the various tribes. Tattooing for medical purposes has been introduced among the Kootenay by the Chinese "doctors," to whom they now often have re-

course. The nostrums of the white man also find vogue among these Indians. The "cure" practiced by their own shamans was of the characteristic "medicine man" sort—blowing and sucking, pinching and manipulating, etc.

Games and amusements. A favorite amusement of the Lower Kootenay on Sunday afternoons is "horse-running," *i.e.*, driving the horses to and fro on the great grassy plain for "the fun of it." In this even small boys take part. Breaking stubborn horses, a task of the young men, affords the onlookers abundant grounds for merriment and sarcasm. Both on land and in the water, the children play in imitation of their elders, who fashion for them toy canoes, weapons, implements, etc. The writer found a little Upper Kootenay boy playing hide-and-seek with a little white girl in the most approved style. A sort of round game with song and action was in use among the children. The word for "doll" in Kootenay, *tlinkoiyam*, seems to mean "plaything."

The Lower Kootenay are still much addicted to gambling, as were formerly also the Upper Kootenay, who have been largely weaned from it by missionary influences. It is among the former that the great gambling game survived in 1891. It is the widespread stick-guessing game, in the pursuit of which Indians have been known to pledge and lose everything they possessed, including even their clothes and their wives. The game often lasts for days at a time, and with it are connected many songs and dances.

Social and political organization. The Kootenay are remarkable for the simplicity of their social structure, which contrasts strikingly with the very complicated systems of some of the other tribes and peoples of British Columbia. There are, apparently, no evidences of the present or past existence among them of clan systems, totemic institutions, secret societies, etc. Each local or tribal community seems to have had a chief (the term in use, *nasoke*, or *nasukwen*, signifies, literally, "the good, or strong one"). This office (to be held only by males who had reached the age of 30) was hereditary, but the people had always the right to select some other of the family when the heir was incompetent or unworthy, or refused the chiefship. It would seem that the "medicine men" sometimes influenced the selection. The power of the chief was limited by the advice and action of his council. In former days there was also elected a "buffalo-chief," whose authority extended over the great hunting expeditions. In the old days slavery existed, the victims being chiefly women and children captured in wars with the Blackfeet, etc. They were not cruelly treated. The social position of woman among the Kootenay did not differ much from that accorded her by the surrounding tribes, and in the old days polygamy was in vogue. Girls were thought fit to marry at 15, boys at 20. The husband could send back his wife to her people within a year, if found bad or unsatisfactory. Adultery was not severely punished, the guilty woman being marked by the loss of one of the braids of her hair, which the offended husband cut off. Marriage of first cousins was forbidden. Divorced women and widows were allowed to re-marry.

Adoption by marriage and by residence was in use, and relatives took good care of orphans, brothers of sisters, etc. Women could hold property, and to the women and children went the lodge and its contents on the death of the father; horses, canoes, weapons, etc.,

went to the male children of age. In earlier days, if the deceased left no relatives, it is said, a "strong man" took possession of his property. Private property in land was unknown. The debts of a dead man were paid by his relatives, a custom which worked to the advantage of the white traders. Descent seems to have been traced through the mother. Murder was punished by the death of the offender at the will of the relatives of the victim. A sort of composition by wergild was also known.

Religion and superstition. The highest aspect of the religion of the Kootenay seems to be a species of "sun worship" on the way toward the recognition of an ever-ruling and beneficent spirit. The pagan Kootenay believed that the dead go to the sun, and that at some time in the future they would come back to meet the Indians at Lake Pend d'Oreille, in northern Idaho. At this place the various Kootenay tribes used to meet at a festival, with many dances, which lasted for days, but was held at rare intervals. On their way thither, all who were not engaged in family or tribal disputes danced sun-wise round a fire—the rest the opposite way. Formerly, it is said, the first-born child was sacrificed to the sun for the welfare of the whole family, the first joint of the finger cut off, and other like offerings made. But a good deal of this may have been imitated from the Blackfeet, with whom they were so long in close contact. A survival of "sun worship" is to be noted in the ceremonial *wusitlwatlakoine*, "making the sun smoke." Prayers seem also to have been offered to the sun.

The Kootenay believe in the existence of spirits in everything animate and inanimate, and at death the spirits of Indians may enter any object or creature whatsoever. The touch of the spirits causes disease and death. Spirits of the dead return to visit their friends. Formerly sacrifices were made to the spirits of mountains and forests to secure success in hunting, etc. The mountain spirit, especially, figures in myth and legend. The shaman, *nipikáka*, gets his name from the fact that he has to do with the spirits (*nipíka*), to whom he prays and whom he invokes by set ceremonies to reveal to him matters for prophecy, give him power to cure disease, etc. The Kootenay shamans seem to have impressed many of the whites with their "satanic power" in the early days. They are said to have been initiated in the woods with fasting, and were believed to be able to kill animals at a distance by merely glancing at them.

The birth ceremonies of the Kootenay were, probably, connected with such "sun worship" as existed. Segregation of girls at maturity, with certain food taboos, was in vogue. In former days the dead were buried with considerable ceremony, loud shrieking being a part of the mourning rites. The property of the deceased was buried with him or hung on a tree near his grave. Sometimes the burial took place on low lands, which were covered with water when the river ran high.

Mythology and Folk-lore. The Kootenay have a considerable number of cosmologic and explanatory myths. The sun, regarded as a woman, was made by the coyote (or, by other accounts, the chicken-hawk), the moon (looked upon as a man), by the chicken-hawk. The stars are Indians, who have been taken up into the sky, or reached it in some way or other. The Great Bear is a female grizzly, the Milky Way, the "dog's trail." The thunder is caused by a great bird, the

shooting of whose arrows makes the lightning. The coyote gave his daughter, when she married the thunder, the clouds for a blanket. There is a characteristic deluge legend in which the chicken-hawk (a man) figures, together with a monster who ravishes his wife, and whose death leads to the catastrophe. In some version of this tale the "monster" is a lake-animal or a fish.

The Kootenay have many animal tales in which the coyote (prairie-wolf) is the chief figure; he caused the first prairie-fire, got thrown into fire by the chicken-hawk (whence his singed fur), got his mouth burned by trying to smoke the buffalo's pipe, appeased the mountain spirit, ran a race with the fox, etc. Other prominent animals are the grizzly, the fox, the "mountain lion," the skunk, the wolf and the buffalo. Of birds the principal figure is the chicken-hawk (Accipiter Cooperi); the owl is represented as an old woman who steals children. The butterfly is mistaken by the coyote for a man instead of a woman, and the cricket is the coyote's younger brother. The frog (grandmother of the chipmunk) cheats the deer in a race.

There are many legends of giants and similar monsters. Also two interesting stories of "Seven Heads" and "Lame Knee," which approach in nature and content the European folk-tale.

The Kootenay have, likewise, some folk-lore in relation to the cries of birds (owl, robin, tomtit, etc.). For further information concerning the Kootenay Indians consult the following:—

F. Boas: Einige Sagen der Kootenay. Verh. der Berliner anthrop. Gesellschaft, 1891, pp. 161-172; Kootenay Indians, in Report of the British Association for the Advancement of Science, 1889. A. F. Chamberlain: Report on the Kootenay Indians of South-Eastern British Columbia. Report of the British Association, 1892, pp. 549-611; Kootenay Indians, American Antiquarian, 1893, pp. 292-294, 1894, pp. 271-274, 1895, pp. 68-72; Kootenay "Medicine Men." Journ. of Amer, Folk-Lore, 1902, pp. 95-99; articles on Kootenay language, etc., in American Anthropologist, 1894, 1900-1904, Archivio per l'Antropologia 1893, Verhand. der Berliner anthrop. Gesellschaft, 1893, 1895, Proceedings of the Amer. Assoc. Adv. Science, 1894, 1895; Tales of the Kootenay Indians, Mem. Intern. Congr. Anthrop. (1893), pp. 282-284. E. F. Wilson: The Kootenay Indians; Journ. Amer. Folk-Lore, Vol. III. ((1890), pp. 10-12, and also Our Forest Children, Vol. III, (1889-1890). J. Maclean: The Kootenay Indians in "Canadian Savage Folk," (1896), pp. 137-148. P. J. De Smet, in "New Indian Sketches (1863)," pp. 90-91, 104-117, 118-125. Ross Cox in "Adventures on the Columbia River (1831)," Vol. II. pp. 152-155. Prince Max. of Wied-Neuwied in "Travels (Trans. Lloyd, 18-41)," pp. 242-248, 272-279, and Appendix. O. T. Mason: Pointed Canoes of the Kutenai and Amur. Rep. U. S. Nat. Mus., 1899, pp. 523-537.

8. THE CANADIAN DÉNÉS.

By the Rev. A. G. Morice, O.M.I.

If Alaska were politically one with Canada, as it is geographically, we could say without hesitation that, as regards territory, the Dénés are the most important of all the aboriginal races within

the Dominion. The Algonquin are close competitors for territorial supremacy, but there is no doubt that the area occupied by the former is more extensive within the same political division.* Being so remote from civilization, the Dénés cannot boast so thrilling a history as some of the Algonquin tribes; but their very isolation from disintegrating influences and the compactness of their ancestral domain render them so much the more attractive to the ethnologist. It stands to reason that the more the student of anthropological lore strays from long established settlements by representatives of our own blood, the more genuinely aboriginal must be the life, manners and customs of the natives he will meet.

If we add to this consideration that, in accordance with their wonderful receptiveness, the Dénés have appropriated many of the sociological peculiarities of the heterogeneous tribes with which they have been in contact, it will soon become apparent how extremely interesting a close study of those Indians must be.

By Dénés is meant that great family of American aborigines wrongly called Athapaskans, Tinné or Tinneh by scholars who think it proper to designate it by an Anglicized Cree word, and by travellers who, in their ignorance of its dialects, take some disfigured form of word-endings for its national name.† Déné means men, or people, and when that nation assumes that apparently pretentious appellation, it simply follows the example of many other divisions of mankind, such as the Eskimos, the Aleuts, the Hurons, some Carib tribes, the Tungus of northern Asia, the Ainos of Japan, etc. Now, is it logical to call a people by a hybrid word, of which it knows nothing itself, and which does not represent the thousandth part of the territory it claims as its own, when it already possesses a name, which is easy of pronunciation and fully representative?

And here let us premise that tribes of that race are to be found all the way from the sunny plains of Mexico to the frozen steppes of the Eskimos, important off-shoots of the family tree having taken root at irregular intervals throughout the western or Pacific States of the American Union. This essay shall embrace only those which have remained within the limits of our own Dominion.

Their habitat extends practically from the mouth of the Churchill River in the east, following the course of that stream in a southwest direction; then, by 54° latitude, up to the sources of the Northern Saskatchewan, where their southern boundaries cross the Rocky Mountains into British Columbia. Within that Province they are to be found as far south as the Lillooet range of mountains, by about 51° 30°. North of that line their representatives occupy the entire country up to the Arctic Ocean and the Strait of Behring, with the exception of narrow strips of land claimed by the

*Powell's ethnographical map, which accompanies his important paper on the classification of the aboriginal stocks north of Mexico (Seventh Ann. Rep. Bureau of Ethnol.), invaluable as it is otherwise, must nevertheless be pronounced misleading, inasmuch as it gives to the Crees the territory adjacent to Lakes Caribou, Wollaston, Cold, and Isle-à-la-Crosse which belongs to a Déné tribe. This makes a difference of fully five degrees of latitude and as many of longitude. The land of the Eskimos is also made thereby to project too far south along the Mackenzie. On the other hand, it attributes to the Dénés several spots on the littoral of Alaska which are in reality settled by Eskimos.

†This question is fully treated in my "Notes on the Western Dénés," pp. 8-10. Trans. Can. Institute, vol. IV.

Eskimos on Hudson Bay, the polar sea and round Alaska, while the Pacific coast is also throughout settled by heterogenous stocks.

I.

The different tribes into which the Canadian Dénés are divided are, from north to south:

1st. The Loucheux, the Quarrellers of Sir Alexander Mackenzie, sometimes, but wrongly called Kutchin, whose habitat extends from the frontiers of the Eskimos' fishing grounds to 67° of latitude north, and between Anderson River in the east and almost the Pacific Ocean, throughout the lower Mackenzie and the vast forests of Alaska. They number some 5,500 souls, forming according to Petitot,* thirteen distinct subdivisions based mostly on linguistic peculiarities.

2nd. The Mountaineers, or Eta-go'tinne, who roam throughout the valleys within the Rockies. Population about 300.

3rd. The Hares, a timid tribe among not any too valiant congeners, whose hunting grounds lie along the Anderson and the Macfarlane Rivers, from the northern shores of Great Bear Lake. They may be 600, with five subtribes. They were originally famous for the smartness of their conjurers.

4th. The Dog-ribs, who hunt to the number of nearly 1,150 souls, between Great Slave Lake and Great Bear Lake, east of the Mackenzie, as far as the Coppermine River. They pretend to be the offspring of a dog: hence their name.

5th. The Slaves, whose numbers are about the same, are divided into five subtribes. Their habitat may be described as lying between the western shores of Great Slave Lake, along the banks of the Mackenzie, as far as the outlet of Great Bear Lake. They are also found along the Liard River, east of the Rocky Mountains. Sir John Franklin called them Strong Bow Indians, and their present name, which betokens the poor opinion of their manliness entertained by their neighbors, is due to the Crees of the south.

6th. The Yellow-knives may number 500. They are the Red-Knives of Richardson, the Copper Indians of Hearne and Franklin. Their original habitat, the valley of the Coppermine, explains the nature of their name. Alone of all the Déné tribes, they formerly boasted the possession of copper tools, wrought out of pieces of that metal they found scattered on the slopes of a particular mountain. They now roam chiefly over the barren steppes to the northeast of Great Slave Lake.

7th. Closely allied to the above are the Cariboo-eaters, an important tribe numbering 1,700 individuals or thereabouts, whose territory comprises the waste lands east of Lakes Cariboo, Wollaston and Athabaska. The trading post of Fond du Lac, on the latter, may be considered their commercial rendezvous.

8th. The Chippewayans are divided into the Athabaskans, who hunt around Lake Athabaska, as well as along Slave River, and the Chippewayans proper, who dwell on the shores of Lakes Isle-à-la-Crosse, Cold and Heart. They form an aggregate of about 4,000 souls.

9th. The Nahanais are, like the Loucheux, distributed over both sides of the Rocky Mountains, though their main seat is west thereof

*_Monographie des Déné-Dindjié_, p. xx, and other works. Fr. Petitot is our main authority on the distribution of the northeastern Dénés.

They form a total not short of 1,000 persons, whose habitat is the Stickine River and tributaries, in northern British Columbia, from Tahltan, near Telegraph Creek, up to Dease River and the Upper Liard, some distance east of the Rockies.

10th. The Beavers, who might be considered a subdivision of the Sékanais (see No. 12), are now the aboriginal inhabitants of the vast plains along Peace River, immediately to the east of the Rocky Mountains. Their numbers are not much more than 650 souls.

11th. The Sarcees are likewise an offshoot of the Sékanais, the result of a second scission from the parent tree due to a difference caused by a trivial offense.* They are now incorporated within the Blackfoot Confederation, to the number of 190 souls, and their present seat is about five miles south-south-west of Calgary.

All the following are western Dénés, within the limits of British Columbia:

12th. The Sékanais, whose original home was east of the Rocky Mountains, and who, for all linguistic purposes, have remained eastern Dénés, are now practically western members of the great aboriginal family under study. After the double secession above recorded and the ravages of want to which the paucity of their economical resources exposes them, they have dwindled to some 450 souls. Their principal trading posts are to-day Forts McLeod and Grahame. The abuse of fire-arms newly in the possession of the easternmost portion of the tribe was the final cause of the exodus westward and of the formation of the Beavers into a distinct tribe.

13th. Immediately to the west of the Sékanais, on Babine Lake and along the Bulkley valley down to French and Morice Lakes, are the Babines, a tribe numbering 530 souls, south of which are

14th. The Carriers, who, like the preceding, are semi-sedentary. Their villages are to be found between Tremblay Lake in the north and Alexandria, a distance of two degrees and a half of latitude. Present population, 970.

15th. Finally, we have the Chilcotins, the southernmost of all the Canadian Dénés, whose habitat is immediately south of the Carrier territory, on either side of the river after which they are called. Since the advent of the whites contagious diseases and other causes have reduced to some 450 their numbers which, but forty years ago, were fully 1,500.

To the above we might perhaps add the Ts'ɛts'aut, an offshoot of the great Déné stem, which Dr. F. Boas discovered some time ago on Portland Inlet. But these have long since lost their tribal autonomy, if they ever possessed it, and for that reason they may be neglected without impropriety in common with a small band, apparently of Chilcotin descent, who, till some years ago, resided among the Salish of the Nicola valley.

II.

This enumeration is in itself sufficient to give an idea of the great importance to the ethnologist of the Déné family, even though we do not take into consideration its southern half within the United States. A people covering such an immense territory, under so different climes and with so many distinct dialects, which originally

*See my "Notes on the Western Dénés," p. 12. Trans. Can. Inst., vol IV.

rendered social and commercial intercourse difficult, is bound to exhibit numerous points of dissimilarity.

Considered from a physiological standpoint, the Loucheux are undoubtedly the best representatives of the human species within its fold. Tall and well formed—most of their hunters who frequent Peel River Fort being over six feet in height—they have regular features, with high foreheads, fine sparkling eyes, moderately high cheek-bones and a fair complexion.

Their neighbors to the south and east of the Rocky Mountains cannot boast such a good physique. They are generally dolichocephalic, though with receding foreheads, prominent cheek-bones, noses of an aquiline type and yet abnormally broad at the base. Their mouths are wide, and furnished with well set and very white teeth; their lips, apparently too long, give them a quasi-prognathic appearance, when they are not ungracefully parted, leaving the mouth open, while their chins are either pointed and slightly curved up, or receding, especially in cases of real prognathism.

The Dog-ribs and the Slaves met by A. Mackenzie were "a meagre ugly, ill-made people, particularly about the legs, which are very clumsy and covered with scabs."* Altogether, the impression they made on the great explorer was not very favourable, and they also seem to have been rather unhealthy, owing mostly to their want of cleanliness.

In the west the physical differences of the Déné tribes are still sharper, relatively to the various tribes. While the Carriers are in stature perhaps above the average and stoutly built, with coarse features, thick lips, prominent chins, indices generally more brachycephalic than otherwise, and noses straight with extended nostrils, the Sékanais, their immediate neighbours in the northeast, have fine, almost delicate features, wiry limbs, well formed and sometimes rather long noses, thin lips slightly protruding, and very small eyes deeply sunk in their sockets. Their size and weight are certainly much below the average. On the other hand, the Chilcotins and Babines are short and broad, with heavy features and flattish faces, though the women of the latter have abnormally round and fat heads with remarkably thick lips. The fair sex is more attractive among the Nahanais of the north, who enjoy an even whiter complexion which, in many cases, is not far from rosy.

Though all the tribes are always more or less swarthy in appearance, they are nevertheless much whiter, and, as a rule, better looking, than the Salish tribes of southern British Columbia, especially after a stay of some time at home.

The principal traits common to all the divisions of the Déné race are the black and straight hair, prominent cheek-bones, dark eyes,† small hands and feet, which seem to be the heritage of all the American aborigines.

Previous to the advent of the whites among them, longevity was the rule rather than the exception. But the importation of farinaceous foods, strong drinks and consequent vices, not to speak of the more sedentary character of their lives, unaccompanied by the hy-

*"Voyages from Montreal to the Frozen and Pacific Oceans," vol. I, Toronto reprint.

†So dark indeed that in young children even the white of the eyes is noticeably tinged with blue, as if this was a reflection of the lustrous black of the iris.

gienic precautions this should entail, generally prove too much for their constitutions. The chief diseases to which they are subject are pulmonary complaints, rheumatism, vitiated blood and, last not least, fear and imagination. I know personally of cases when otherwise healthy individuals died because they thought they had seen in their rambles through the woods a fabulous animal whose appearance is believed to portend evil, and of others who were convinced that they were the victims of the ill-will of persons supposed to be endowed with malefic powers. On the other hand, I am almost as sure that some should have died who survived through the effects of their strong faith in my medical and other abilities. Dowie and his adepts would certainly find a splendid field for their operations among these primitive children of nature.

III.

As a means of enhancing their natural charms, most of the tribes had but lately recourse to tattooing. But this was always restricted to the face and wrists, and it had never the same connection with clans or totemic ideas as has been noticed on the coast of the northern Pacific Ocean. A few lines from the lower lip to the bottom of the chin or horizontally across the cheeks, with possibly a cross or the symbolic emblem of a bird on each temple, supplemented by additional, but shorter, bars above the bridge of the nose, were the style most in vogue among the women, whilst the men more often omitted the tatooing of the chin, which they generally replaced by some emblematic device on either side of the mouth. They also painted their faces, especially on ceremonial occasions or when animated by evil dispositions. A species of red ochre or vermilion did duty on joyful occasions, while a figure daubed on with charcoal told of warlike or murderous designs. Among the Loucheux both colours were often concurrently used in stripes along the nose, the forehead or the cheeks, according to the whim of the individual.

Nasal and aural pendants of dentalium shells or haliotis were also much in vogue, while, among the Loucheux and partially also the Carriers, two, sometimes three, long shells of that description with juxtaposed smaller ends passed through the septum were preferred. These were replaced among the Slaves and Dog-rib Indians by a goose quill or a small piece of wood.

To those ornaments the Babine women still added a bone or wood labret, thereby giving to the lower lip a prominence which made of the belles of the past generation veritable caricatures. Ear-rings of a peculiar pattern were then the exclusive apanage of men of rank. Finally, youth, rank or social aspirations delighted in shell necklaces and bracelets of wood, horn, bone or, in later times, copper.

When not in mourning, both sexes wore their hair long and parted in the middle. The men had it tied in a knot and falling down to the shoulders, or when in repose, twisted behind the head, much after the manner of the Chinese, while the women preferred to plait it in two tresses falling on their breasts, and often adorned with strings of dentalium shells or of glass beads obtained from the fur traders. In some of the eastern tribes this latter style was followed by both men or women.

In common with most American aborigines and even the natives of the eastern Asiatic littoral, the Dénés have as a rule a few straggl-

ing hairs on the upper lip and the chin, which were sedulously plucked with tiny tweezers made of horn before the introduction of copper, which replaced with them the knives which the Chukchee use for the same purpose.* It is but right to add, however, that among some of the western tribes individuals are occasionally found with quite heavy beards; but these are, as among the North Asiatic races, almost always coarse, black and straight, hardly ever soft or curly. A few half-blonde beards are, however, noticed even with persons of undoubted full Déné blood.

As to their wearing apparel, it originally consisted for the men of a breech-clout of tanned skin, over which a shirt-like vestment of beaver, lynx or marmot skin with the fur next to the body was worn. Among the Slaves and the Dog-ribs this was more commonly of moose skin. These shirts or jackets were cut evenly round and thigh-high among the Chippewayans and other eastern tribes, with the exception of the Loucheux, whose frocks were pointed in front and behind, for the men, while those of the women had slightly larger appendages behind, but none in front. A graceful fringe hanging round the bottom of all those garments, pointed or not, adorned the costume of the various tribes.

Over this rows of beads, dentalium shells, or, in some tribes, dyed porcupine quills along the seams, with occasional bands painted across the breast and shoulders contributed to give elegance and denote rank or wealth. A pair of leggings reaching to the thighs, together with moccasins of pattern and material varying according to the tribe, and which were sewed to the leggings among the Loucheux and some eastern Dénés, completed the costume. In cold weather a robe of furs or a blanket of woven rabbit skins was at times thrown over the frock and kept round the waist by means of a belt furnished with a quantity of beaver teeth, bear or caribou claws or, in later times, thimbles and brass shells which produced in walking a jingling sound quite appreciated by the native ear.

For a head-dress the aborigines of the lower Mackenzie valley had a stripe of skin passing round the head as a bandeau, which was replaced in British Columbia by a cap usually made of small ground-hog skins. The skin of the head of a deer was formerly used for a like purpose, among the Chippewayans.

I must not forget their mittens, which, under such inclement climes, form quite an important part of their dress. They are of dressed skin, and usually hang from the neck by a skin cord passing over the shoulders, though with the primitive Chippewayans they were sometimes sewn to the sleeves of the coat.

IV.

As with the physical characteristics of the various tribes, so it is with their mental faculties; great divergencies tell of the deep influence of their environment. For manliness and other kindred qualities the Loucheux have no superiors among the Canadian Dénés, though they are treacherous enough towards their enemies and can be as cruel as any other redskins. They are more cleanly in their persons and, as a rule, more humane in their treatment of the women than most American aborigines. The Hares and Slaves are noted for

*"Ten months among the Tents of the Tuski," p. 37. London, 1853.

their timidity, which is carried to the point of being ridiculous. This quality is, however, more or less shared by all the divisions of the Déné stock, whose members are living in constant distrust of one another, and especially of people of different tribes, whom they represent to themselves as continually lurking in the woods with evil designs.

None could lay claim to great natural veracity. Exaggeration or depreciation, according to the dictates of their personal interests, seem to be part and parcel of their very nature; but the Dog-Ribs and the Hare Indians deserve to be pointed out as absolutely devoid of any feeling of shame when detected in the act of lying, though no more scorching insult can be imagined for any Déné than the epithets liar and thief.

We may as well confess, however, that, when not spoiled by commerce with unprincipled whites, the members of all the tribes, except perhaps the Carriers and the Chilcotins, are remarkably honest, especially when dealing with representatives of their own tribal divisions. It is customary with them to leave on well beaten trails or cache up in the trees provisions, personal goods, traps, snares, snowshoes and other property, which is there as safe as within the dwellings of the owner. On the other hand, I know of a Nahanai who travelled twelve full miles through a thick forest, simply in order to return one bunch of matches which the white trader had given him, by mistake he thought, over and above what was due him.

The Dog-Rib and Hares are of a mild and rather indolent disposition, obliging and hospitable, in fact spending much of their time in dancing and singing. Nay, if we are to credit Sir John Franklin,* the former are even noted for their kindness to the weaker sex, an attitude which is the more remarkable as it is rare among the Dénés. As to the Chippewayans, they are far from being so considerate in their ways towards women. Yet they are strongly religious, or rather superstitious, in temperament.

Within British Columbia, the Carriers are proud, touchy and naturally progressive, the Sékanais naive, honest and credulous, the Babines loquacious and stubbornly attached to their ancestral customs, while the Chilcotins are energetic, violent and somewhat prone to profligacy.

Taken as a whole, however, it may be said that the Déné race within the limits of Canada is religiously inclined, of a timorous nature and kindly disposition, which, as usual in such cases, does not preclude occasional outbursts of anger, when the most revolting deeds may be committed. So timid, indeed, are these aborigines that, according to Sir John Richardson, not even the possession of fire-arms would embolden them "to risk an encounter with the Eskimo bowmen."†

While thus their mental activities appear to be dormant, their senses are highly developed. I remember reading that the keenness of the American Indian's senses had been greatly exaggerated. He that penned that remark could certainly not have been, like the present writer, travelling for over twenty years with individuals of that race, or he would have totally modified his opinion concerning the acuteness of its senses. A Déné will smell smoke for miles; I do not mean the smoke of a general conflagration in the for-

*"Journey to the Shore of the Polar Sea," Vol. III., p. 49.
†"Arctic Searching Expedition," Vol. I., p. 212. London, 1851.

est, but merely of the lonely native's bivouac fire. His hearing is just as good. A slight rustle in the woods, the breaking of a twig under the feet of game will immediately draw his attention and make him stand up in his canoe in order to locate the exact seat of the disturbance and discover its cause.

As to his sight, it is that of the eagle. How many times have I not wondered at its incredible keenness when, exploring large lakes or mountains bare of timber, objects which my eyes refused absolutely to perceive were pointed out to me by hunters who could not understand what they were pleased to call my blindness! It is but fair to remark, however, that the Déné being preeminently a huntsman, he can hardly travel any distance without being constantly on the lookout for game. His piercing eye is constantly scrutinizing every nook of nature's primeval domain. "See, a grizzly bear passed here last night," he will exclaim when your attention may be engrossed with a philological or other problem. You look, and see nothing. But the child of the forest has noticed one or two blades of grass bent in the same direction at regular intervals, and his instinct prompts the proper deductions.

His memory is likewise very retentive, especially that form of the faculty which is known as local memory. "Here is a twig which was not broken when I passed here last," he will sometimes remark, or "somebody bent down the top of this sapling; so-and-so cut this piece of wood," etc.

Hence it is next to impossible for him to get lost even in the most intricate forest, especially if the sun is visible in the heavens, for its course is to him a very accurate compass as well as a clock which requires no repairing.

Few people have such a control over their emotions, and such power of exciting manifestations of emotions at will. While among themselves they will generally keep up a certain decorum and would not for anything pass for beggars, they generally consider the whites as a fair field for exploitation. They will then feign to perfection sickness, starvation, grief or any other feeling or situation which they think will be the most profitable to themselves. Hearne assures us that he "can affirm with truth he has seen some of them with one side of the face bathed in tears, while the other has exhibited a significant smile."* I cannot say quite as much from personal observation, but I remember well having sometimes been affected by the cries and unmistakable signs of despair of females who burst into laughter as soon as they perceived that I was taking them seriously.

V.

As to their morality, the lewdness of the Carrier women shortly after the establishment of the first trading posts could hardly be exaggerated, while Samuel Hearne declares of their sisters near Hudson Bay that "they are the mildest and most virtuous females he had seen in any part of America."† It should be remarked, however, that that explorer, who wrote a hundred and ten years ago of a journey performed long before, was the first white visitor to their country, a circumstance which implies no great benefiting effects of our civilization over primeval barbarism, as the compliment could pro-

*"A Journey to the Northern Ocean," p. 308. Dublin, 1796.
†Ibid., p. 126.

bably not be repeated to-day with regard to the descendants of those women.

And yet, in spite of their good qualities, the temporary exchange of wives was not then deemed improper at all. It was rather considered the supreme token of friendship, an act of unsurpassed hospitality. The Copper Indians, or Yellow-Knives as they are now called, were less obliging. But that in their reserve with their guests a becoming regard for chastity was hardly their moving spirit is shown by the fact that, whenever they met any party of the meek Dog-Ribs, or Hares, they used to rob them of their women, a proceeding which, in 1823, occasioned an unexpected reprisal, when their whilom victims fell upon them unawares and cut off quite a number of them.* Even cowardice can be transformed into courage, or at least treacherous activity, under the sting of incessant provocation.

This seizing of strange women recalls to mind a practice which was formerly universal among the eastern Dénés. Woman was then considered a prize which belonged by right to the strongest or most skilful pugilist. Whenever a man had set the eyes of covetousness on any female, he would challenge her mate or suitor to a duel, wherein wrestling decided her fate. This was not done in an unbecoming or unduly violent manner. The struggle was considered a matter of course under the circumstances, and the spectators would see to it that fair play was not wanting on either side, just as among more modern savages seconds are supposed to protect the rights of the duelists. Meanwhile the poor woman, who may have been really attached to her husband or may have secretly harbored strong preferences for another party, had to be a silent witness of the combat which was perhaps to launch her into the arms of a bully, who would deride the idea that her own tastes and inclinations might not improperly be consulted.

East of the Rocky Mountains, the same stigma which we have seen affecting the character of the Carrier women originally attached itself to the Chippewayan men, if Hearne's companions during his voyage to the Arctic Ocean may be taken as true representatives of their tribe. Brutal rapes and revolting incests seem to have been the order of the day, whenever they had an opportunity of gratifying their worst passions.

Their almost incredible lack of humanity to their own wives, who had to do all the hard work, even to the dragging of their heavily loaded toboggans on the day they had been delivered of a child, can only be compared to their cruelty to their enemies, or rather the poor hapless strangers they surprised in their sleep, before and after death. Their revolting deeds on such occasions stamp them as little above the station of the brute. Were not my space so limited, I should not refrain from reproducing the above mentioned traveller's entire description of the massacre of over twenty poor Eskimos by his own Chippewayan companions, especially of that girl of eighteen, who "fell down at (his) feet and twisted round (his) legs, so that it was with difficulty that (he) could disengage (himself) from her dying grasp.† One cannot but feel thankful for the influence of the Gospel

*"A Narrative of the Discoveries on the North Coast of America," by Thomas Simpson, p. 318. London, 1843.

†"A Journey to the Northern Ocean," p. 154.

which has transformed the descendants of those miserable wretches into the considerate, virtuous and law-abiding Christians they are to-day.

VI.

Another characteristic, a remarkable receptiveness or propensity for borrowing from foreigners supposedly higher in the social scale, is proper to all the Canadian Dénés. For that reason we must now give it a few moments' consideration.

This distinctive faculty probably flows from their natural timidity and consequent diffidence. The northern Dénés are pre-eminently meek, in the sense that they instinctively allow aliens to play over them the rôle of superiors, whose manners they must ape, and that they look upon them as models whom they must copy. To see the Dénés in their original guise, we must turn to the eastern tribes peopling the middle of this continent, where no neighbourhood of foreign races ever tempted them into altering their ways. Even then, however, should foreigners penetrate into their desolate country, those children of the soil immediately prove adept imitators, as Thomas Simpson noticed during his short stay among them. "I must not close this part of the narrative," he wrote in his account of the discoveries on the northern coast of the American continent, "without bestowing a just encomium on the generally docile character of the natives of Great Bear Lake. They soon became attached to the white men and are fond of imitating their manners."*

The Dénés, uninfluenced by foreign contact, lived in semi-circular huts of coniferous boughs laid over a frame-work of stout poles, mere shelters, in fact, rather than even attempts at house building. Whenever practicable these shelters went in pairs, the second hut facing the first, so as to complete the circle, yet leaving sufficient room between the two for the fire-place, which was thus common to both. This arrangement had also the advantage of creating a draft in the proper direction and reducing to a minimum the quantity of smoke in the lodges themselves. It is still followed by the western Dénés of to-day when they camp out.

But their innate penchant for imitation soon led the Chippewayans and the Beavers to adopt the skin-covered tepees of their southern neighbours, the Crees, and in the far west the same receptiveness made the Babines and the northern Carriers build large lodges with low walls and regular gables, accommodating several related families, such as those they saw among the Tsimshians of the Skeena River, while the southern Carriers and the Chilcotins took to underground houses after the manner of the Shuswaps. And as if it were necessary to accentuate the fact that the Déné tribes were indeed the borrowers, not the lenders, it so happened that those subterranean hovels, which seemed regular ovens, even in winter, were adopted, not by the people of the north, but by those of the south, where the climate is, of course, considerably milder. On the other hand, "the lodges of the Kutchin Loucheux resemble the Eskimo snow huts in shape and also the yourts of the Asiatic Chukchee."†

*"A Narrative of the Discoveries on the North Coast of America," p. 243.

†"Journal of a Boat Voyage through Rupert's Land," by Sir John Richardson, vol. I., p. 393. London, 1851.

We have just metioned the neighbours of the Eskimos. The characteristic acquisitiveness we are now studying can be demonstrated to the point of absolute certainty by reference to the technology of that tribe, which is conspicuous for its unusually independent and manly nature. Nevertheless the Loucheux have borrowed the peculiarly peaked shirts to which we have already alluded from the Eskimos.* According to Richardson, they also have "the hose (or leggings) and shoes of the same piece, thus imitating the Eskimo boot, though with a different material."† Nay, even such a small detail as the particular shape of their sleighs marks them out as great imitators. All the other Déné tribes within Canada use, in connection with their winter travelling, the birch boards curved up in front widely known under the name of toboggan; but the Loucheux have long since adopted the regular sledges with separate runners and upright supports proper to their northern neighbors. All the students of Eskimo life are also familiar with the rude wooden goggles in use by the aborgines of the northern coast of this continent as a protection against snow-blindness. The Loucheux manufacture similar "spectacles," which have remained unknown to all the Déné tribes not in immediate contact with the Eskimos, though long, snowy winters are common to all of them.

Then we have the case of the Sarcees, who, according to the late Archbishop Taché, "have identified themselves with their allies (the Blackfeet) with whom they are now confounded as regards their manners and customs. . . The Sarcees have lost the mildness, love of peace and honesty which characterize all the tribes of their race, and adpoted the vindictiveness and thievish dispositions which are proper to the nation with which they are now mixed. This is so true, that Sir George Simpson calls them "the boldest of all the tribes that inhabit the plains."‡

They retain their own language, the one thing a Déné will never lose, but otherwise they are practically Blackfeet. They now have a sun dance like the Blackfeet, a ceremony in connection with tobacco growing and a thunder pipe ceremony borrowed from the Blackfeet even to the smallest details, and the myths current amongst them are much the same as those found among the Blackfeet and others.¶

*Petitot states (*Monographie des Dènè-Dindjié*, p. XXIX.) that this frock with tail-like appendages was the original costume of all the Dénés. In this the learned ethnographer evidently follows Archbishop Taché (p. 102 of his *Esquisse sur le Nord-Ouest de l'Amerique*) who tries to account for the name Chippewayan by deriving it from two Cree words meaning pointed skin, or blanket. If both authors are correct in their surmise, their opinion does not impeach the truth of my own assertion. In that case, instead of one Déné tribe having adopted an alien costume, we will simply have to say that at least eight tribal divisions of that stock changed the shape of their outer garment, in order to conform to the style of the same prevailing among their southern neighbours. Within what is now British Columbia such pointed coats were never known, and S. Hearne does not mention any in his Journal.

†Ibid., vol, II., p. 11.

‡"Narrative of a Journey round the World," vol. I., p. 110. London, 1847.

¶These last details I owe to the kindness of Dr. P. E. Goddard, who lately visited the Sarcees in connection with an investigation relating to the distribution of types of Indian culture organized and planned by Dr. Boas, in order to repeat among them the researches he had already conducted in the reservation of the Hupas, another Déné tribe now living in northern California.

VII.

The mode of disposing of the dead among the different tribes is another striking proof of their remarkable power of adaptation. The original custom of the family seems to have been to enclose the bodies within rough cratings made of small logs crossed at the ends, which were raised from three to seven feet above the ground on stout poles or posts, much after the manner of the scaffoldings whereon they cache their provisions and other household impedimenta. Any object which might have belonged to the deceased either accompanied him in his final retreat, or was cast into the water, burnt or cached in the branches of trees near by.

The Sékanais, who were surrounded on all sides by related tribes, in common with all the eastern bands so situated, acted thus in connection with influential hunters, though the former occasionally concealed the remains of their dear ones within trees hollowed out for the purpose. Simple plebeians, or people who enjoyed no special consideration, were simply left where they died, their fellows immediately lowering on their scarcely-cold bodies* the shelters they had lived in, and moving on in their incessant peregrinations after game. In no case was cremation resorted to. But the Babines and Carriers had no sooner come in contact with the Skeena representatives of the Tsimshian stock, among whom the dead were cremated, than forsooth they commenced to burn the remains of those who fell out from among them. They even went so far as to erect as resting places for the small bones that would escape the ravages of fire those lofty funeral poles with square ornamented boxes so common along the coast of the northern Pacific.

As if to make still more patent the extraneousness of the practice among them and mix the old order of things with the new, the western branch of the Nahanais tribe but lately used to depose those charred remains within small travelling trunks set up on two or more poles in the woods, which were the equivalents of the original cratings mentioned above.† The eastern Nahanais never practiced cremation.

In the beginning of last century, an irresistible instinct of imitation had even prompted some tribes to adopt, second-hand, the customs already borrowed by their own congeners; since Harmon, one of the first representatives of the Northwest Fur Trading Company in the west, tells us that the influence of the Carriers was leading the Sékanais to burn their dead.‡

As to the Chilcotins, they are neighbors of the Shuswaps, among whom the dead were always buried. Therefore the former had not

*Fear of death and the necessity of following the migratory game on which the tribe almost exclusively subsists were the primary causes of that neglect. The same sense of self-preservation, which is innate in the lowliest savage as well as in the most highly cultivated Aryans, prompted the abandoning of old people whose state of decreptitudedebarred them from taking part in the tribe's migrations. These were generally provided with fire, water and a few morsels of food, and left to die. In times of famine little children were similarly treated, when they did not meet with a still more horrible fate by their life being made to prolong that of their parents.

†Some of these can be seen even at the present day throughout the territory of the Nahanais.

‡"A Journal of Voyages," p. 266. New York reprint of 1903.

failed to adopt interment as their national mode of disposing of bodies,

At the time of the first advent of the whites, the custom of erecting totemic columns with the heraldic coat-of-arms of the heads of clans whom they were intended to honor had already reached that portion of the Babine tribe, which had almost daily intercourse with the Tsimshian. The extension of this custom inland was only prevented by the advent of a still superior civilization.

We have already referred to the labrets worn by the Babine women. These supposed ornaments and the ceremonies which accompanied the assuming of the same by pubescent girls were also borrowed from their western neighbours of Tsimshian parentage. So that these observances might be considered as so many steps in the evolution of Déné custom and reliable gauges of the influence of aliens over those singularly receptive people. First we have the practice of erecting totemic poles; it was apparently the last noticed by the Dénés, or it did not appeal to them as very important, since it did not penetrate further than their villages on the Bulkley River, thus leaving a full half of the Babine tribe untouched. Then we see the use of labrets universal among the entire tribe, a sure token of an anterior adoption. Finally, cremation, with its attendent practises, ceremonial mourning and the enslaving of the widows, had already become general among both the Babines and the Carriers; whence we may fairly deduce the conclusion that those several customs had preceded the two others among the western Dénés.

The one practice which was original and proper to the tribe in which it obtained is that which was responsible for the distinctive name of the Carriers. For that reason it might not be out of place to enter into some details concerning its causes and results among those aborigines. But for the better understanding of the same, preliminary remarks touching other points of the Déné sociology, which betray the same receptiveness of the family, now become necessary.

VIII.

First, as to the organization of society among them. The influence of environment, the particular occupation, or even the geographical situation of a tribe cannot fail to bear more or less on the mode of life prevalent among its members. Thus it is that, while the eastern Dénés are inveterate nomads, all the western divisions of the stock are semi-sedentary. They live in regular villages with habitations of a permanent character, which they periodically leave for their hunts after fur-bearing animals. The peculiar resources of the country they inhabit, no less than their innate penchant for imitation, are primarily responsible for these different social conditions. While the eastern tribes have to be constantly on the move after the migratory game on the flesh of which they mainly subsist, their congeners in the west have the resource of salmon, which they take in such quantities that, once properly dried, it becomes their daily bread, and allows a longer stay at home.

It has been said that matriarchy, or the fundamental law whereby the mother, instead of the father, is recognized as the head or basis of the family, on which depend the subdivisions of a tribe, the right of inheritance of the individual and the other functions inherent to agglomerations of human beings, is the principle after which

society was originally constituted. My own opinion, based on the study of the Déné and neighboring aborigines, would run counter to that idea. It seems to me that mother-right implies two particulars which point to a secondary condition of society: the gathering of numerous families into regular villages, and a consequent looseness of morals. The unit of primitive society must have been, if not the family as we understand it, at least the paterfamilias, as the natural head and protector of the children and women-folk. If living during a few generations, he would still have been regarded as the chief or patriarch of the group of related families.

On the other hand, matriarchy supposes a stage in the evolution of society when this has become demoralized by promiscuity to such an extent that the search after paternity is difficult and, in some cases, untruthful. The mother is then the only recognized source of all family ties, the only link which binds together individuals who would otherwise have no known blood relationship, and the basis of aggregates of families which cannot trace their kinship except through the female line; and here we have the tribal subdivisions usually called the clans. Now, it is well known that, with races not animated by high aspirations or guided by a pure ideal, too easy a social intercourse soon degenerates into undue familiarities and illicit commerce between the sexes. Such disorders, even if thought of, would hardly be possible among nomads or unimportant groups of related families leading, under the eyes of their patriarch, the simple life of primitive folks.

Be this as it may, the eastern Dénés, who pass their time roaming in bands with necessarily limited numbers through mount and vale, forest and barren grounds, know of no other fundamental law than patriarchy, while such of their western congeners as the Carriers, the Babines, and the westernmost Nahanais, who live in regularly constituted villages, had adopted matriarchy, with all its consequences, after the example of the coast Indians. Only the Chilcotins formed an exception to this rule. But in this they were only obeying the dictates of their national instinct, I mean the need of copying the social customs of their neighbours, the Salish and Kwakiutl races, which were both almost entirely governed by father-right.

IX.

Most of the western Dénés are therefore divided into clans, among which succession to rank or property follows the female line. Members of those clans are supposed to be so intimately related to one another, to whichsoever village they may otherwise belong, that marriage between them is not to be thought of. In fact, this law of exogamy was formerly believed to be more binding than are with us the ties of blood relationship. First cousins married each other without any scruple if related only through the father's side; but no youth would ever dream of seeking the hand of a girl who was a perfect stranger to him if told that she belonged to the same clan as himself. On the other hand, a Babine from the far northwest, if chance brought him in contact with a clansfellow from, say Alexandria, 500 miles to the south, was sure of protection, hospitality and every mark of attachment, though Carrier and Babine might not before as much as have known of each other.

The headmen or representatives of these gentes were called *tœneza*, the men *par excellence*, by the Carriers and Babines, while among the Nahanais they were known under the name of *téné-thie*, or great men. They formed a privileged class of hereditary chiefs, on behalf of whom the hunting grounds were parcelled out as their lawful patrimony, over which nobody else had any right. They enjoyed a great consideration in the tribe, were respectfully listened to, and obeyed as far as consistent with a society which, in other respects, was little above the stage of savagery, and, on ceremonial occasions, they wore a special costume, occupied places of honor, that is, as far as possible from the doorway, and, if dancing or distributing presents, their appearance in the assembly elicited songs or chants proper to their title and handed down by their ancestors. Let us remark, however, in further confirmation of the little claim they had to originality, that the very words of these hereditary songs were nothing else than badly pronounced Tsimshian.

To them alone belonged the right of hunting on the lands of the clan, or special portions thereof, with the assistance of related families, which received only such a share in the spoils of the chase or trapping expedition as they were pleased to bestow. There were several such dignitaries in the same gens, and each bore a distinctive name, which was as denotive of the individual's rank as that of any European nobleman.*

In fact, the whole institution had more points of similarities with the landed nobility of the old countries than with the modern class of tribal chiefs. The mental vision of the American aborigines is proverbially limited, and it hardlv ever went beyond the notion of the clan as the maximum social unit. Hence chiefs in the present sense of the word never existed among the Dénés prior to the advent of the whites. Occasionally thrift and wealth, aggressiveness and mental superioritv would raise an individual *tœneza* above his peers, especially if generosity was one of his virtues; but the chieftainship of a full tribe or even of a single village is with them of modern origin.

Even the children of such primitive noblemen shared in some degree the consideration enjoyed by their father. For that reason they were dubbed *œzkheza*, or the true children. But, as they belonged to the clan of their mother, which was necessarily different from that of their father, since the tribes were exogamous, they could not succeed to the rank or property of the latter. As the lands could not be expropriated in favour of a different gens, it followed that only a sister's son, or, this failing, one's own brother, or even sister, or a sister's daughter were the lawful heirs to the *tœneza's* rank.

This last peculiarity accounts for the occasional female chiefs, or *t'sèkhuza*, among the western Dénés. In 1838-39, Robert Campbell, who established the first post in the upper basin of the Liard River, met such a chieftainness, who was of great help to him at a time when he was in sore distress. His fort had been destroyed

*Though the entire social system is unknown east of the Rocky Mountains, in several of the tribes there "the hunting-grounds descend by inheritance among the natives, and this right of property is rigidly enforced" ("Narrative of the Discoveries on the N. Coast of America," by Thos. Simpson, p. 75. London, 1843).

through the ill-will of the Tlingit of the coast, and his party were condemned to live on skin ropes and parchment at the rate of a meal a day, when he was succoured by the above mentioned female chief, whose kind-heartedness and influence perhaps prevented an even direr catastrophe.*

X.

Connected with the clans were sets of animals or other beings, which were supposed to have had in pristine times something to do with the establishment of those artificial divisions. They were regarded with a particular respect almost amounting to veneration, and, on festival occasions, they personified the whole clan and its members, whose symbol or crest they became. These were the well known totems.

Several kinds of these existed among the western Dénés, viz.: the gentile, the honorific, and the personal totems. Were it not that they are connected more with localities than with men, another class could be formed with those spirits whose functions seem to have been to preside over particular spots in the forest or along the lakes. These recall the *genii loci* of the Romans, and large rocks *in situ* were sacred to them, which every traveller had to honour by offering thereto a stone or a pebble as he passed by. I have seen myself that practice in actual force among the western Dénés, and Hearne speaks of some such rocks "which are covered by many thousands of small pebbles. . . On its being observed to us that it was the universal custom for every one to add a stone to the heap, each of us took up a small stone to increase the number, for good luck."†

On the question of the primary origin or derivation of the two first kinds of totems I need not tarry, since there is not the shadow of a doubt that the Dénés owed their existence among them to the natives dwelling on the Pacific coast. The gentile totem, of course, represented the whole clan, while that which I call the honorific totem was restricted to some individuals. It was assumed, with befitting ceremonies and dances, by any person desirous of acquiring in society a rank to which he could not aspire in virtue of the laws of heredity.

As to the personal totem, it was common to both eastern and western Dénés, being as indigenous to them as most of the institutions in vogue among all the northern American Indians, since it was with them part and parcel of their religious system, shamanism, and had nothing to do with society as such. For that reason I cannot better explain its nature than by entering into some details concerning the theogony of these aborigines.

Although they hardly realize it themselves, the Canadian Dénés of all tribes originally believed in a twofold world: the one visible and purely material now inhabited by man, the other invisible, though in some way co-extensive with the first, which is the home of the spirits.

Of these there are two kinds, good and bad, all more or less under the control of the Supreme Being, whose personality and attributes

*"Overland Journey Round the World," by Sir Geo. Simpson, vol. I., pp. 210-11. London, 147.

†"A Journey to the Northern Ocean," p. 132.

are not well defined. Some, as the Chippewayans, called him "he (or it) whereby the earth exists," or simply "the Powerful;" others, like the Hares, designated it under the name "*Enna-gu ini*, "he that sees before and after," while the prehistoric Carriers knew him as *Yuttœre*, "that which is on high." The reader will please remember that these are all purely aboriginal names, in no way due to the whites or the missionaries. A clearer knowledge consequent on the ministrations of the latter caused them, in course of time, to be replaced by more appropriate terms.

What the exact essence of that Being was in the native mind would be hard to say, as the Indians themselves did not agree on that point. Sometimes it seemed to be confounded with the dynamic forces of nature, that which caused rain and snow, wind and the other celestial phenomena. That it was, however, a real entity, which they feared rather than loved or worshipped, is evident from the phrase, *Yuttœre nyûzilht'sai*, "That-which-is-on-High heareth thee," which I am in a position to affirm was currently addressed to obstreperous or profligate people. The meaning was: keep quiet, behave yourself, if you do not want to draw on yourself the wrath of Him-who-is-on-High.

Beside the Supreme Being, there were, in the estimation of the Dénés, numerous spirits, mostly of a malefic character, which were supposed to lurk among them, animated by evil intentions. Should they ever come into immediate contact with man, the result was what we call disease, which, though sometimes invested with a concrete form not unlike the microbes of modern scientists, was always believed to be due to the action of hidden beings with nocuous properties.

XI.

Alongside of these, however, was another class of spirits, which had on earth, in the animate or inanimate world, representatives wherein were embodied, as it were, some of their own marvelous powers over nature. In the estimation of the Dénés, and I think I may say practically of all the North American Indians, all the present entities in nature were at one time endowed with human-like faculties. Even trees spoke and worked and fought, and the fowls of the air and the animals of the earth were then men like ourselves, though possessed of potent virtues which are not ours. This magic, though now somewhat reduced in strength, has remained in the brute creation, and is the means whereby man can communicate with the spirit world, and by whose aid he is enabled to succeed in his quest after happiness and the necessaries of life.

This is so true that even to-day, when the native's original notions have yielded before a superior theogony, his language, which is the one item perfectly immutable in him, has retained traces of those zootheistic ideas. If unsuccessful in his hunt after bear or beaver, the western Déné, even though animated with the most Christian sentiments, will not say: "I had no luck with bear or beaver," but "bear or beaver did not *want* me."

Now, those spirits, which are personified by the representatives of the vegetable or animal kingdoms, occasionally manifest themselves to man, and give evidence of their friendly dispositions by adopting individuals and protecting them through life, in return for some con-

sideration shown their present concrete forms or symbols. In a word, they are the link which connects man with the invisible world, and the only means of communing with the unseen: *these are the personal totems* of the Dénés, and, I cannot help thinking, of most of the American aborigines as well.

It has been said that totemism is a purely social institution. I feel absolutely no hesitation in denying this, in so far at least as the Dénés are concerned. Totemism among them is essentially and exclusively connected with their religious system, and I am inclined to believe that the gentile totem is nothing else than an extension to the entire clan of an institution which was originally restricted to the individual.

The personal totem revealed itself usually in dreams, when it appeared to its future *protégé* under the shape of the animal, etc., which was to be thenceforth his tutelary genius. Sometimes the totem animal was met in the woods under striking circumstances, and even at times went so far as to speak (?) to the Indian.

Thenceforth the most intimate connection existed between the two. The native would be careful to carry on his person and publicly expose in his lodge the spoils of that animal, its entire skin or part of it, which he would not suffer to be treated lightly. Occasionally he would even carve a rough representation of the totem. He would treasure any object—such as a stone or a vegetable excrescence,—between which and his totem he fancied he saw a striking resemblance. He would paint its form or symbol in bright vermilion on conspicuous rocks along lakes or rivers, etc. Under no circumstance would anything induce him wilfully to kill, or at least to eat the flesh of the being the prototype of which had become, as it were, sacred to him.

In times of need he would secretly invoke its assistance, saying: "May you do this or that to me!" Before an assault on his enemies or previous to his chase of large game, he would daub its symbol on his bow and arrows, and if success attended his efforts, he would sometimes thank it by destroying in its honor any piece of property on hand, food or clothing, or in later times tobacco, which he would throw into the water or cast into the fire as a sacrifice.

XII.

So much for the personal totem and its relation to the individual. It sometimes happened that, instead of being simply revealed in a dream or in a quiet manner as just related, the totem spirit suddenly prostrated the native, who fell as if struck dead. Bystanders, if there were any, knew well the reason of the phenomenon. The prosaic Indo-European would have simply attributed the accident to a cataleptic stroke. Not so the American aborigine, however. According to his own psychological notions, the mind and soul of the smitten native had been attributed by some powerful totem spirit, with which he was evidently communing.

By loud chanting with rhythmical beating of drums the bystanders would seek to prevent that this interview with the denizens of the invisible world did not last a dangerously long time, and when the patient came to, he was looked upon with a consideration bordering

on awe. Ordinarily he had quite a story to tell of his visit to the home of the spirits. Should the attacks of his disease—I mean his excursions to the world of the unseen—prove of frequent occurrence, he would be treated with fear and trembling, and pronounced a powerful medicine-man or shaman. In the same way as contact with magnetism begets magnetism, it was evident to the simple mind of the aborigines that potent magical virtues were bound to be imparted through these repeated communings with the world of magic.

In that sense the shamanistic powers were but an extension or an exaggeration of the tutelary virtues inherent in the personal totem. The latter were for the individual alone; the former were intended for the benefit of others. When thus the mysterious forces of some powerful totem reposed in a member of the tribe, it was but natural that he should make use of them in order to counteract the influence of the malignant spirits whose presence caused sickness. Thus it was that disease was treated among the Dénés not only by the use of herbs, cauterizations and other remedies or surgical operations, but also and chiefly by the exertions of the shaman.

The hidden forces of which he was the proud possessor were called *cœn* in Carrier, a word which means at the same time magic and song, which circumstance reminds one of the ideas of the ancients on the same subject. They certainly seem to have had some similarity with those of the uncultivated people now under study. Chanting in rhythmic cadence was apparently reputed to have a sort of influence over nature not much short of that of magic, if we are to believe Virgilius when he sang:

"Carmina vel cœlo possunt deducere lunam."

—(Bucol., Eglog. VIII.)

When the services of the adept in the magic art were called into requisition, the great protégé of the powerful totem divested himself of all his clothing, and donned the spoils of his own tutelary genius, a bear skin, the claws of a grizzly bear, the feathers of an owl, etc., and the ceremony commenced near the patient who was lying on the ground. While the assistants were beating vigorously their drums, the "doctor," with his rattle in hand—a hollow receptacle filled with sonorous pebbles, to which a short handle was attached—danced to the time imparted by the drummers. By dint of bodily efforts and the singing of a particular chant of his, whereby he strove to impose his will on the evil spirits in the patient, he worked himself to a state of frenzy which, at times, brought on himself additional attacks of catalepsy.

As soon as he had recovered, he would recommence his dancing and singing amidst the ever increasing tumult of the drummers and other assistants, who were now lustily taking up his own song. Then, receding a while from the patient, he would point to the prostrate form on the ground the image of his own genius or totem, wherewith he would exercise the evil spirits of his victim, all the time moving in his dance in his or her direction. Then, falling suddenly on the naked limbs of the sick, he would suck out therefrom either a diminutive reptile, a thorn, a stone, etc., which he would present to the gaze of the admiring assembly as the materialized form of the cause of the disease.

Another rôle played by the shaman among some western tribes, such as the Carriers and the Chilcotins, was that of father confessor.

I have long known of that particularly, but always refrained from mentioning it, out of fear lest I should seem to be drawing on my imagination. But Harmon, the very first author who lived among the Carriers, is very explicit on this point. "When the Carriers are severely sick," he writes, "they often think that they shall not recover unless they divulge to a priest or magician every crime which they may have committed, which has hitherto been kept secret. In such a case, they will make a full confession, and then they expect that their lives will be spared, for a time longer. But should they keep back a single crime, they as fully believe that they shall suffer almost instant death."*

XIII.

Conjuring remained, however, the main function of the shaman. This was of seven kinds among the Dénés. There was, first, the curative conjuring which I have already described. The second kind, preventive conjuring, I shall treat of in the next paragraph.

A third form of the art was inquisitive conjuring. I cannot find a better instance of it than in the following extract from my last book, which has reference to the loss and finding of the first iron axe ever possessed by a Carrier Indian. "The native chronicler goes on to relate how that shaman, who enjoyed a wonderful reputation even among his peers, had a personal totem or familiar genius, in the shape of a skunk-skin, which he wore hanging from his neck. This, during his trances, he used to press in his hands, when it emitted a piercing scream. On the occasion of Na'kwoel's loss, in the midst of dancing, singing and beating of drums, the shaman squeezed his skunk-skin, upon which it cried as if the animal had been alive, and, detaching itself from the neck of the medicine man, it made for the heap of boughs, wherein it plunged and remained for a while. When it came back, it bore in its mouth the lost adze blade!"†

Another circumstance, of much more frequent occurrence, called the same powers into play. Did any influential or greatly beloved person die? Nobody would think of attributing his or her demise to natural causes; but the friends or relations of the deceased would want to ascertain the name of the party who had brought his malefic gifts into play in order to encompass his or her death. The shaman was therefore consulted, who, in the midst of his dancing and singing, attired in all the glory of his usual paraphernalia, so as to be the more easily brought into direct communication with his totem, would suddenly fall down, feigning death or sleep, during which he was held to see through the machinations of the dead person's enemy. On resuming consciousness, he would unhesitatingly name the latter, and thereby in most cases pronounce his death warrant.

This brings us to the consideration of malefic conjuring, which is the fourth kind of shamanistic activities. This was much feared, and such as were supposed to be addicted thereto were but half safe among their fellows. Its use, real or imaginary, was the cause of many murders committed in retaliation for deaths attributed to the black art.

*"A Journal of Voyages," pp. 256-57.

†"Primitive Tribes and Pioneer Traders," p. 10 of third edition. Wm. Briggs, Toronto, 1905.

Intimately connected therewith, and yet different in the mode of exercising it, was witchcraft. This consisted in secret practices by ordinary mortals with a view to causing bodily harm to an absent enemy or injuring his possessions. Pieces of his attire, a lock of his hair, or if possible parings from his finger-nails, hidden in certain unlucky places, by the side of dreaded reptiles or their skins, amidst the muttering of imprecatory words, were reputed extremely efficacious in such cases.

Whether the victim of real witchcraft or of malefic incantations, the doomed individual, as soon as made aware of his dreadful position, almost invariably began to feel unwell. He would then gradually wither away and die in a short time. Such was—indeed, I should perhaps say such is the power of imagination with these timorous people!

A fifth kind of conjuring may be termed operative. It was intended chiefly to create good weather, make rain, bring on fair wind, hasten the annual run of salmon, or render it more abundant, remedy the barrenness of women, implant love in persons of different sex, etc. When the object of the incantations was of public utility, several shamans usually combined their efforts towards the attainment of the desired end.

There was, moreover, a sixth kind of conjuring, which was in reality nothing else than juggling or prestidigitation. It was at times resorted to in order to retain the shaman's hold on the admiration of the plebs, and still further increase faith in his ministrations. Marvellous deeds, such as the eating of fire, the swallowing and disgorging without any unpleasant effects of reputedly venomous reptiles, etc., were then accomplished in the sight of wondering natives.

In my recent work already referred to, I quote the case of a famous Babine shaman who "in the course of his religious dances, would introduce in his mouth the green, unmatured fruit of the amelanchier or service-berry, which, in the presence of all the spectators, would soon ripen to the extent of yielding a copious flow of dark juice."*

The seventh and last kind of conjuring we will dignify by the name of prophetical. The epithet sufficiently explains its nature. What the reader will probably be more anxious to know is whether there ever was any actual sample of the genuine article among the Déné tribes. To this I cannot answer otherwise than by referring to the above mentioned Babine shaman. He was the founder of a kind of religion and the center of some sort of Messiah craze, and when his authority and prestige had been well established, not only within his own tribe, but even amongst the tribes of coast Indians, he set upon prophesying. All his surviving tribefellows, and even a trustworthy white lady who has mastered the Tsimshian language, assure me that in every case his prophecies were fulfilled, which fact, if really true, is so much the more extraordinary as he is reported to have even announced the introduction of the telegraph into his country, an institution of which the natives had not then the least idea.†

*"Primitive Tribes and Pioneer Traders," p. 240 of third ed.

†Harmon himself says that "it is not uncommon for events to take place much as these conjurers predict." *Op. cit.*, p. 325.

XIV.

I have left preventive conjuring out of its natural place because, to be properly understood, it requires more than a passing reference. To fully grasp its import we must penetrate still further into the intricacies of the Indian mind.

According to the primitive Dénés, man is made up of a perishable body and of a transformable soul, if soul this can really be called, which they knew as *nezœl*. This is almost equivalent to the *anima* of the Romans, inasmuch as it gives warmth and vitality to the body. However, etymologically speaking, it is rather the effect than the cause of life, since *nezœl* means at the same time human heat. In fact, though this word is used to-day to designate the soul as we understand it, it is possible that its signification was originally slightly different.

Besides this principle or physical condition, there was *netsen*, man's shadow, commonly called second self among us. This was a kind of double, a reflection of the individual personality, which was, of course, invisible in time of health, because then confined within its proper corporeal seat, but which, on the approach of sickness and death, wandered off the body and roamed about, seldom seen, but often heard, in the vicinity of its normal home. Its absence therefrom, if too prolonged, infallibly resulted in death.

The rôle of the shaman in such cases is easy to guess. His duty was to coax or force the truant soul to return to its proper seat. With this end in view, he would, in the evening, hang up the patient's moccasins previously stuffed with feather-down, and, on the following morning, should the down be warm, he would carefully put them back on his feet with the wandering shade therein. At other times, the simple imposition of the conjurer's hands on the patient's head, or silent ablutions of the weak parts of the body, with water endowed with magical properties through the manipulations of the conjurer, would have the same effect on the patient.

Should the exertions of the medicine man prove of no avail against the claims of nature, the soul or immortal personality of his patient —or victim—was then called *nezul*, in Carrier, a word which implies void and impalpability. It was supposed to embody what was left of man's previous self.

As to the fate of these shades after death, very little was known. The eastern Dénés believed them to be constantly erring in some underground world, where their occupations were not much different from those of their survivors on our sphere. Most of them live, they claimed, on fœtuses, mice, toads and squirrels, while some, who are more fortunate, pass their time in fishing for small fry, visiting their nets in double canoes, or dancing together on the shores of the river.

According to the Carrier mythology, the shades inhabit some subterranean village beyond a large river, which they have to cross after a dismal voyage through snakes, toads and lizzards;* but the fact that some of their homes—large board houses like those of the coast Indians—and half of the canoes used to ferry them across the river,

*See my paper on "The Western Dénés." Proc. Can. Inst., 1889.

were painted red, the color of brightness and bliss, while the others were black, the token of bad feeling and of a spirit of revenge, would seem to indicate that their fate is unequal.

Most of these and other notions probably originated in the brains of some shamans who professed to have visited the land of the shades.

Before parting with this important personality in the Déné theologic system, we may as well ask ourselves what were the usual effects of its ministrations among the sick. Strange as it may seem, they were generally satisfactory. Hearne mentions two striking cases that fell under his observation,* and my own experience and studies go to confirm the good results claimed for the shamans' conjuring. People will cease to wonder, when they take into consideration the extraordinary influence of the mind over the body, among credulous and naturally timid aborigines as the northern or Canadian Dénés are.

Of course, it did happen often enough that death claimed its own. In such cases the shaman had to build up as satisfactory as possible a theory as to the real causes of his failure, were it only to save his prestige in the tribe; but under no circumstances had he to return the generally valuable presents—dressed skins or ornamental shells—received in consideration of his labors. As to the relatives of the deceased generally sacrificing "the quack or some of his connections," as Ross Cox declares† was done by the Carriers of British Columbia, there is absolutely no ground for that assertion.

XV.

Unless otherwise noted, the foregoing applies to all the Déné tribes, irrespective of geographical location. We now come to the custom characteristic of the Carriers exclusively.

We suppose that a *tœneza* or notable among them was evidently doomed. The hereditary chant denotive of his rank was taken up by a member of a different clan and continued by exo-gentile villagers until he expired, while his own relatives and clanfellows, especially the women, would rend the air with their lamentations. On the chief's demise, one or two young men of another clan were deputed to announce the sad tidings to neighboring villages, and invite their inhabitants to the incineration ceremonies.

In the meantime, daily dances by exo-clansmen would act as a diversion to the relatives' grief, while the poor widow, already shorn of her hair by the relatives of the deceased, would have to keep watch day and night by the body of her late husband.

On the great day of the funeral, in the presence of as large a concourse of people as could be secured, the remains were laid over a pile of dry wood, face upwards and painted as on festive occasions, while the rest of the body was covered with a robe of beaver skins and the feet encased in a new pair of moccasins.

*"A Journey from Prince of Wales' Fort," pp. 194 and 219.

†"Adventures on the Columbia River," p. 325. New York, 1832. It is but simple justice to the reader to warn him against the exaggerations and one-sided assertions of that author, or rather his informant, Jos. McGillivray, when he speaks of the Carriers. For instance, notwithstanding his explicit declarations, those Indians never practised scalping, except at the bidding of the whites among them.

Fire was now applied to the funeral pyre by an exo-clansman, who was paid on the spot for this service, while the widow was obliged by etiquette to hold in as long embrace as was possible under the circumstances the remains of her late husband. When the agony of pain arising from the violence of the fire or the suffocating smoke became unbearable, she was momentarily drawn off by her own relatives, but had soon to return to her post, until a fit of fainting would again part her therefrom. If her apparent earnestness in her endeavors to get burnt with the body did not satisfy the relations of the deceased, they would themselves jostle her into the furnace, thereby disfiguring her for life, with a view to diminishing her chances of remarriage, especially when she had not proved a model wife.

The garments of the dead once consumed, they were immediately replaced by others, skins or blankets, which were thrown over it by exo-clansmen, whose presents were carefully noted, as they had to be repaid in kind on subsequent occasions of a similar character, or in the midst of one of those ceremonial feasts of which I shall soon entertain the reader. Not unfrequently the shaman who had unsuccessfully treated the deceased adopted this expedient as a means of wiping out his shame, as they called it; but, of course, in this case this was an unrequited offering.

Shortly after the cremation of the remains, a bark shelter was erected on the spot, and the relatives of the deceased would pick up from among the ashes the few remaining bones, which they would enclose, first in a birch bark receptacle, and then in a leather satchel ornamented with fringes and suitable designs. This they would hand to the widow, who had thenceforth to *carry* it constantly on her back, or, at night, keep by her side. Hence the name of the tribe, which is but a translation of the *Arehlne* by which they are known of the Sékanais. This is the most notable of the few really aboriginal customs proper to a Déné tribe which I can recall to mind.

I will not expatiate on the terrible fate of the now enslaved widow, who had become part and parcel of the chattels belonging to the female relatives of the late *tœneza*. I also feel reluctant to repeat here what I have elsewhere written with full details* concerning the series of ceremonial feasts which the maternal nephew of the deceased headman had to give to crowds of exo-clansmen, in order to be entitled to succeeed to his rank, privileges and property. Yet these feasts, or potlatches as they were called from a Chinook word meaning "giving away," were of such importance in the eyes, not only of the Carriers, but even of all the western Dénés, who borrowed the entire social system from the coast Indians, that I must at least summarize that information for the benefit of such as may not have read my previous papers published by the Canadian Institute of Toronto.

XVI.

These feasts were public distributions of dressed skins, eatables and other property by the people of one gens to the assembled members of other gentes. Apparently useless shows of vainglorious liberality on the part of the headmen, who seemed for the nonce to act as well deserving benefactors, they were withal nothing more or less than formal payments of debts contracted by the potlatching clan

*"The Western Dénés," p. 147 *et seq.* Proc. Can. Inst., vol. XXV.

towards the present partakers of its bounties on the occasion of past feasts or public distributions. They might also be considered as letters-patent granted by and paid to the community, whereby the hunting grounds of a deceased "nobleman" were turned over to his lawful heir. The Dénés were eminently democratic in their social constitution; the assembled multitude of various clans, with their respective headmen, represented the highest authority amongst them, and these solemn assizes had for their principal object what was in their mind tantamount to the payment of the fees which, with more civilized nations, accompany succession to rank and landed estate.

A series of six feasts had generally to be gone through before this latter end was accomplished among the western Dénés. The first was called "the taking off the ashes," because the remains of the dead *tœneza* were supposed to be therewith removed from the fire-place, where they had theretofore been lying. It was given soon after his demise, and consisted mostly of a public repast followed by the distribution of dressed moose or cariboo skins, torn, in the gaze of the assistants, into strips of the dimension most convenient for making pairs of moccasins. Such as were intended for notables were always given twice the size of those that went to the *commune vulgus*.

The second potlatch took place some time afterwards, and was intended to celebrate the deposition in the place of honor of the remains of the late *tœneza*, though said remains might have been previously cremated.

The third was called "the imposition of feather-down." As among the coast tribes, this material was considered as distinctive of rank and honor. This feast was one of the most important of the whole series, and it was equivalent to the aspirant *tœneza's* elevation to the social status of his late maternal uncle. It was celebrated with an elaborate ceremonial, which lack of space prevents me from detailing.

The fourth potlatch was to honor the installation of the new headman in the traditional seat of his predecessor.

The fifth was simply an unostentatious meal given to bands of young men and notables, male and female, who entered, while dancing and singing, the lodge of the new "nobleman," whose last and most important feast was expected to take place within a short time.

This latter potlatch was a most elaborate affair, whose chief feature was the erection by the public of a large ceremonial house for the new *tœneza*. In the evening, two masked jesters would try to amuse the public by their antics, while the notables, dressed in their insignia, would dance on a kind of primitive stage. Prominent among these insignia were the ceremonial wig, a beautiful head-dress made out of the hair of three women tastefully plaited, with numbers of fine long shells (*Dentalium Indianorum*) inserted therein at regular intervals, or laid out side by side in complete rows; a long apron with a fringe decorated with many sonorous trinkets, and a breastplate cut in the shape of a wide crescent practically covered with the same precious shells.

The day after this dance took place a pantagruelistic repast, during which the bones of the late *tœneza* were taken from the back of the widow, who was then presented with a new blanket and publicly declared free to remarry.

The third day of that feast might have been called shaman day, inasmuch as those possessed of magical powers then used the same for the benefit of the whole assembly. Then took place the great distribution of clothing, blankets, etc., and the guests were obliged by custom to offer the rudely carved image of the totem of the host's clan any piece of property with which they might choose to present the new *tœneza*, and through him his entire clan. Due count of these was as usual taken and carefully remembered for compensation on a future occasion of similar import.

XVII.

I have mentioned dances. They were as rude and unartistic affairs as could well be devised. Among the Carriers they consisted mostly of jumps and leaps with both feet simultaneously, to the time of one or two drums or tambourines, accompanied by a phrase repeated *ad nauseam*, with meaningless monosyllables sung out to the tune of the weirdest imaginable melody. With the Sékanais, their immediate neighbors in the north-east, the motions of the legs were not so much in evidence, and were sometimes entirely replaced by alternate sets of two or three jerks of the shoulders to the right and to the left.

Sun, or strictly religious, dances were unknown among the Canadian Dénés.* The nearest approch thereto was that practiced on the occasion of an eclipse. To hasten the reappearance of the luminary, they would silently emerge from their lodges, and then, ranging themselves in single file, they would start a sort of propitiatory dance. To this effect, bending under an imaginary burden, though packing only an empty bark vessel, they would strike in cadence their right thigh, repeating in piteous tones, *hanaintaih, qé!* Come back, oh, do!

Ceremonial dances, such as that noticed in the preceding paragraph, were usually performed either on a stage or in a free place within a large lodge by one or two men, rarely by any woman, unless she be a titled noble woman. Common, or simply pleasure dances would be started almost anywhere by people of either sex. In these the dancers moved in circles.

Among the eastern Dénés, the Dog-Ribs were considered the master-dancers of the family. Yet, that their art was not any too remarkable for its gracefulness is shown by this quotation from Sir Alex. Mackenzie's journal, who witnessed one of their dances when he first met them in 1789: "The men and women formed a promiscuous ring. The former had a bone dagger or piece of stick between the fingers of the right hand, which they kept extended above the head, in continual motion; the left they seldom raise so high, but work it backwards in a horizontal direction, while they leap about and throw themselves into various antic postures, to the measure of their music, always bringing their heels close to each other at every pause. The men occasionally howl in imitation of some animal, and he who continues this violent exercise for the longest period appears to be considered the best performer. The women suffer their arms to hang as without the power of motion."†

*Except among the Sarcees, who are far from being typical Dénés.

†"Journal of a Voyage," vol. I., pp. 233-34.

A common occasion for an impromptu dance was until recently the meeting of parties representing different tribes. The Dog-Ribs, Loucheux, Carriers and Chilcotins are on record as following that custom, which amounted as much to a mark of deference as to a token of friendship. This is evident from the fact that, when the leader of a Chilcotin party of marauders who had just massacred almost the entire population of a Carrier village fell in with the chief of the latter, accidentally reduced to a state of utter helplessness, the victorious Chilcotin asked his rival to "dance for him."*

On such occasions "the two bands commence the dance with their backs turned to each other, the individuals following one another in Indian file, and holding the bow in the left hand, and an arrow in the right. They approach obliquely, after many turns, and when the two lines are closely back to back, they feign to see each other for the first time, and the bow is instantly transferred to the right hand and the arrow to the left, signifying that it is not their intention to employ them against their friends. At a fort they use feathers instead of bows."†

Generally of a most indolent disposition, and with plenty of leisure when not pressed by famine, the Dénés were naturally not deficient in games wherewith to while away their time. The scope of this paper will not allow of more than a mere enumeration of them. Among the Carriers *atiyéh*, which was played with circular pieces of bone, was based on the principle of the modern dice. *Atlih* necessitated the use of a number of slender bone sticks, a few inches long. Both have become obsolete. This cannot be said of what I will call the "hand-game," from two more or less polished bone-sticks held in the hands, while a band of Indians execute a song proper to the game. Winning depends solely upon a successful guess as to the hand into which the peculiarly marked stick has been surreptitiously transferred.

These are games of chance, and are played anywhere and at any time, though innumerable nights, especially, are made hideous by the tumult and revelry which the last game usually entails. This is so absorbing to the native mind that many a Déné has been thereby despoiled of all his belongings. Other games there are in which personal skill, or a certain degree of exertion, are the chief factors. Besides lacrosse, which seems to have been known long before the advent of the whites and is responsible for the name of an important locality—Isle-à-la-Crosse—within Chippewayan territory, the most popular among the western Dénés is *tætquh*, which is played with slender sticks, four or five feet long, thrown out through the air, the distance reached determining the winner. Its equivalent in winter time is *nœzaz*, which is also the name of the finely polished wooden rod, with a sort of elliptical head, which is launched on the frozen surface of the snow. Two rival teams, composed sometimes of half a dozen men or boys, are then in the field, and the largest aggregate of points gained indicate the winning side.

Another game of a quieter character is *tœ'ko*. It is played mostly by the fireside, during the long winter evenings, with a blunt-headed

*"History of the Northern Interior of B.C.," p. 15. Wm. Briggs, Toronto.

†"Journey to the Shores of the Polar Sea," by Sir J. Franklin, vol. III., p. 50.

stick sent by two partners sitting opposite to one another, against thin, springy boards firmly set in the ground near each player. When one of these is struck so dexterously that the stick bounds back to the knees of the party who threw it, the latter is entitled to recommence until luck ceases to favor him.

This is of too childish a character to suit the lively disposition of most Dénés, who prefer arrow-shooting by two competing bands taking as a target a rolling disk or wheel of willow bark. The arrows which go home become the stake which the rival team has to win over by hitting the disk now hung up on a stick.

XVIII.

But, though little more than a grown-up child, even when well up in years, the Déné has to live, and therefore to work, at least occasionally. With no absolutely sedentary status, and forming an embryo society with ranks too thin to warrant or require a distribution of labor among differently endowed individuals, any great diversity of avocations cannot be thought of in his case. In fact, his occupations may be said to be reduced to hunting, fishing and gathering berries or roots, and, in this respect, practically every family is on the same footing. Hunting is exclusively the men's work; fishing, mostly the women's, and berry collecting entirely so.

Hunting may be considered under two heads: hunting proper, or the chase of the larger game, and trapping or snaring. To this division corresponds closely enough that of venison and fur animals. The former are moose (*Alce americanus*), cariboo (*Rangifer caribou*, and, east of the Rocky Mountains, *R. groenlandicus*, or barren ground cariboo), the musk-ox (*Ovibos moschatus*); while, on the same range, or exclusively to the west thereof, are to be found the mountain goat (*Capra americana*), the mountain sheep (*Ovis montana*), and the mule deer (*Cariacus macrotis*). These were originally dispatched with strong bows, and arrows usually fletched with three half feathers, and tipped with augite-porphyrite, obsidian, or impure quartz, though sometimes also with bone.

While the task of chasing game is within man's province, it is reserved to woman, as the beast of burden and factotum of the family, to fetch home and dry its meat. For this purpose it is neatly carved into thin and very long slices, which are suspended on transversal poles by the fire-side. In the east these were afterwards pounded fine and mixed with grease or marrow, under the name of pemmican, a preparation which does not seem to have ever been extensively introduced west of the Rocky Mountains.

As adjuncts to winter hunting and travelling, all the Canadian Dénés have snowshoes, which vary in pattern and finish according to the tribe which makes them. The Sékanais snowshoe is abnormally long, as it is sometimes used as a sliding sleigh while descending the precipitous slopes of their mountains. The eastern snowshoe is chiefly remarkable for its uneven sides, the outer stick of each bulging out, so that they cannot be more easily interchanged than modern shoes. Its Louchoux equivalent is long and very broad in front. Almost all the Déné models are curved up in their fore-parts, which are sometimes pointed and made of two sticks, and sometimes round, or rather elliptical, being made of only one stick.

Among those tribes which subsisted principally on deer or cariboo, pounds with avenues of stout sticks or trees leading thereto were formerly erected, at the cost of much labor. Therein whole herds of animals were driven and finally slaughtered.

It would be too long and foreign to my purpose to describe the various devices resorted to by the Canadian Dénés with a view to entrapping or ensnaring bears and the minor fur-bearing animals. I must be allowed to refer the reader to my "Notes on the Western Dénés,* pp. 93-104, where he will find a full description of the same. I will simply remark, as a token of that people's regard for continence, that, among the Carriers, a married man separated *a thoro* from his wife a full month prior to setting his traps or snares, during which time he led a sort of penitential life intended to secure good luck for his forthcoming efforts.

If eminently huntsmen and trappers, the Dénés are also, and perhaps to a still greater extent, fishermen. In fact, among the western tribes, salmon may be said to be the staple food for old and young. Three or four species of that fish annually ascend the rivers emptying into the Pacific and their tributaries, but *Oncorrhincus nerka* is the only one dried for later use, on account of its well-known gregariousness and excellent keeping qualities. Several contrivances, too numerous to describe in detail, are used, according to the nature of the localities. Whenever possible, the streams are staked across as in northeastern Asia and provided with weirs leaving access, every few feet, to openings in the trellis work leading to basket-like traps from which escape is impossible. Enormous quantities of the fish are usually secured every year.

Salmon is not found within the basin of the Arctic Ocean. It is replaced to some extent among the eastern Dénés by many varieties of minor fish, prime among which is the coregone, or whitefish (*C. transmontanus*) and several species of trout. When taken in the beginning of the winter, the former is allowed to freeze, after which it is considered a great delicacy. Nets of various sizes, which were originally of the fibres of nettle (*Urtica Lyallii*) and willow (*Salix longifolia*), are usually the means of catching that and any smaller fish, though spearing and hook-fishing are also quite often resorted to. But among the Yukon Loucheux who, if we are to believe Sir John Richardson,† were till his time unacquainted with nets, weirs with wicker baskets were the only means of procuring whitefish.

XIX.

This, as well as salmon and smaller fry, is ordinarily boiled without salt or any seasoning, or roasted by the fireside. But when the Carriers of old wanted a really palatable dish, they buried their salmon in the ground until it reached a state of semi-putrefaction, when it was mixed with more or less rancid oil, originally extracted from the heads of the same fish. If a few dried berries were added to the compound, it was considered the *nec plus ultra* of table delicacies.

*"Transactions of the Can. Institute," vol. IV. Toronto, 1894.

†"Arctic Searching Expedition," vol. I., p. 390.

Their berries, as a matter of course, greatly vary according to the territory of the tribes. They are mostly of the *Viburnum*, *Vaccinium* and *Empetrum* genera, though, to the Carriers, for instance, there is nothing like the fruit of the *Amelanchier alnifolia* for economic importance in the vegetable kingdom. They gather it in immense quantities in bark vessels, and compress it into thin cakes which, properly dried, will keep for quite a long time. The soap-berry (*Shepperdia canadensis*), and several other berries or roots, prove also valued additions to their larders.

Prominent among the latter in the eyes of most of the tribes is the root of the red lily (*Lilium columbianum*), which is appreciated as an article of diet even by the natives of northeastern Asia. The Chilcotins prefer two tubers which they call, respectively, *nuntí* and *œsronh*. These are small, and spheroidal or oblong, somewhat of the form of potatoes, which their women dig up in large quantities.

All the vessels of the prehistoric Dénés were made, without much art, of birch bark, sewed with the fibrous rootlets of the black spruce (*Abies nigra*). They have to this day remained unchanged as to shape or material except among the Chilcotins, who do woven basketry as their Salish neighbors in the south. As a matter of course, the original bark kettles have long been discarded in favor of the tin kettles of commerce. The process of boiling by means of hot stones thrown into a vessel full of water, though abandoned when the white man's wares were adopted, has not, however, entirely disappeared from among all the tribes. The Carriers have still recourse to it when cooking their service-berries.

It is a long way from berry gathering or cooking to war. But, since we have mentioned the use of bows and arrows, it is, perhaps, natural that we end this paragraph by a few words on that subject. War among the Dénés was but a series of ambuscades and surprises, resulting when circumstances were favorable to the attacking party, in general massacres. Women and children fell victims to the aggressors' rage just as well as the men; but in some cases the former were spared in so far as their lives were concerned. They were then taken prisoners, and almost invariably became the wives of the leading men among the attacking party. In too many cases the most barbarous cruelties were exercised against the fallen foes, whose bodies were horribly mutilated.

But the two first chapters of my "History of the Northern Interior of British Columbia," which relate with full particulars well authenticated war expeditions among the Carriers and the Chilcotins, will enlighten the reader on this subject better than any didactic treatise on the same could do. Suffice it to add that the war-bow of several prehistoric tribes was usually furnished with one, sometimes two, stone or bone points, which allowed of the weapon being used as a spear when shooting had become impossible. Two kinds of armour, one of stiffened skin, the other of rods tied together, were also in use among the western Dénés. Moreover, the Carriers, at least, knew of the shield, which they called—indicating thereby its material—*'keilla-thœn*, or "amelanchier which is held by the hand.

XX.

We will close this compendium of Déné ethnology and sociology by a few remarks on woman, and her place in the primitive society of these aborigines. Though, as we have seen, her condition in a few tribes was bearable, we may safely assert that, in general, it was humble and lowly, nay, we should say miserable. Some authors, in these latter times, have striven to react against the common and very just idea of her pitiful state in barbarous societies, such as that of the northern American Indians. They have quoted well authenticated cases of regard for individuals of her sex, and even instances when some of them have attained rank and consideration in their tribes. In particular, the female chief who practically saved Robert Campbell's life among the Nahanais has been represented as a splendid exemplification of the power of woman in aboriginal society. As I intend writing for the Congress of Americanists a paper specially devoted to the treatment of this very question, I shall content myself with remarking here that those authors simply confound the exigencies of tribal organization with the status of woman as woman.

As we have already noted in the course of this essay, the laws which govern inheritance preventing the expropriation of land from one clan to another, they occasionally forced the tribes to confer on women titles and privileges which went by right to men. Such cases invariably predicated the absence of any suitable male heir, and did not affect the standing of woman as daughter, wife or mother. In other words, if these exceptional circumstances rendered her lot more tolerable, this was simply owing to social necessities, but not, as amongst us, because the titulary happened to belong to the weaker sex. Marks of deference were, indeed, paid her in public, but there was very little chivalry in this; in the privacy of the family life she became a woman again, that is, an inferior human being, whose duty it was to do all the menial work by the lodge or tepee, unless her special rank and private circumstances furnished her with attendants to replace her in the discharge of her household duties.

Among all the Déné and most other American tribes, hardly any other being was the object of so much dread as a menstruating woman. As soon as signs of that condition made themselves apparent in a young girl she was carefully segregated from all but female company, and had to live by herself in a small hut away from the gaze of the villagers or of the male members of the roving band. While in that awful state, she had to abstain from touching anything belonging to man, or the spoils of any venison or other animal, lest she would thereby pollute the same, and condemn the hunters to failure, owing to the anger of the game thus slighted. Dried fish formed her diet, and cold water, absorbed through a drinking tube, was her only beverage. Moreover, as the very sight of her was dangerous to society, a special skin bonnet, with fringes falling over her face down to her breast, hid her from the public gaze, even some time after she had recovered her normal state.

This had also another purpose. It replaced with our Indians the common houses for pubescent girls which obtain among some of the aboriginal tribes of the Philippine Islands, in that sense that it

announced the fact that the wearer of it was now in the ranks of marriageable parties.

With some of the eastern tribes girls were betrothed from their infancy by their parents, but among most of the western Dénés the young man had to work quite a period of time for his intended bride's parents. In the northeast, as we have seen, wrestling decided the fate of a maiden. Some cases are also on record in connection wherewith goods and property were the only consideration determining a match; in other words, the woman was then the object of a regular bargain. In no case was there any marriage ceremony; the young man simply took the girl to a new tepee and lived with her as husband and wife, or, as among the Carriers, he settled with her in a corner of the large lodge of his father-in-law.

Polygamy was prevalent everywhere, but, except in the cases of very good hunters or of prominent members of the tribe, few men had more than two wives. I know of a chief who had four, and Hearne mentions another who had eight. Divorce was also common enough, especially when the woman had proved barren, lazy, or self-assertive. Cases of independence, however, were exceedingly scarce, and all the early explorers were struck with the down-hearted countenance and humble behavior of the Dené wives.

Every recurring menstruation brought about a temporary separation *a thoro*, and this naturally followed also child-births. Parturition was generally easy enough, though even in the early times painful confinements occasionally happened. If in the woods or travelling, the poor mother was not on that account treated with any more feeling or humanity, but had to proceed with the drudgery of her daily life, while packing her new-born on her back.

In case of any one losing her husband, the wife had to follow the laws of the levirate, and marry her surviving brother-in-law. Many other directions of the Mosaic code were also in vigor among the original Dénés and not a few of their modern descendants. I leave it to my previous papers to detail the same.

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9. THE SALISH TRIBES OF THE INTERIOR OF BRITISH COLUMBIA.

By Franz Boas.

The interior of British Columbia is inhabited by Salish tribes and by the Chilcotin and other Athapascan tribes. Their culture resembles to a certain extent that of the northern Athapascan tribes in its simplicity, and is also allied to that of the tribes of the plateaus farther to the south. It differs fundamentally from the culture of the tribes of the north Pacific coast, and is also quite different from that of the Indians of the Plains, although certain traits of culture have been imported from both sources.

The Indians of this region are hunters and fishermen. Salmon, which ascend the large rivers, are an important staple food; but, besides this, deer and other mammals are hunted, and are infinitely more important in the domestic economy of the people than they are among the coast tribes. The people also gather large quantities of roots and berries, and for this reason their habitations are changed from season to season, according to their pursuits. During the fishing season they live in the river valleys, where the permanent villages are located; while during the hunting season and root-gathering season they live in the mountains. Since the lower part of the country is dry, and wood is not plentiful, the wood industry, which is so characteristic of the coast Indians, is only slightly developed. Stone implements are made both by battering and flaking. Jade axes and adzes are of frequent occurrence. The art of painting is only slightly developed. Clothing is made principally of deer-skin which is carefully prepared. The clothing is much fuller than it is among the coast tribes, moccasins, leggings, breech-clouts and various types of shirts being worn. The head is covered with a cap or with a headband. Besides deer-skin clothing, woven blankets and ponchos made of sage-brush bark, are also in use. The weaving is done by a simple process of twining around strands of shredded bark. The tribes of the Coast Range have a highly developed art of basketry. They make beautiful coiled ware with designs produced by imbrication. These coiled baskets are generally angular in shape, and suggest that the type was developed from bark baskets and boxes. Bark basketry is found principally among the more eastern tribes of this region. Mats, baskets and pouches are also made by twining, the material used being rush and Indian-hemp fibre. Blankets of strips of rabbit-skin are also made by twined weaving.

The permanent house is a semi-subterranean lodge, consisting of a large, round excavation over which a conical roof is built. The entrance to the dwelling is through the smoke-hole in the middle of the roof by means of a ladder consisting of a notched tree. In summer the pople live in round or square tents of varying construction, differing, however, in type from the skin tent of the Plains Indians. The tents are generally covered with rush mats; while, on the other hand, in the mountains the simple lean-to is used. The double lean-to, which is so characteristic of the Athapascan tribes, is found throughout this area.

In the ornamentation of dress, feathers are much more important than among the coast tribes, and they are treated in much the same fashion as by the Plains Indians. Nose and ear ornaments of dentalia and beads are commonly used.

The bow is partly of the some type as that found on the coast, being flat in cross-section with round grip in the middle; but by far the greatest number of their bows are of the characteristic sinew-backed type of the plateau area. Arrows with simple stone points and with barbed bone points are used. Deer and small game are often trapped in snares. Fences were also built at appropriate places to drive the deer in the direction of the hunter. Fish are caught, partly in fish-traps, partly by means of bag-nets, which are used from rocks near the banks of the river, or from platforms built over the water. Hooks and fish-spears are also used. In travelling on the rivers, both dug-

outs and bark canoes are used. The bark canoe has long spurs under the water line, and is made of spruce bark.

In warfare the bow and arrow, lances, knives and various forms of clubs are employed. The war-club with loose stone encased in hide, which is characteristic of the Plains Indians, is found here also. For protection, slat and rod armor was used.

Some of the games are almost identical with those played by the coast Indians, while others resemble those played by the Indians of the Plains. To the former group belong the beaver-teeth dice and the painted gambling-sticks. The well-known hoop-and-spear game is found here also. The game of hiding-the-button is played in the same manner as on the coast. On the other hand, some of the ball games—for instance, a kind of lacrosse—resemble very much the ball games of the Plains.

The decorative art of the plateau Indians is very slightly developed. It is probable that in former times there may have been a more marked development of designs produced by means of embroidery, but these no longer survive. There is almost a complete absence of works of plastic art. Among the archæological remains of this region, which, without any doubt, belong to the ancestors of the present inhabitants of the area, are found a few good carvings in bone, and fairly good realistic representations on stone mortars. These, however, are very few in number. In type they resemble somewhat the plastic art of the coast, but the small number of specimens shows clearly that these objects must always have been rare. Painting is also of a very crude character. A number of highly conventionalized designs are found, which are interpreted in accordance with the general ideas prevailing among the people. Some of these designs consist of simple lines and dots. They are, probably, the oldest type of decorative design of these tribes. Other designs seem to be related to those of the Prairie Indians. This is also suggested by the fact that these designs occur on a few painted pouches and parfleches that are found here. Most of them are angular and consist of rectangles and triangles. By far the bulk of the painted designs are pictographic in character, and are related to the characteristic pictographic art of the Plains Indians. In a few cases very simple forms are interpreted in a symbolic manner. Thus a red dot on a round stone club has been interpreted as a thunder-bird in the sky, and a cross as the world with its four corners. There is practically no trace of the semi-realistic animal representations which are so characteristic of the Pacific coast.

The social organization of the tribes is very loose. There is no recognized tribal unit, and the population of the villages undergoes frequent and considerable changes. There are no exogamic groups, and no hereditary nobility is found. Distinction was obtained principally by wealth and wisdom. Captives made in war became slaves, but if one of the slave women was married to a member of the tribe she and her children were considered equals of the other people. It does not seem that names were restricted to certain families, although names of ancestors were frequently given to young children. In marriage the wife generally followed her husband to live with his family, although shortly after marriage there was a frequent change of resi-

dence of the young people, who for some time lived with the bride's family, and for some time with the groom's family.

The hunting territory was considered the common property of the whole tribe, but deer-fences and fishing-places were the property of certain individuals and families. In most cases an old woman was put in charge of berry-patches, which were the property of the whole tribe. It was her duty to prevent any one from picking berries before they were ripe.

In recent times the custom of giving potlatches has been introduced among the more western plateau tribes, the custom evidently being copied from the coast tribes.

In the western part of the country the infant cradles were shaped like small baskets, and resembled somewhat the infant cradles of the coast. Farther to the east the characteristic North American cradleboard was used.

A young man who desired to marry gave presents to the girl's parents, and their acceptance indicated the acceptance of his suit. In other cases the girl's relatives proposed marriage to the parents of the young man. Levirate was common.

The body of the deceased was buried, the grave being purified by means of thorny bushes to drive away evil spirits, and often tents were erected over the burial-site. If a person died in a foreign country the body was burned and the remains were wrapped up and carried along to be buried in the family graveyard, each family having a burial site of its own. Among the Lower Thompson Indians and Lillooet the burial customs were somewhat similar to those of the coast tribes. In many cases the bodies were placed in large cedar boxes supported on posts. The bodies of members of one family were placed in the same box. It is worth mentioning that terms of affinity undergo a change after the death of husband or wife.

The religious concepts of the Salish tribes of the interior were also much simpler than those of the coast Indians. Since the social organization is simple, and ritualistic societies are not found, the whole group of ideas connected with these concepts does not occur. The essential trait of the religious beliefs of these tribes is connected with the acquisition of guardian spirits. Each person is believed to have his guardian spirit, which is acquired by the performance of ceremonials. Only a few shamans are believed to have inherited their guardian spirits from their parents who have been particularly powerful. All animals and objects possessed of mysterious powers can become guardian spirits, whose powers are somewhat differentiated. Objects referring to death—such as graves, bones, teeth, and also natural phenomena, such as blue sky, east and west, and powerful animals—could become guardian spirits of shamans. Warriors had weapons and strong animals for their guardian spirits; hunters: the water, the tops of mountains, and the animals they hunted, or others that were themselves successful hunters. Fishermen had for their guardian spirits canoes, paddles and water animals; and gamblers: a variety of smaller animals, and also objects used for securing good luck or wealth. The frequent occurrence of guardian spirits that are only part of an animal—as a deer's nose, the left or right side of a thing, the head, the hand, the hair, or the tail of an animal—is remarkable.

The puberty ceremonials during which these guardian spirits were acquired were quite complex, and the ceremonies which boys had to perform depended upon their preferences. Those who desired to become great hunters had to practise hunting and shooting in a ceremonial way. Those who desired to be warriors prayed to the sun to give them their wish, and had to perform mimic battles. The would-be gambler danced, and played with gambling-sticks. One of the important rites connected with these ceremonies, as well as with all other ceremonies, was purification by means of the sweat-bath. In every village there were a number of small lodges, consisting of supple poles bent, and tied together in the middle, and covered over. These were used very frequently by the people.

The puberty ceremonials of girls were much more complicated than those of boys. Girls were forbidden to touch their bodies with their hands, and for this reason had scratchers and drinking tubes which they had to use through the whole ceremonial. They were isolated, and during the period of isolation they had to dig trenches, pick off leaves from fir branches, and make baskets and small mats—all symbolic of the work they had to do later in life, and intended to give them strength. Girls as well as boys made records of the offerings and ceremonies they had passed through by means of pictures painted with red paint on boulders. Generally the period of isolation of boys and of girls extended over several months.

Every living person, all animals, and even inanimate objects, are said to have souls. The Thompson Indians believe that each soul has a shadow which remains behind in this world, while the soul itself goes to the country of the ghosts, which is believed to be situated in the west, and which is guarded by a number of spirits that may turn back the soul of a person who has fainted, and who is not ready to die.

The mythology of the tribes of the interior centres around Coyote. The Thompson Indians, whose beliefs are best known to us, believe the earth to be square, the corners directed towards the points of the compass. The confluence of the Fraser and Thompson Rivers is believed to be the centre of the world, which is perfectly level in the centre, but very mountainous near the outer edge. It is surrounded by lakes over which hover clouds and mists.

Mountains and valleys were given their present form by a number of transformers who travelled over the world. The greatest of these was the Old Coyote, who, it was said, was sent by the "Old Man" to put the world in order. At the same time there were other transformers who travelled all over the world working miracles. It is said that Coyote finally disappeared, and retreated to his house of ice. The beings who inhabited the world during the mythological age, until the time of the transformers, were men with animal characteristics, gifted in magic. They were finally transformed into real animals. Most of the rocks and boulders of remarkable shape are considered as transformed men or animals of the mythological period.

The coyote legends of this area have the characteristics of the coyote cycle of the whole North American plateau district. The coyote is believed to be the ancestor of some of the tribes, and was the only person to survive the deluge. Most of the stories related of him deal with his greed and covetousness, and belong to the characteristic American trickster stories. One of the most famous of these tradi-

tions tells how Coyote coveted his son's wives, and induced his son to climb a tree. By lifting his eyelids, Coyote caused the tree to grow up to the sky. The son then reached the sky, where he found various things which he obtained for the future use of mankind. Finally the Spider let the young man down in a basket. He found his wives, and took revenge on his father. Other stories deal with Coyote's attempts to overcome animals and monsters. Although many of these end with the defeat of Coyote, in others he succeeds in ridding the country of the monsters which infested it.

Many other traditions deal with his visit to the sun, with the origin of fire, which is believed to have been obtained by the Beaver and the Eagle, and with the origin of certain peculiarities of animals. Several of this last class of stories deal entirely with animals, while most of the other legends of the tribe relate to adventures of men who meet with supernatural beings or with animals.

Cold winds are caused by the people who live far to the north, where earth and sky meet. Hot winds are made by another people, who live far south. Wars between these people, which exposed the earth to alternate spells of hot and cold winds, were ended by an intermarriage between them.

The thunder is believed to be a bird a little larger than a grouse. It shoots arrows, using its wings as a bow. Giants, dwarfs and other beings of mysterious power are believed in, and high mountains are considered with particular awe. Great mysterious power is believed to reside in the dawn of day, which is frequently prayed to.

The only communal festival of importance seems to have been a feast connected with dancing and praying, which lasted a whole day, and was repeated more or less regularly. The dancing ground was generally carefully prepared, and it would seem that the dance had some reference to a belief in the return of the souls. This appears more clearly among the tribes in the eastern part of the plateau, while the tribes in the region near the coast range either had lost the knowledge of the earlier significance of the dances, or have never had any definite idea in relation to the return of the dead connected with the ceremony. A characteristic feature of the dance in the western region was the custom of according to the young men and the young women the right of touching one another, thus symbolizing their desire to be married. The act of touching was considered a formal marriage.

The general consideration of the culture of this district suggests that in former times the culture was even more simple than it is now. A greater complexity has developed, partly owing to the influence of the coast tribes, and partly owing to dissemination of cultural elements belonging to the Plains Indians. The influence of these two areas is indicated, not only by the complex character of the mythology of the region, but also by many other traits.

Many of the coyote tales are almost identical with those told by the Plains Indians from the upper Mackenzie as far south as the lower Mississippi River, while the other transformer myths of the Salish tribes are analogous to the traditions of the coast Indians. Other indications of affiliation to eastern North America are the elaborate feather technique, the highly developed pictographic painting, and the peculiar angular decorative elements which are found particularly

in the decorative designs executed on hide. The influence of the coast Indians upon technique does not extend far to the east. It makes itself felt in the wood-work, particularly in the dug-outs of the western tribes, and in the high development of the fishing industry. Their influence upon the art of the people seems to have been very slight.

The most important trait in regard to which the culture of the plateaus differs from that farther to the east and from that of the coast is the great simplicity of social and religious life. There is practically no indication of the complex ritualistic symbolism of the Plains Indians, nor of the strict organization of the ritualistic brotherhoods and societies of the coast. The more complex forms that occur on the plateaus are clearly due to foreign influence. Thus the most highly developed forms of religious dance seem to have been found in the eastern plateau regions, while the influence of the social organization of the coast has made itself felt among the most western tribes of this area. Thus, the Lillooet, a Salish tribe in direct communication with the coast tribes, have gentes similar to those of the coast tribes; and analogous developments, even in a more marked degree, are found among the Athapascan tribes that are in contact with the Tsimshian Indians of Northern British Columbia.

It would seem that in the early history of this district the coast of Southern British Columbia partook of all the essential traits that are now characteristic of the plateaus; and both linguistic and archæological indications suggest that the Salish tribes which now inhabit the coast of the Gulf of Georgia separated from the Salish tribes of the interior at a time when both had the simple form of culture that seems to be characteristic of the whole plateau area and of the Mackenzie basin.*

10. THE SALISH TRIBES OF THE COAST AND LOWER FRASER DELTA.

By Chas. Hill-Tout.

In attempting in this necessarily brief paper to describe the lives and conditions of the westernmost of the Salish tribes of British Columbia I can only touch upon the more striking features of my subject, and this I propose to do under the threefold division of Social Organization and Customs; Religious Beliefs and Practices, and Material Culture.

*James Teit. The Thompson Indians of British Columbia. Publications as the Jesup North Pacific Expedition. Vol. I., pp. 163-390. Leiden, 1900.

Livingston Farrand. Basketry Designs of the Salish Indians. Ibid., pp. 391-399. Leiden, 1900.

James Teit. The Lillooet Indians, Ibid. Vol. II., pp. 193-300. Lieden, 1906.

James Teit. Traditions of the Thompson River Indians. Memoirs of the American Folk-Lore Society. Vol. VI. Boston, 1898.

Social Organization and Customs.

The social organization of the littoral Salish is found to differ materially from that of their congeners of the interior. The difference begins with the Lower Lillooet tribes and continues as we proceed down the Fraser until when we reach the Vancouver Island tribes, a condition of things is found to prevail as unlike that which characterizes the inland tribes as if no relationship existed or ever had existed between the two divisions.

From a social structure which in its simplicity and looseness borders closely upon pure anarchy we reach a comparatively complex social organization under which the commune is divided into a number of hard and fast classes or castes which exhibit at times a rigidity and inflexibility that in some features recall the social divisions of the natives of India.

Among the Lkúngen and neighbouring tribes there are three of these castes not counting that of the Slaves. First, there is what may be called the "royal" or "princely" caste composed of the ruling chiefs of the local communes and their families. These form a class apart from the rest of the people as inaccessible and exclusive as any of the Royal Houses of more sophisticated peoples. The chieftaincy which is elective among the interior tribes is here strictly hereditary, passing from fathers to sons in the same families as automatically as clock-work. This class is known under the distinctive name or title of *tcilángen-siám*.

Next to this came the *silee-siám* or caste of the hereditary nobility—men with family histories, as proud of their lineage and honourable descent as any Spanish or Castilian grandee.

Below these came the *kwutlqelingus* or common-folk, "people without grandfathers;" and beneath these again the slave class.

Between each of these classes or castes there was an absolutely impassable barrier as far as the Island Salish were concerned. Among the Delta tribes class exclusion was not apparently so rigid and inflexible as on the island; nor was the chieftaincy regarded, in theory at least, as hereditary, though practice was fast making it so here also, when we first came into contact with them.

The rigidity of the island classes and the jealous exclusiveness of the hereditary nobility is clearly brought out in a most interesting and significant manner, viz., by the upgrowth and existence among them of an intermediate class, a kind of *bourgeoisie*, called in the Lkúngen tongue *nitcnángit*, which name has exactly the same significance among these people as the term *parvenu* had under the old French regime. The *nitcnángit* were men who, by their ability or good luck, had acquired wealth, by means of which they had gained a certain social standing, but as they had no "grandfathers" no pedegrees of honourable descent, and no family or kin-crests, they could not be admitted among the hereditary nobles and so had to form a class intermediate between these and the common-folk.

The family pride and exclusiveness of the privileged classes was further illustrated in every social function which they held, and of these there were a goodly number, such as naming-feasts, marriage-feasts, mortuary-feasts, and the "potlatch," or gift-feasts. On

these occasions the chiefs put on lofty and condescending airs, conversed only with one another, and formed a group apart by themselves. The hereditary nobles, or men of pedegree, formed a second group, and the untitled or common-folk a third. The *nitcnángit*, or *nouveaux riches* held on these occasions a very equivocal position determined largely by the condescension of the nobles and the degree of respect accorded them by the people.

The Lkúngen method of receiving and placing their guests was absurdly like that in vogue in high social functions in Old World Society. Two or more of the older noblemen stood at the entrance of the Feast Chambers and received the visitors, enquiring their names or titles and those of their fathers and grandfathers and placing them accordinglv—rank being determined and marked by these as distinctly as among ourselves. Each social division or caste had its own list of names or titles so that a person had but to give his name or that of his father or grandfather to show his social position and standing in his tribe.

The name systems of the Salish, like those of other primitive peoples, are very interesting, and their study reveals some of the most curious phases of savage culture. The limits of this paper preclude a full consideration of these here, but a few remarks upon the name-feasts of the Coast Salish—a function which had an important place in their social life—may be offered.

These naming-feasts refer only, of course, to the customs of the upper classes, the chiefs and nobles, the common people could not afford such.

Titular names were bestowed upon their bearers only when they had reached and passed the age of puberty. To show the way in which this was generally done let us suppose a nobleman of standing has a son fifteen or sixteen years of age, on whom he desires to bestow one of the family names or titles. He first goes to the chief of his commune, informs him of his desire and secures his acquiescence and promise of assistance. A date is then fixed for the event and invitations are sent broadcast throughout the neighbouring tribes. On the day appointed for the ceremony great numbers of guests come in from the friendly villages round about, some also coming from distant settlements if the giver of the feast is well known and of distinguished rank. Preparations have been going on for days past to receive and entertain these visitors. Large quantities of food have been brought together by the host and his kinsfolk; the family treasure-chests have been opened and their contents set in order for distribution at the feast. When all is ready the father of the boy who is to receive the name, the boy himself, and his immediate sponsors, friends and kinsfolk all ascend the roof of their house—the pitch of the roofs always being low and convenient for the purpose—and from this vantage ground the proceedings take place. These vary a little from tribe to tribe and from district to district. Commonly the ceremony is opened by the father of the boy dancing one of his family dances—to dance meaning also to sing at the same time. This song dance is probably a more or less dramatic representation of some event, fancied or real, in the life or history of his ancestors, perhaps that which gave rise to the name he is going to bestow upon his son. When this is over a distribution of blankets—the measure of wealth of the coast tribes—is made to honour the names and spirits of his

family, it being held dishonorable to speak of or even mention an ancestral name publicly without making gifts. The father now calls about him some thirty or forty of the leading noblemen among his guests to act as sponsors or witnesses of the rank his son will acquire by the name he is about to receive. Two eldermen, or preferably two aged chiefs, who know his lineage and ancestry, now bring the youth forward and standing one on either side of him the elder of the two proclaims in a loud voice to the assembled audience that it is the wish and intention of the father of the youth to bestow upon him his paternal grandfather's name or title. At this the people express their assent and pleasure by clapping of hands and shouting.

The name is then given to the youth after which another distribution of blankets takes place, special care being taken to give at least one each to all the formal witnesses of the ceremony and to the officiating elders. If the father is wealthy he will throw other blankets among the common-folk to be scrambled for. When this part of the ceremony is over the feasting begins.

After the naming ceremony is over the youth is known by his newly-acquired name though, according to their customs, he is never called by it except on special and ceremonial occasions.

Among the Lkúngen and cognate tribes a man could not take his own father's name should his father die before he had received his titular name, the names of deceased persons being tabooed among them for a whole generation. Hence in the case just imagined the youth received and revived the name of his father's father. The ancestral names were thus handed down in these tribes.

The marriage customs among these tribes bring out in the same way the exclusiveness of the upper classes. Marriage in their rank was an exceedingly formal affair and hedged about with many precautions to prevent *mésalliance* and sullying of their blood. When a youth had arrived at a marriageable age his family cast about for a suitable bride for him. It goes without saying that she must be his equal in rank. Having selected a girl the father sends two or more old women of his family to sound the girl's parents and ascertain their willingness to the union. If they receive the offer in a friendly spirit he next sends two eldermen of his kin-group or crest whose office it is to set forth to the girl's family the rank, honors and standing of their young kinsman. Should these be satisfactory to the girl's people both parties then make preparation for the marriage.

We gather from all this how important these tribes regarded the marriage unions and how jealously they guarded their rank. There are many other interesting social features in the lives of the tribes under consideration which I have not touched upon at all; but to speak of them here would be to extend my paper beyond the limits accorded me. Those interested in a further study of the social organization of these tribes may consult the writer's ethnological reports on this division of the Salish in which all these features are dealt with in detail, each tribe being treated separately.

Religious Beliefs and Practices.

Closely connected with one side of the social life of these tribes was one of the most characteristic features of their religion. I refer to their totem or kin-group crests. Among the Delta and Coast

tribes a marked social phase of totemism has been developed, of a character such as is generally found among other totemic peoples. Although the kin-groups are not commonly called by animal or plant names, as most of them are among the Haida and Tlingit, they were nevertheless distinguished one from another by crests in the same way as the kin-groups of the northern tribes, each family of standing possessing its own crest or crests. These are more or less conventionalized representations, plastic or pictographic, of the ancestral totems of the family or kin-group, commonly thought to have come down from the founder of the family or group. These totems are looked upon as spirit guardians of the household, representations or symbols of them being carved or painted on some portion of the family dwelling, usually upon the supporting pillars of the roof, and among the Island tribes they largely take the place of the individual totems or guardian spirits of the Interior Salish—the personal totem among these tribes having given place almost entirely under their changed social conditions to the family or kin-group totem.

Belief in protecting spirits constitutes the chief feature of the religion of the Salish. Such beliefs were not confined to this stock; they were held in one form or another by practically all the aboriginal tribes of the New World when we first came in contact with them. It has its source, of course, in those animistic, anthropomorphic conceptions common to primitive man the world over. The Salish in common with other tribes in the same plane of culture as themselves, peopled their environment with mysterious beings and sentient agencies of beneficent and maleficent character, mostly of the latter. The land, water and air teem with mysteries; they are surrounded on all sides with capricious beings that have power to harm or destroy them. They are at any moment of their lives liable to come under the influence of these—to be made their victims or prey; consequentlv they felt a vital need of some protecting, guiding influence in their lives; and hence arose their practice of seeking and acquiring tutelar spirits.

The general method of acquiring these guardian spirits was by means of dreams and visions. These were not the ordinary dream or vision but others of a mystic order, which came to the novice or person seeking the spirits, only after long and special preparation. The seeker goes apart by himself into the forest or mountains in some solitary spot close to a lake or some other body of water, and imposes upon himself a rigorous course of training, which is called *kwakwaiyisit* by the Delta and some of the Island tribes and by other names in other divisions. This training consists of prolonged fasts, frequent bathings, forced vomitings and other exhausting bodily exercises. With the body thus enervated the mind becomes abnormally active and expectant and dreams and visions and hallucinations are as natural to the novice in such a state as breathing; and we can readily understand how real must seem to him the visions of his looked-for spirit helper.

Whatever object appears to him on these occasions, or rather what he conceives to be the spirit of the object, becomes his totem or tutelary spirit. It may be anything almost in nature—plant, bird, beast, fish, a tool, weapon or any other inanimate object, or natural phenomena. As, under the view he takes, everything in nature is possessed of a spirit and has mystery power, the spirit of a stick or

stone can protect and lend him aid as well as the spirit of living things. Usually, however, he recognizes some kind of hierarchical order among these ghostly helpers. Some things or objects were more "powerful" to aid than others, and some aided along special lines in one direction and others in another. Some conferred great hunting powers others great running or fighting powers. Others again assisted the "medicine" men in their cures. If therefore the seeker after mystery powers was not satisfied with the first "spirit" that came to him, or rather with the powers it bestowed, he would enter upon a second course of training and await the coming or vision of a second helper, or even of a third or a fourth, spending years perhaps in his seeking.

Between the individual and his protecting spirit or spirits a very close and mysterious relationship is supposed to exist. He does not pray to his totem in the sense in which we used this word, but expects and looks for its aid and protection when needed. The totem is supposed to warn him by dreams and visions of impending danger and to assist him in difficult undertakings, and indeed in all the issues of his life.

Outside of this belief in tutelary spirits there was no conception among the Delta or Coast Salish of a Supreme overruling Being who ordered and regulated the universe. It is true they did in a kind of way look to a being who was thought to have taught their first ancestors such knowledge as they possessed, and who by his magic, wonder-working powers procured for them their fish and game and roots; but this being was a very mythical creature, having none of the attributes of a god about him; their stories concerning him and his life and doings when he was among them show him to have been half human, half bestial. Indeed, all the beings that peopled their world in its infancy were of this nature, possessing the same dual characters and assuming at will that of man or beast. Many of the Indians believe themselves to be descended from these mythical creatures and claim in consequence power over the *animal* descendents of them to-day whom they look upon as related to themselves. Thus the people of the Mountain-goat or Sturgeon ancestry believe they can secure animals of these species more readily than other people can, because of the supposed relationship existing between them; and they had esoteric formulas and ceremonies which they employed when they wished to capture them and which were thought to cause the fish or animals to yield themselves readily to their human kinsmen.

In these religious ideas of the Salish there is nothing that might be regarded as of an ethical or moral character. Yet it must not be supposed they were without morality or rules of conduct. Before contact with ourselves no people could be more moral and decent in their lives and actions. But their morality was of a social, practical kind, having no religious sanction whatever. Customary law and public opinion are the source and guides of conduct among primitive people like the Salish, as indeed they are to a larger extent, than would perhaps be generally admitted among ourselves. No religious or moral obligation could be more binding or more effective in regulating sexual and other social relations than that imposed upon the Salish by their customary laws and the public opinion of the commune, and though none of these laws were conceived as god-

given they were none the less binding upon them on that account. Custom founded upon the wisdom and experience of their forefathers had established certain lines of conduct, and the sense of the community as expressed by public opinion, saw that these were observed. For example, chastity in both sexes, but, of course, particularly in that of the female, had been found to be conducive to good order and social well-being, and was demanded; and a lapse from virtue in either sex, married or unmarried, was regarded as a deep shame and lasting disgrace to the persons involved and all their kindred. So keenly was social disgrace of this kind felt among the Salish that it not infrequently led to self-destruction, particularly among girls. We have many of their folk-tales in which incidents of this kind occur. It is indeed in their traditional lore that we get our best insight into the character and lives of those tribes before the disrupting, unbalancing influences of our civilization made themselves felt among them. The view we gather of their lives and conduct from these sources makes one, indeed, almost wonder whether the restraints upon conduct imposed by the authority of religion are any stronger or more effective in a community than those having their sanction in public opinion only; and certainly those who look with dread at what they think is the subversion of the authority upon which our moral or religious laws and restraints are grounded, and expect nothing but social anarchy, disorder, shameless immortality and all other imaginable evils to shortly come upon us, may take heart from the picture which the Salish folk-tales reveal to us of the life and condition of these pagans before we attempted to impose upon them our superior Christian civilization, the blessings of which they very ungratefully do not properly appreciate.

In common with other primitive peoples the Salish had an unquestioning belief in the imperishability of the soul or spirit—of a life hereafter; but their views of this after-existence are like some of our own, not always clear or well-defined.

They also believed fervently in ghosts, particularly those of recently-deceased persons. They believed also that some of their wise men or shamans could restore the soul to the body and bring the seeming dead to life. Many forms of sickness, fainting spells and swoonings in particular, they attributed to the straying away or withdrawing by magic means, of the soul or spirit from the body; and certain of the shamans were held to be skilled in going after and bringing back these missing spirits, and hence the power and influence of these men in the community.

These shamans or "medicine" men believed in their own powers just as sincerely as their more sophisticated brothers do in theirs, and thought their sometime cures were effected by the might and magic of their protectors. So did the patients; for according to the measure of their faith in the power of the medicine man, so was their cure in all cases where the mind was able to influence the body. Nowhere are there such wonderful "faith-cures" as among primitive races, only they are not here called by such names nor recognized as such. The medicine-man gets all the credit and all the glory; but then as a set-off to this he was held responsible for all failures to cure, and if his patient died under his hands he had to pay to the relatives of the deceased person a heavy death fine, so things were after all pretty fairly balanced between doctor and patient among them.

The more one studies the old-time Salish the more one in constrained to admire the wisdom displayed in the ordinances which regulated their lives and actions. They appear to have been an eminently practical people, and to have found satisfactory solutions to many of the problems of existence more advanced races are still much exercised in mind upon.

Material Culture.

Under this division we will discuss as far as our space permits the habitations, food and dress of the Delta and Coast Salish.

Habitations.

The main or permanent dwellings of these tribes differed radically from those of their brothers of the Interior. In nothing does the difference in the physical sorroundings of the two divisions manifest itself more clearly than in their habitations.

The typical coast structure was the communal long-house; and some of these dwellings were truly and literally *long* houses, stretching under one roof in unbroken continuity for six, seven, eight and even nine and ten hundred feet. Houses of from four to six hundred feet were quite ordinary structures. Simon Fraser records seeing one in his trip down the river which afterwards bore his name, that extended for upwards of six hundred feet and had a width of sixty feet.

These houses were generally of the half-gable, single-slope style; and as their fronts or face-walls were only a few feet higher than their back walls, their common great width made the roofs very shallow indeed in their pitch. But such disadvantage as this might entail upon them by occasional leaks was more than compensated for by their use as platforms, for which purpose, as I have already indicated, they were customarily used on all festive and ceremonial occasions.

The frame work of these houses consisted of two rows of massive pillars which ran from end to end of the structure on either side, each pair of pillars being from fifty to sixty feet apart in a typical dwelling. On these pillars long stout beams rested in notches cut for the purpose, and upon these again the supporting poles of the roof which was formed of thick cedar slabs laid one upon another after the manner of tiles. Upon one of the faces of the main pillars figures in high relief were customarily carved. These represented the family or kin-group totems,—the presiding, protecting spirits of the household.

The walls of these structures were always built separately from the main frame work, which was intended to support the roof only, and were made of cedar planks or slabs, the same as those forming the roof laid horizontally between sets or rows of double sticks, between which they were fastened by cedar withes. The planks were built up from the ground, the lower edge of each being made to overlap the one beneath it for an inch or two to keep out the wind and rain. There were no windows or chimneys in these dwellings, temporary smoke holes being made in the roof by pulling down or thrusting aside a plank or two. Light had access in the same way. Within the structure low, broad platforms were built all round the walls. These formed the lounges or resting places of the inmates by day and

their couches or sleeping places by night. Their beds consisted of several layers of long reed mats, one end of which was rolled up to form a pillow or head rest. Blankets woven from a mixture of dog and mountain-goat hair and bird's feathers and skins of their larger game animals formed their bed clothes.

Beneath these bed platforms some of the tribes stored away their winter supply of roots, others their fire wood. Overhead suspended from the rafters were hanging-shelves, on which they placed away their store of dried fish, meat and fruit.

The inner walls of these dwellings were lined during cold weather with swamp grass mats, and hangings of the same material divided the interior of the building into a number of separate compartments or sections, each of which corresponded to the space between the main pillars, making an area usually of about fifty or sixty feet. The compartments of the chiefs were sometimes half as long again as the others. These were usually situated in or about the middle of the building. Next on either side came the compartments of the nobles, the common folk occupying the sections nearest the ends of the house.

The position of the doors varied somewhat with the locality. Sometimes these were placed in the ends near the lower or back wall, sometimes at intervals where the dwelling was a long one, in the front wall, at others in both front and back walls, a boarded passage-way running right through the building.

During the great dance season or *Smēltás*, which lasts from one to two moons, corresponding to portions of our months of December and January, the hanging mats which divided the interior of the dwellings, were taken down and the whole space thrown into one large, common hall. It was because of these annual social events that the partitions were of the temporary character described. For among the upper Delta tribes who did not observe the *Smēltás* or winter dancing season, the partitions were always of a permanent kind. Here they were made of boards which divided the long-house into a number of double compartments, each of which was subdivided again into two separate ones by the passage way I spoke of just now as existing in some buildings, entrance to the living room being made from the centre of these. Usually each compartment was shared which were closely related to one another and between whom no marriage or sexual intercourse was allowable.

The household utensils consisted usually of an assortment of basketware, wooden, trough-like dishes of various sizes, wooden and horn and shell spoons, reed serving mats and plaques of basketry, cooking-stones, tongs for handling them, and the family treasure-chests. A well-to-do family would have several of these latter and the wealthier chiefs would own perhaps a score or more. These chests were most ingeniously made from three pieces of cedar, the cover bottom and sides being each formed of one piece. They are rectangular in shape, the board forming the sides being so cut on its inner face at three of the angles, as to enable it to fold without cracking or breaking, the fourth angle being formed by the juncture of the two ends which are evenly mitred and sewn together from the inside. The bottom is a shallow tray fastened by stitching to the inside of

the box, and fitting so evenly that the box will hold water without leaking. The top is a similar tray which overlaps the edges of the sides. In these receptacles are stored away the family treasures which consist mainly of blankets and their ceremonial costumes and ornaments.

Food.

The food of the Delta and Coastal Salish consisted mainly of fish, in which the salmon figured largely, this fish taking much the same place among these tribes, particularly those of the Delta, as rice does among the orientals or bread among ourselves. It was the staple of their larders and was eaten in one form or another the whole year round. The Island Salish, and those of the mainland who had settlements actually on the coast waters, made use of many other fish and marine products as well, such as the seal, porpoise, sea-lion and whale. In addition to their fish diet they eat the flesh of most of the animals and birds of their habitat, of which deer and mountain-goat, ducks and geese were the most important. They also gathered and ate many kinds of wild berries and bulbous roots, particularly those of the lily kind of which they had several varieties. These latter they cooked by steaming or baking in ovens made in the ground. The fruit they eat either in its fresh, raw state or dried like the currants of commerce, or made into compressed cakes or into thin sheets of sun-dried "jam."

They cooked their food by baking, roasting or boiling. The baking was done in ovens or holes made in the ground heated with hot stones or by fires. The roasting was accomplished in different ways, before or over open fires, and the boiling by means of heated stones which were cast into their wooden or woven pots or kettles. The food was commonly served in dishes if of a liquid nature, if solid on mats or plaques.

All the tribes dried large quantities of salmon and stored them away for winter use. They also extracted oil from the salmon, dog-fish, "candle-fish," and several other kinds, but particularly from the salmon. This they also stored away in bottle-like receptacles of various kinds. Some were made from the whole skins of salmon, others from the hollow, bulbous, bottle-shaped stems of a species of kelp or sea-weed, and others again from the sounds or air-bladders of fish, or the larger intestines of animals.

Dress.

The clothing of the Delta and Coastal Salish was commonly of a scantier nature than that of the Interior tribes. In summer the men customarily went naked save for a loin-cloth. Most possessed a blanket of dog and goat hair or a cloak of dressed deer skin, but these were not ordinarily worn, being reserved for cold weather only, or for formal ceremonial occasions. Some of the nobility and all the chiefs possessed deer or elk hide tunics and long heavily-fringed leggings, but these articles of clothing belonged rather to the style of dress of the Interior Salish than to those of the Coast.

The women went more modestly attired, though their persons were not so tastefully nor so scrupulously covered as those of their sisters of the Interior. The ordinary female dress of the wives and

daughters of noblemen was a long shroud-like garment made of tanned doe-skin. This was commonly decorated about the breast with shell work and the side and arm seams were profusely covered with fringes. To this they added at times short leggings like the men's and coarse hats made of the same material as the best water-tight basketry.

Women of the poorer class and Slaves wore skirts of woven cedar bark and sometimes short shoulder coverings or ponchos of the same material, or others made from the untanned skins of small animals such as squirrels and chipmunks.

The upper Delta tribes wore more clothing habitually than the Coast people, and made it in a more careful and tasteful manner, copying in this respect the beautifully made garments of the inland tribes. The materials they employed were the usual dog and goat hair, skins of various kinds and the soft inner bark of the cedar (*Thuya gigantea*). The dogs from which this hair was taken were a special native breed, possessing a fleecy coat of a texture resembling sheep's wool.*

11. THE TRIBES OF THE NORTH PACIFIC COAST.

By Franz Boas.

The North Pacific coast is inhabited by quite a number of distinct tribes, whose culture, however, is fairly uniform. According to the degree of typical development we may distinguish three groups of tribes: the northern group, embracing the Tlingit, the Haida, and the Tsimshian; the central group embracing the Kwakiutl tribes and the Bella Coola, and the southern group embracing the Coast Salish and the Nootka. Among the last group the characteristic traits of North Pacific coast culture are weakest, while in the first group they are most strongly developed.

Economically, the people of this region are fishermen, who subsist partly on the salmon that ascend the rivers of the coast in great numbers; partly on deep-sea fishery, which is prosecuted on the cod-fish and halibut banks off the coast. At the same time, seals and sea-lions are hunted. Whales that drift ashore are used, and the

*F. Boas. The Lku'ñgen. Report of the 60th meeting of the British Association for the Advancement of Science, 1890, pp. 563-582, and

F. Boas. The Indian Tribes of Lower Fraser River. Ibid. 64th meeting 1894, pp. 453-463.

F. Boas. Indianische Sagen von der Nord-Pacifischen Küste Amerikas. Berlin, 1895, pp. 18-97.

C. Hill-Tout. Notes on the Skqomic. Report of the 70th meeting of the British Association for the Advancement of Science, 1900, pp. 472-495.

C. Hill-Tout. Ethnological Studies of the Mainland Halkomē'lem. Ibid., 72nd meeting, pp. 3-18, 48-63.

C. Hill-Tout. Ethnological report on the Stsee'lis and Skau'lits. Journal Anthropological Inst., Vol. XXXIV., 1904, pp. 311-376.

C. Hill-Tout. Report on the Ethnology of the Si'ciatl. Ibid., Vol. XXXIV., 1904, pp. 20-58.

Nootka carry on actual pursuit of the whale. Those tribes that live near the fjords of the mainland are also energetic hunters, and they pursue particularly the mountain-goat, but also the bear and the deer. Vegetable diet is not by any means unimportant. Large quantities of berries are picked in summer and preserved for winter use. The sap of the hemlock and some species of kelp are treated in the same way. The oulachen is sought for eagerly and the principal oulachen rivers are visited by all the neighboring tribes. This fish is caught particularly on account of its oil, which is tried out and kept in large bottles made of the stems of the giant kelp. Fish and clams are dried in a great variety of ways, and are used as a staple food throughout the year.

The industries of the Indians are based to a great extent on the occurrence of the yellow and red cedar. The wood of the red cedar, which is easily split, is worked into planks, which serve for building houses and which are utilized in a great variety of ways by the native wood worker. The bark of the red cedar is also used extensively for making matting, baskets, and certain parts of clothing. Strong ropes are made of twigs of the cedar, while other ropes are made of twisted cedar bark. Blankets are woven of the inner bark of the yellow cedar, which is shredded and softened by careful beating and then woven by a simple method of twining. It may be said that the salmon and cedar are the foundations of northwest coast culture.

Part of the year the Indians live in permanent villages. These villages consist of large wooden houses built of cedar planks and arranged in a row facing the sea. A street is levelled in front of the houses, and the canoes are placed on runways on the beach in front of the village. In olden times the houses of the northern tribes were of moderate size, probably about 30 feet square. An excavation several feet deep was made, which formed the floor of the house. In front and in the rear two pairs of heavy posts were erected, which supported a central beam. Other posts were placed at the corners of the house. and these supported beams parallel to the central beam. Over these three beams the roof was placed, and the sides of the houses were walled in by means of heavy split planks, placed horizontally and either tied between pairs of supporting poles, one inside, one outside or fitted neatly into the posts that formed the corners of the house.

A fire was kept in the centre of the house, and over it an opening was made in the roof, which served as a smoke-hole. In the daytime, people lived on the floor of the house, while the beds were arranged on a platform that ran all around the walls. Provisions were also kept partly on this platform, partly on lofts, which were suspended from the beams and rafters. According to tradition, there were some houses that had more than one platform, and in which the excavation of the floor was quite deep. In some regions the whole house was supported on poles of moderate height.

The building of a house of this type required considerable skill in woodwork. In former times the Indians felled large trees by means of stone chisels, stone axes, and fires, but the planks used for house-building were usually split off from a live tree by cutting deep notches into the trunk at appropriate distances and then splitting off pieces from the tree by means of large wedges, which, in the north-

ern part of the coast, were driven with long handled stone mauls, while in the southern part of the coast, hand-hammers were used. After the planks had been split off, they were smoothed by means of stone or bone adzes. For very fine work, the process of smoothing was continued until the surface of the plank had reached a high degree of finish. The planks and boards were finally polished off with grit stones and dogfish skin. The art of making household utensils from thin planks of this kind had reached a high degree of perfection. The method pursued was that of kerfing the planks and of bending, after having subjected the wood to a steam bath. In this manner the sides of boxes and buckets were made. These were fastened to a wooden bottom, either by means of pegs or by sewing with twisted cedar twigs. The joints were caulked, and in this manner water-tight boxes were secured. These were used not only for storing provisions, blankets, etc., but also for cooking food, the box being filled with water, which was then heated by means of red-hot stones.

Other household utensils were made of large blocks of wood, which were hollowed out by means of chisel and ax, and which were finished with the carving knife, which had a crooked blade and a handle, well fitting the hand. One of the best products of the woodwork of the natives of this region is the dug-out canoe, which is made of cedar, hollowed out and worked down to an even thickness. After the cedar has been hollowed out, it is steamed and then spread and thus large canoes are made of graceful form and capable of withstanding a heavy sea.

As compared to the woodwork, the basketry of the tribes is very simple. The bulk of the basketry of the more southern tribes consists of woven or twilled matting, made of wide strips of cedar bark, while in the northern regions twined spruceroot basketry prevails. Among the Tlingit, spruceroot basketry takes to a great extent the place of the small boxes which are common on the southern part of the coast. Baskets are largely used for storage of provisions, for keeping blankets, as covers of boxes, for holding spoons, and for berrying.

For fishing, hooks, harpoons, and fish traps are used. A great variety of forms of fish traps are found, in which large quantities of salmon are secured during the summer months. Traps are also used for securing land game. Small fur-bearing animals, as well as larger game, such as bears and deer, are trapped in this manner.

The bow is of simple construction. It is made of a single piece of yew wood, with slightly curved back, flat belly and narrow, round grip. It is carried in a wooden quiver. Arrows with detachable head are used for hunting sea-otter, while land game was hunted with arrows with bone points.

It would seem that in olden times, practically all along this coast, the art of stone chipping was not in use while rubbed slate points and pecked and battered stone hammers and stone mortars were common.

While the men procure all the animal food, except shellfish, the women gather berries and dig roots and shellfish. In some regions of the coast, clover is treated with particular care; although it is not actually planted, clover patches are cleared and surrounded by

fences to indicate the limit of garden patches. On Queen Charlotte Island tobacco was raised in olden times in gardens cleared near the villages.

Household utensils, canoes, and practically all objects utilized by the natives are elaborately decorated. This is true particularly of their woodwork. The style of decoration is very characteristic. It consists entirely of the application of animal motives, each design generally consisting of a combination of various parts of an animal's body. The animal forms, although highly coventionalized, are easily recognized, The style of conventionalization consists in an extended use of curved lines and a tendency to arrange, wherever possible, oval fields, which may be decorated with a group of concentric or almost concentric elliptical or rounded designs. These peculiar designs resemble eyes, and the north-west coast art may be said to be characterized by the prevalence of the eye motive. The eye is used with great frequency to indicate the joints of the body, the original idea being evidently a representation of the ball-and-socket joint, the curved outline of the figure representing the socket, the inner field the ball. In general the artist endeavors to represent the whole animal on the decorative field. In doing so, he is at liberty to distort and dissect the animal figure, so as to fit the whole as nearly as possible into the decorative field. Very frequently this is accomplished by splitting the animal in two and by representing the two halves as spread out; but many other processes are used. These designs are done both in carving and painting. The colors applied are principally black and red, although green and blue also occur. The animals used for ornamentation are almost throughout those which play an important part in the mythology and in the beliefs connected with the social organization of the tribe. It is remarkable that geometrical designs are practically absent. In the southern regions, where the decoration of basketry is almost absent, geometrical designs are also absent. The only region where a highly developed geometrical decorative art accompanies the more realistic art before described, is found in southern Alaska, where elaborate decoration of spruce-root basketry occurs. It seems, however, probable that this art has been introduced through contact of the coast tribes with the tribes of the interior. The decoration resembles the porcupine quill designs of Athapascan tribes, and is executed in basketry by a peculiar method of "false embroidery." In the most southern part of the region in discussion, geometrical basketry designs are also found, particularly among the southern tribes of the Nootka. These are clearly related to the geometrical designs of the basketry of the coast of Washington.

The social organization of the North West coast tribes is very complex and remarkable differences are found among various tribes. Of the northern tribes, the Tlingit and Haida are divided into two exogamic halves, some of which bear the names of animals, and in which descent is in the female line. The two groups among the Tlingit are characterized by the Raven and Wolf, among the Haida, Eagle and Raven. The members of each of these groups have the privilege of using designs representing certain animals as their crests, and in many cases they claim a supernatural relationship to these animals. To a limited extent, the animals may therefore be

said to be the totems of these groups. It is, however, important to know that not always the principal crest animal and the animal from which the group takes its name are the same. Thus, the Raven clan of the Haida has as its principal crest the killerwhale, and in the Eagle clan of the Haida, the beaver is as important a crest as the eagle. Furthermore, not all the members of each group have the same crest, but there are a considerable number of sub-groups, each of which has a number of crest animals of its own. In a great many cases the acquisition of these crest animals can be traced by historical traditions, and we know that in some cases, crests have been obtained by gift from friends among foreign tribes. Often its acquisition is explained by a myth which belongs only to one of the subdivisions of the larger groups. It is therefore evident that in this case the animal name of the group and the crest of the subdivision of the group are not equivalent.

The sub-groups among the Haida and Tlingit are throughout local in character. They were evidently, at one time, village communities consisting of blood relatives, that is to say, of a number of people related by maternal descent. This group of people had their own local traditions, which in almost every case has the form of a crest tradition.

Although the village was the property of a subdivision of one group, necessarily a considerable number of individuals of the opposite group must have lived in the same village as husbands or wives, as the case may have been. It is probable that in this way the present conditions originated, the recent villages consisting of a number of sub-divisions inhabited by different branches of the two groups.

The social organization of the Tsimshian is not unlike that of the Haida and Tlingit, the only difference being that in this case four exogamic groups are found. Of these, two are named from animals, the wolf and the eagle, while the two others, which have the Raven and the Bear for their crest or totem, have names that are not derived from the names of these animals. Conditions among the Tsimshian are somewhat more complex than among the Tlingit on account of the existence of the greater number of groups. It seems, however, fairly evident that the same kind of local subdivision of the four clans exists which is found among the more northern tribes.

A very curious social organization is found among the Kwakiutl tribes. Among the Tsimshian there is a definite maternal organization, but the tendency toward maternal organization decreases as we proceed from the north to the south. The northern Kwakiutl tribes have a number of exogamic groups which take their names from animals, such as the raven, wolf and killerwhale, and descent is preferably reckoned in the maternal line, but not with such rigidity as is found among the more northern tribes. In certain cases children are free to be counted as members of the father's group. Among the Kwakiutl proper this freedom is even greater. A child belongs by blood to both his father's and his mother's family. By a peculiar arrangement, however, descent is so regulated that it proceeds in the maternal line. It is probable that the clan privileges of the northern tribes are responsible for this curious state of affairs. One of the essential property rights of each individual is his clan-legend and the use of his crest. According to the Kwakiutl custom,

the property right in these objects is held by the men of the tribe. It is, however, not transmitted as a permanent inheritance to the sons, but it is always acquired in marriage. Thus, if a certain man has the right to use the raven as his crest, he will give this crest to his son-in-law about the time when a child is born to the young man. In this way, the son-in-law practically holds the crest in trust for his wife's daughter, because when he in turn is to give up the use of the crest he must deliver it to his daughter's husband, who again holds it in trust for his future daughter. It is clear that in this manner a purely maternal descent is secured. Among the Kwakiutl tribes which follow these customs there is no limited number of exogamic groups as are found among the more northern tribes. Instead we find in each village a considerable number of families represented in the same way as are found in northern villages. It seems probable that here also the different families in each village were originally separate village communities, which, owing to historical fates, came to live in the same village, or which in other places split up and are now represented in different villages.

According to the group system of the northern tribes, each family of the village community must be necessarily exogamic. The custom among the Kwakiutl is not definitely settled, some of the families preferring marriages outside the group, while others prefer marriages in the group. On the whole, marriages outside of the group are more frequent on account of the eagerness of individuals to secure the privilege of using new and important crests.

The further south we go the less important becomes the crest, which among the Coast Salish and Nootka exists only in traces, as compared to its extended use in the north.

The Bella Coola of the central part of British Columbia, who are neighbors of the northern Kwakiutl tribes, and under whose influence their culture has developed, have also adopted the crest system. The village community is here also the social unit, and each village has its own crest. Here, however, the jealousy with which the property rights in the crests are guarded is so great that at least among chiefs' families exogamy is strictly forbidden.

This diversity of types of social organization on the Pacific coast is remarkable. There seems to be very little doubt that the group system of the Tlingit and Haida has exerted a very strong influence over their immediate neighbors. Thus we find that not only the northern Kwakiutl tribes have adopted the group system, but we find the same among the Athapascan tribes adjoining the Tlingit, and also among those adjoining the Tsimshian. Since the two-fold division of a whole tribe into exogamic group is a phenomenon of very wide occurrence, it is fruitless to speculate on its origin in this special case, but it is worth while to point out that Dr. Swanton in his investigations on the Haida was led to the conclusion that possibly the Eagle group may represent a foreign element in the tribe. However this may be, it is fairly clear that the crest system, which has developed on the north Pacific coast is not necessarily connected with this peculiar division of the tribe.

It may be pointed out that the crest system has an intimate relation to the artistic development among the coast tribes as well as to their mythological ideas, and that the religious importance of the

crest is in most cases very slight among the northern tribes. The Raven, which appears as a group name, is identified with the mythological raven, which will be discussed later. The killerwhale, which also appears as a crest, plays an important part in the religious beliefs of the tribe. On the other hand, the eagle, beaver, and grisly bear, which are important crests common to a great many families have no particular religious significance.

In later times, the idea of the occurrence of crests has exerted a powerful influence over the development of the semi-realistic art of the northwest coast. Almost all the subjects of artistic representation are selected from among the crests, and it would seem plausible that if the crest idea had not existed, the exuberance of artistic form would also not have developed. It is, however, worth while to bear in mind the question whether the artistic skill may not have added materially to the development of the crest idea. The simple fact that a person used to a great extent objects decorated with representations of a certain animal, may have fostered the tendency of using such an animal as a crest. That this has occurred is indicated by historical and semi-historical traditions, which state that a certain design, or object bearing a certain design was given to a person either by a friend or by a supernatural being, and that henceforth the object became his crest. These traditions may be compared to the reports of the origin of decorative designs so common in North America, in which it is stated that the design was received in a dream. Considering the weakness of the religious side of the crest, it seems to be very plausible that the art of the people has, to say the least, materially increased the total number of crests.

That an accretion of new crests has occurred, may be observed clearly among the southern tribes, which evidently had no crests in earlier times, and where we may observe to a certain extent the introduction of northern crests by intermarriage and imitation. I believe it can be shown by a study of the crest mythology of the Kwakiutl that their myths are quite recent and have developed at the same time with the development of artistic reproduction of these crests.

The religious significance of the crest shows great variations. It was stated before that the raven and killerwhale, both crests of the Haida, are the two most important supernatural beings of their mythology. There are a great many cases among the northern tribes in which the crest was acquired by an ancestor of the family in the same way as Indians of the plains acquire a manitou. It is told how a man went out into the wilderness and in the course of events, met a supernatural being or animal, which henceforth became his protector. The difference between the northwest coast traditions and those of the plains consists in the fact that the animal once acquired was transmitted by the ancestor to his sister's children. There is hardly a single case of traditions in which the family claims direct descent from the crest animal.

Among the southern tribes, the type of tradition is more varied. There are a considerable number of cases in which the myth claims that the ancestor of the family came down from heaven, wearing the dress or mask of the animal, which later on became the crest of the family, so that each person wearing this crest impersonates the

family ancestor. While there are many cases of this kind, there are also a great many others in which the crest is explained to have been acquired by the encounter of an ancestor with an animal or supernatural being, which became his protector. In both these cases, the crest is used in the same manner. On the whole, it may be said that the mythological explanation of the use of the crest is by far more complete among the Kwakiutl than among the northern tribes. Nevertheless, I am strongly of the opinion that these mythological explanations are quite recent. The reason for my conviction is the uniformity in type of all traditions of this kind and the phenomenally great extent of borrowing that the evidence shows. It may be well to give an example of this. A characteristic belief of the Tlingit refers to the land-otters, which were said to take away drowned persons. A number of Alaskan traditions refer to adventures of men who were drowned and who were rescued by the land-otters. This belief is not characteristic of the southern parts of the coast, but it has been worked into a myth among the Kwakiutl, which explains the use of a certain mask among one family. The details of this tradition are identical with the details of an Alaskan tradition, and they must have been recently borrowed.

Wherever the crest is strongly developed, we also find an exuberance of artistic forms, particularly representations of crests on houses and graves. The crest is either painted or carved on the house-front; the beams and the posts of the house are carved so as to represent the crest animal, and large posts, called totem poles, representing a series of crest animals are erected in front of the houses. Grave-boxes, memorial posts and posts marking the graves are carved in the same manner. It seems likely that before the introduction of iron tools, these carvings were of more modest form than later on. According to the reports of the natives, in olden times these carvings were cut out on the face of heavy planks; animal figures being cut out either in relief or in the round.

Society on the north Pacific coast was divided into four classes, chiefs, nobility, common people and slaves. Among the southern tribes there is a marked tendency to count the rank of a person according to the position held by his father, not by his mother—another indication that paternal descent in this region preceded maternal descent.

The system of barter and exchange among the northwest coast Indians is quite highly developed. At the present time the unit of value is the blanket, and values are calculated by blankets. The assumed value of the blanket at the present time is 50 cents. Canoes may be counted as worth so many blankets, and other objects are valued in the same way. In olden times curried elk skin blankets, canoes, and slaves were used as standards of value. In their dealings among themselves, objects are valued according to these valuations and exchanged on this basis, but in many cases actual payment is made by means of blankets.

A vast credit system has grown up among all the tribes of the north Pacific coast. We may observe that originally this system was based on the custom of loaning out property before the assembled tribe as a means of having a public record of the transaction. Consequently, the payment of debts was also made in the same way. This seems to be the fundamental idea of the so-called potlatches. At the present time

the fundamental idea of the potlatch is that of a great festival, at which the host distributes his whole property among his friends. In a small potlatch he will give presents to the members of his own family, in a larger potlatch he will make presents to the other families inhabiting his own village. In this he is assisted by the wealthy members of his own family. In still larger potlatches the presents are given to neighboring tribes that have been invited, and the host is assisted by all the members of his own tribe. In all these cases the presents are given to individuals as members of certain families and tribes. Through a potlatch of this kind high distinction is attained by the host, in accordance to the amount of property given away and the number of tribes invited. In principle, however, this distribution is partly a payment of debts, partly an investment of property, which at a later time will be returned with 100 per cent. interest by the recipients. Since the property has to be returned not to the host individually, but to him as representative of the position he holds in his family and in his tribe, this distribution is at the same time an investment for his successors, or, as might be said, it may become the life insurance for his children. Owing to this system of potlatches and the system of credits it involves, the total amount of property claimed by each individual among these tribes is ever so much greater than the blanket currency and other property in existence among all the tribes combined, and as a result currency blankets often change hands with remarkable rapidity. It may be partly due to the needs of this system that certain symbolic objects have attained fanciful values. This is particularly true of the peculiar copper plates which are used among these tribes, and some of which are valued at fabulous prices. Even now there are copper plates among the Kwakiutl that are valued at 7,000 blankets, although their actual value is nil. They may be compared to a certain extent to bank notes which represent property otherwise invested.

Connected with this complex system of values and of credits is also the occurrence of symbolic property which is given as a dower. This also is most strongly developed among the Kwakiutl. The property consists of bracelets tied together to sticks, each stick representing a certain value. Small imitations of copper plates about one inch in length are used in the same manner. The young woman also receives a large number of old box covers, of a type which has gone out of use entirely, but each of which symbolizes a box and its contents. Thus, hundreds of box-covers and hundreds of small coppers and of sticks of bracelets may be given away, which have only symbolic value, which, however, may be used as coin in exchange for objects of value.

The potlatch is celebrated on every occasion of importance to the family, such as, at the time of initiation of a young man, at the time of promotion in rank, the erection of a house, and at marriage ceremonies. The system has spread, in less pronounced form, to the Eskimo tribes of Alaska, southward as far as the Columbia River, and also to the Salish and Athapascan tribes bordering on the coast region.

All along the north west coast is found a ritualistic organization which intercrosses the family organization in a most curious manner.

This organization seems to be most marked among the Kwakiutl Indians, and I will describe the conditions found among them.

Besides the crests, which are owned by each individual, he has also the privilege, which is inherited, together with the crests, of being initiated by a supernatural being. The method of initiation is the same as that of the eastern Indian, who finds supernatural power after fasting. The difference between the acquisition of supernatural power among the eastern Indians and that believed in by the Kwakiutl is that among the former the relation between the individual and the supernatural power is purely personal, while among the latter it is a family affair, each family having the right to be initiated by a certain supernatural being. The relation between this idea and the property in crests is also characteristic. They descend in the same manner, but, while the crest is inherited without any particular ritualistic performance giving the individual the right to the crest, the protection of the supernatural being must be acquired in each individual case by an initiation. There is an important difference between the traditions relating to the acquisition of crests and those which relate to the gift of magic powers by a supernatural being. While the ancestor acquired the crest for the whole family, he only acquired the privilege for his descendants to communicate with the same supernatural being.

The supernatural beings who are the protectors of families are, comparatively speaking, few in number, and for this reason a considerable number of families have the same supernatural being as their protector. Notwithstanding this fact, the method of initiation is different for each family, the method being determined by the legend which accounts for the acquisition of the supernatural being as the family protector.

All the individuals in the tribe who have the same supernatural being as their protector are grouped together during the ritualistic performance in one group, which takes the place of the family organization that prevails during the rest of the year. Among all the northwest coast tribes these ritualistic performances are confined to the winter months, and the season is set off from the rest of the year as the sacred season. Since all the families participate in the rituals celebrated during the sacred season, the whole family organization is broken up during this period. The individuals initiated by supernatural beings form one group in the tribe. They are treated with particular regard and take the place of the high nobility. The uninitiated, on the other hand, take the position of the common people. The uninitiated, in turn, are also subdivided into a number of groups, not according to the families to which they belong, but according to their prospective position among the initiated. Thus, young children, who will probably not belong to the initiated for a considerable time to come, form a group by themselves. The young men, older men, and those who in former times belonged to the initiated, and who have given up their membership in favor of their sons-in-law, each form a class by themselves. Thus, we find the whole tribe, instead of being arranged in families, arranged in two large groups, the uninitiated and the initiated. The uninitiated are subdivided into age classes, while the initiated are grouped according to the spirits by which each group is initiated.

The most important among these are the Cannibal spirit, the Ghost, the Grisly Bear, and the Fool Spirit.

All the legends explaining the practices of these sacred societies relate some event telling how a member of the family was carried away by one of these spirits; how he saw the spirit's house, and the ritual,

and how later on he was taken back, and imitated what he had seen. This, which is the characteristic explanation of practically all Indian rituals of North America is, of course, merely a re-statement of the practices that are used at the present time. The reasons assigned for the various practices, the most important among which is ritualistic cannibalism, show material differences, not only among different tribes, but even inside of the same tribe. Thus, the principal myth explaining cannibalism relates to the visit of four brothers to the house of the cannibal spirit, who threatened to devour them. By a stratagem the young men made their escape and reached their father's house pursued by the cannibal. The father then invited the cannibal, pretending that he would make a feast for him. In the course of this visit, the cannibal was thrown into a ditch filled with red-hot stones, where he was burned, and from his ashes arose the mosquitoes. From this time on one of the sons imitated the actions of the cannibal, while another son imitated the actions of the grisly bear, who was the cannibal's watchman.

In another tradition of the Kwakiutl, which accounts for the cannibalism of another family, it is told how a young man, upon leaving his house in the evening, was taken away by the cannibal spirit, who took him to his house, where he saw a dance performed, the singers being seated in a ditch, and the rainbow appearing during the dance in the house. While dancing, the cannibal killed and devoured a slave. Since that time the dance is performed in this manner by the young man's family.

Notwithstanding the difference of these traditions, the men initiated in these different forms by the cannibal spirit belong to the same society during the sacred season. The cannibal is highest in rank in the tribe, and next to him is the ghost dancer.

Among the Kwakiutl the ritual consists in the initiation of the novice, the return of the novice, and the exorcising of the spirit that possesses him. The usual sequence during the ritual is the following: The singers sit in the rear of the house, beating time on a plank with batons; in the left hand rear corner of the house is seated the man who beats the box-drum; in front of the singers, near the fire, which is built in the centre of the house, sit the members of the initiated, those highest in rank in the middle, those of lower rank arranged all along both sides. The uninitiated sit in groups along the sides of the house, those lowest in rank, that is the women and children, near the door.

The ceremonial begins with a number of speeches and songs, and with some of the incidents of the potlatch. During these introductory incidents, the voices of the spirits are heard (represented by whistles, which are blown inside or outside of the house), and suddenly one among the uninitiated disappears. It is stated that he has been taken away by the spirits, and that at a set time he will return. On the day set for his return the whistles of the spirits are heard again, and the people go to search for the novice, who is generally found at some little distance from the houses, in the woods, and he is then brought back by the tribe, who arrange themselves in formal procession. Then follow a series of dances, partly performed by the novice who impersonates the spirit that possesses him. Other dances are performed and songs are sung in order to quiet the spirit. After four formal dances it is supposed that the spirit has left, and the novice has to undergo a ceremonial purification, which lasts for a con-

siderable time, and consists essentially in ceremonial washings, which are repeated at intervals of four days, or multiples of four days.

This whole performance is interrupted by numerous accessory performances, consisting largely in dances of the older members of the initiated. These are often provoked by transgressions of the rules of behavior during the sacred season. Thus, the Cannibal may be excited by failure to observe the rule that nobody is allowed to eat before the cannibal has eaten; or the fool may be excited by mention of a long nose, which is believed to be characteristic of the fool.

The dances themselves, as stated before, are pantomimic presentations of the acts of the spirits. As a rule, the first dance is performed by the novice, who is dressed in certain rings made of hemlock branches, and with characteristic face-painting, these being determined by the tradition of the initiation. In the second dance the novice appears wearing a mask, which represents the spirit which possesses him. In the third dance he appears wearing rings made of cedar bark dyed red, which is a symbol of the sacred ceremonies. The form of these rings also depends upon the tradition explaining the ritual. In the last dance he appears again wearing the mask of the spirit.

The details of these rituals show great varieties in different regions. Thus, among the Nootka, who have adopted large portions of the ceremonial, the essential performance is always the appearance of a great number of men wearing wolf-skins and wolf-masks, who take away the novice and who also return the novice at a later time. Other forms of the ceremonial, which are more like those found among the Kwakiutl, are, however, not absent.

Among the Bella Coola, the traditions relating to the cannibal have quite a distinct form, being closely related to the concepts of the tribe who believe that a number of deities inhabit a house located in the zenith. Among these deities is the cannibal spirit. In this tribe the spirit of cannibalism is shown as a wolf or an eagle, which is bodily taken out of the body of the novice. The whole ceremonial among this tribe is much more dramatic than among the Kwakiutl.

Among the tribes of northern British Columbia a portion of these ceremonials have been introduced quite recently, and the ritual is, on the whole, more closely connected with clan ceremonials than with initiation ceremonials.

Linguistic evidence, as well as other historical data, show that the cannibal ceremonies were originally confined to the more northern Kwakiutl tribes—probably the Bella Bella and the tribe of Rivers Inlet, and that later on they were acquired through intermarriage by the neighboring tribes. It seems probable that many of these customs have originated from old war ceremonials. This is suggested by the fact that the reorganization of the tribe, according to ritualistic groups, took place also in times of war, and that during such times the high grades of the initiated, particularly the Cannibal, Bear and Fool were the warriors. The cannibalistic act seems to have consisted originally in the killing of a slave and, incidentally, in killing a slave by biting his throat, by which act the victory was sympolically repeated before the assembled tribe. Among the more northern tribes, particularly the Tsimshian and Haida, no such development can be traced, and it seems more likely that among them the custom was directly copied from their southern neighbors.

It seems likely that the development of the societies of the initiated and uninitiated has taken place, to a certain extent, under the

stimulus of the family organization with its crests, which pervades the whole life of these tribes. The privileges and duties of the groups that exist during the sacred season are quite analogous to those of the family organization, which exists during the rest of the year.

A similar effect of the social grouping of the tribe may be observed in many other directions. Thus, we find that in the summer season festivals are given, not only by the families, but also by the age classes, which, however, in this case appear as intercrossing subdivisions of the families. Even the shamans of the tribe are subdivided in similar ways. At least among some tribes there are two distinct groups of shamans, which have an organization similar to the family organization.

The form of ritual that has been described here is not confined to the sacred ceremonial, but is also used in the ceremonial admission of a man to the privileges of a family, or at other festivities that are of importance in the life of the family.

Among the Kwakiutl the family legend is often performed by means of pantomime at the time of marriage, the legendary marriage of the ancestor of the family being used as a subject of such performance. Among the more northern tribes, the acquisition of the crest is often presented in a similar way. Thus we have records of a performance among the Bella Bella in which an artificial rock was anchored in front of the village. The young man who was to assume his position in the family appeared as coming out of the rock, the performance being a pantomimic representation of the clan legend according to which the ancestor of the clan had obtained his privileges from the master of a certain small island.

The mythological concepts of the northwest coast Indians cluster around the Raven legend. On the northern part of the coast the Raven tradition accounts for the world as it appears at the present time. The same kind of traditions are also found on the southern part of the coast, but in somewhat different combinations. The general concept of the world is not quite definite. The Haida, the Tlingit and Tsimshian believe the earth to be four-cornered and to rest on a pole, which is supported on the lower world. The country of the souls is believed to be either in the lower world or at the outskirts of our world. Other souls, however, are believed to be able to visit the villages. The sky is conceived as another world, which may be reached by passing through a hole in the sky. The Bella Coola take quite an exceptional position in regard to these general concepts. Their mythological ideas, although in their material identical with those of other northwest coast tribes, have been highly systematized. They believe that there are five worlds, two lower worlds, our own world, and two upper worlds. Our own world is held in the east by a giant, while in the west stands the pillar of sunset. The sun travels over a wide trail along the sky, on which two beings are placed, one guarding the summer solstice, the other the winter solstice. In the zenith is the house of the gods, whose chiefs are the sun and his brother. The thoughts of these gods are transformed into action by four brothers, who mediate between the gods and mankind. The winter ceremonial referred to before is in charge of a woman who lives in a cave. As long as her cave is closed the secular season lasts, while as soon as it opens the sacred season begins. The opening and closing of her cave is determined by the arrival and departure of the canoe containing the spirits of the winter ceremonial. The whole

mythololgy of the Bella Coola is grouped around these concepts, although, of course, a good deal of loose material, more or less disconnected, is also in existence.

It seems that according to the ideas of the Indians the present conditions of the world have always prevailed. However, in regard to many details the world was incomplete. Thus, according to the ideas of the Haida, there was in the beginning only sky and water, and a single rock on which the supernatural beings lay. Then the Raven created the mainland and the Queen Charlotte Islands from two stones. The trees had to be created. There was no sun nor moon nor stars. These were owned by a chief, who kept them suspended from the rafters of his house, well protected, in a box. The Raven allowed himself to be born as an infant in this chief's house, and then cried until the box was given to him. Eventually he took it away, broke it, and thus liberated the sun. He obtained the fire from a chief, who was its sole possessor. According to one version of this legend, he assumed the shape of a deer, tied shavings to his tail and lighted them by the fire, then ran away, setting fire to the woods, thus bringing fire for his own use and for that of man. He obtained fresh water by getting permission, by an artful device, to drink from the only well in existence and owned by a chief. Then he flew away and scattered the water all over the earth, thus creating rivers and lakes. He brought the salmon by carrying away the daughter of the chief of the salmon, and throwing her into the river. Tales of this character describing the feats of the Raven, by means of which he benefited mankind, are very numerous. There is, however, another large number of tales in which the Raven appears as a trickster, who tries to cheat every person he meets, and who is generally vanquished. Thus, the well known story of the imitation of the host, who, by means of magic, produces food, is told of the Raven. He tries to imitate the magical performances of his host, but fails. While the seal fills a dish with oil by holding his hands near the fire, the Raven, who tries to do the same, scorches his hands, which accounts for his black feet. Coarse and obscene tricks abound in this group of stories.

Analogous traditions are told along the southern part of the coast among the Kwakiutl and Salish tribes, partly of a human being, who is not identified with the Raven, partly of the Mink. The stories told of these beings are, however, not characteristic transformation stories, but rather a group of trickster stories. The transformation stories in this region are told of another being, human in character, who appears as a true culture hero, and one of whose functions is the introduction of the institutions found among these tribes at the present time. The culture hero transforms one hostile person into a deer, another into a raccoon. He travels all over the country killing monsters and restoring people to health. He meets all the ancestors of the various families and gives them the privileges which they possess at the present time. It is worth remarking that the culture hero is distinctly stated to belong to the uninitiated, and to be afraid of the sacred winter ceremonies, which play such an important part in the religious life of the tribes. Excepting the few tales of the transformation of men into animals, the culture hero is not a transformer who gives the world its present shape, but rather finds the world as it now is. There is no such connected account of the origin of phenomena found at the present time among the Kwakiutl and Salish tribes as is found further to the north in the Raven legend.

Besides the Raven myth, the northern tribes have a great number of stories which are essentially human in their composition. They treat of the events which happen in certain towns, bringing in, however, many supernatural elements. Many of these traditions are very long and complex, and consist evidently of a series of disconnected stories, which are centered around a favorite hero. The acquisition of privileges from supernatural beings, escapes from the all-destroying fire, and similar incidents, are prominent among these stories.

Tsimshian mythology, although it shares many of these characteristics with the tales of coast tribes, bears traces of a number of elements that do not occur in any other part of the north Pacific coast. Tsimshian mythology, in many respects, is the mythology of an inland people, and it shows close affiliation with the traditions of the Athapascan tribes and of other tribes of the plateaus. This is indicated, for instance, by the frequent occurrence of fairly short animal tales relating to contests between animals. To a certain extent these are similar to European fables. To this class belongs the story of the wolves and the deer, who have a laughing contest, in which the wolves induce the deer to open their mouths. When they see that the deer have no teeth, they devour them. To this group also belongs the story of a council of the animals, in which the animals appear as true animals, although endowed with reason and with the power to speak. They are, however, not individuals, like the Raven of the Tlingit or the Coyote of the tribes of the interior, but simply representations of their species. Another tradition of the Tsimshian, which illustrates the presence of foreign elements, is that of the origin of the sun. According to this tale, the animals hold a council and draw lots who is to be the sun, and, after a number of fruitless attempts, moon. A general review of the elements of Tsimshian mythology shows very clearly the presence of many foreign elements which point toward the interior.*

*A. Krause. Die Tlinkit—Indianer. Jena, 1885.

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G. T. Emmons. The Basketry of the Tlingit. Mem. Am. Mus. Nat. Hist., Vol. III., pp. 229-277. New York, 1903.

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UNIVERSITY OF TORONTO

AUDITOR'S REPORT

TO THE

Board of Trustees

ON

Capital and Income Accounts

FOR THE

YEAR ENDING 30TH JUNE, 1905

ADOPTED SEPTEMBER 22ND, 1905

TORONTO:
Printed and Published by L. K. CAMERON,
Printer to the King's Most Excellent Majesty.
1905.

WARWICK BRO'S & RUTTER, LIMITED, PRINTERS,
TORONTO.

UNIVERSITY OF TORONTO.

AUDITOR'S REPORT

TO THE BOARD OF TRUSTEES ON CAPITAL AND INCOME ACCOUNTS

FOR THE

YEAR ENDING 30th JUNE, 1905.

To the Trustees of the University of Toronto:

GENTLEMEN:—Upon the demise of the late Mr. J. E. Berkeley Smith in December last, you instructed me to examine all the securities of his office. I had the honour to report every item thereof correct, and after examination also by the present Bursar, Mr. F. A. Mouré, you obtained his unqualified acceptance of them in writing.

I now beg to present the financial statement for the year ending 30th June, 1905.

The estimates passed by you 28th October last show: —

Expenditures	$213,796 99	
Less those of Departments maintained by the Government	47,632 49	
		$166,164 50
Available Revenue		120,074 16
An estimated deficit of		46,090 34
The actual deficit however proves to be		39,122 68
		$6.967 66
Add to this a saving in the Government Depts. of		380 00
Making a lessened deficit to extent of		$7,348 50

Hence, as shown in Schedule 5 C of this report, the amount yet to be received from the Provincial Government is $38,741.84.

This favourable result mainly arises from the receipt of fees to the extent of $67,056.15 as against estimated receipts of $60,000.00, the expenditures having been held slightly within the estimates.

It has been evident for some years past that the return, as regards lands and the University Buildings and their equipment, needed revision.

In 1892 a portion of the unleased lands in Queen's Park was looked upon as a means of obtaining revenue. Now that it is certain that the whole area will be required for University purposes, these lands, to which a valuation of $505,627.73, has been attached in the returns, fall to be transferred to Site lands account.

It was part of the present plan of account that adjustments of valuation of fixed assets should be made periodically. With regard to structures and their equipment, they would now be subject to decrease to the extent of their depreciation during the past thirteen years, qualified, however, by the increases to equipment which have been charged to revenue from year to year. On the other hand, the land valuations would doubtless be increased as the result of an appraisal. At present figures, $2,131,256.13, or about two thirds of the General Endowments of the University, have been absorbed in providing the existing accommodation, and you may now regard the exact valuations of each portion as of less importance than did your predecessors in office in 1892, owing to changed conditions. It may be convenient to treat the total of Schedule 6 as a fixed basis and in future returns add any expenditures that may be made thereto.

In Schedule No. 7 an approximate adjustment is made of the valuation of the Upper Canada College Block of land on King Street, Toronto. In 1892 this block was taken into your accounts at $392,679.58 and by an Order in Council you were authorized to treat interest upon the actual cash then advanced by you as revenue. It now appears that this land has failed to realize the above amount, with interest on the cash advances, to the extent of $172,875.40, which sum has been written off.

W. H. CROSS,
Auditor.

Toronto, 11th August, 1905.

APPENDIX I.

BALANCE SHEET, 30 JUNE, 1905.

FUNDS.

General Endowments Fund, Schedule 1	$3,315.924 70	
Specific Endowment Funds, Schedule 2	84,907 54	
Retirement Fund, Schedule 3	94,087,74	
Trust Funds, Schedule 4	24,129 24	
Revenue Outstandings, Schedule 5	13,340 24	
		$3,532,389 46

ASSETS.

Site Lands, Buildings, and contents, Schedule 6		$2,131.256 13
Unproductive Lands, Schedule 7	38,302 00	
Leased Property, Schedule 8	504,796 06	
Investments and Cash, Schedule 9	857,514 80	
Past Due Fees, Schedule 10	520 47	
		$1,401,133 33
		$3,532.389 46

SCHEDULE I.

General Endowments Fund.

Fund of 30 June, 1904		$3,482,783 51
Value of 1904-5 additions to Library as shown by accession catalogue	$7,108 00	
Less depreciation at three per cent. upon $136,380.35	4,091 41	3,016 59
Capitalization of Printing Plant; Original cost, less five per cent. annual depreciation since installation, three years ago		3,000 00
		$3,488,800 10

Deduct.

Upper Canada College Block, to reduce account to $30,000—approximate value of unsold land	172,875 40
Fund of 30 June, 1905	$3,315,924 70

SCHEDULE 2.

Scholarship Trust Funds.

Blake, Matriculation	$24,554 34
Blake, Science and Moderns	3,750 00
Moss, Classics	2,000 00
William Mulock, Classics and Mathematics	2,000 00
Daniel Wilson, Natural Science	2,000 00
George Brown, Modern Languages	1,128 34
George Brown, Medical Science	5,391 72
Mary Mulock, Classics	2,838 74
William Ramsay, Political Economy	1,009 42
Julius Rossin, German	1,000 00
Bankers, Political Science	1,200 00
John Macdonald, Philosophy	2,030 00
Physics	2,350,00
Prince of Wales, General Proficiency	950 00
Mackenzie Memorial	18,334 60
Fulton Bequest	3,291 30
Starr Bequest	5,039 60
Lyle Medal	265 10
Young Memorial	3,284 38
Gibson Matriculation	2,100 00
Board of Trade, Commercial	140 00
Reeve Scholarship	250 00
	$84,907 54

Note—Transactions for Year.

Return of 30 June, 1904	$83,232,37
Interest appropriation	4,220 92
Rent, Starr farm	120 00
Lyle Medal	44 25
Young Memorial	20 00
Gibson Matriculation	100 00
Reeve Scholarship	250 00
McCaul Scholarship	60 00
	$88.047 54
Scholarship Expenditures	3,140 00
	$84,907 54

SCHEDULE 3.

RETIREMENT FUND, BENEFICIARIES 30 JUNE, 1905.

James Loudon	$9,283 31	
Alfred Baker	5,959 16	
Maurice Hutton	5,959 16	
R. Ramsay Wright	5,959 16	
W. J. Alexander	5,959 16	
J. G. Hume	5,646 67	
J. F. McCurdy	4,876 64	
James Mavor	4,581 87	
G. M. Wrong	3,843 90	
A. B. Macallum	3,323 99	
W. H. Fraser	3,182 34	
John Squair	3,182 34	
John Fletcher	3,065 30	
W. J. Loudon	2,285 21	
D. R. Keys	2,285 21	
H. H. Langton	2,176 67	
August Kirschmann	1,809 74	
W. Lash Miller	1,784 27	
W. S. Milner	1,704 68	
J. H. Cameron	1,704 68	
G. H. Needler	1,683 75	
A. T. DeLury	1,528 13	
W. R. Lang	1,498 58	
C. A. Chant	1,497 06	
James Brebner	1,489 96	
Adam Carruthers	1,481 35	
J. C. McLennan	1,170 01	
R. G. Murison	862 20	
G. W. Johnston	862 19	
T. L. Walker	827 75	
P. Toews	518 30	
F. Tracy	403 50	
F. B. Kenrick	342 92	
F. B. Allan	342 92	
B. A. Bensley	257 76	
W. H. Piersol	185 00	
J. H. Faull	172 21	
A. H. Abbott	135 51	
F. J. A. Davidson	96 59	
F. A. Mouré	85 00	
E. J. Kylie	73 59	
		$94,087 74
Fund of 30th June, 1904	$84,751 16	
Interest as per terms of O. C.	5,180 84	
Contributions 1904-5	6,964 54	
	$96,896 54	
Withdrawal	2,808 80	
		$94,087 74

SCHEDULE 4.

TRUST ACCOUNTS.

Library Funds:—		
Insurance	$4,880 91	
Greek	10 50	
King Alfred Millenary Fund	10,707 44	
Phillips Stewart bequest	1,500 00	
Biological Students' supply	17 24	
Local Lectures Fund	10 84	
Residence Extension Fund	1,049 46	
John Langton Memorial	30 00	
Sir William Mulock	703 56	
Alumnae Prize	20 00	
University Historical Studies	606 52	
Women's Residence	4,592 77	
		$24,129 24

NOTE AS TO YEAR'S TRANSACTIONS.

Return of 30 June 1904	$22,204 42	
Interest appropriations	861 22	
Receipts during 1904-5	11,687 46	
		$34,753 10
Expenditures from		
Library Insurance Fund	$3,518 20	
Library Greek Fund	19 50	
King Alfred Millenary Fund	154 85	
Biological Student's supply	1,419 83	
Local Lectures	157 51	
Phillips Stewart bequest	60 00	
University Historical Studies	1,898 94	
Women's Residence	3,395 03	
		$10,623 86
		$24,129 24

Note as to Women's Residence Fund:—

Total Cash subscriptions and interest received by the Bursar		$7,808 53
Expended upon repairs to Howland House	$950 04	
Furnishings	2,194 99	
Superintendent's Salary, 6 months	250 00	
	3,395 03	
Surplus on housekeeping account to 30 June, 1905	179 27	
		$3,215 76
Balance 30th June, 1905		$4,592 77

SCHEDULE 5 A.

REVENUE BALANCES

Contingent Fund, 30 June, 1904	$18,065 92	
Loss on sale of Cavan farm	1,000 00	
		$17,065 92
University Printing Press:—		
Balance 30 June, 1904	$650 00	
Outlays to enlarge plant	605 04	
	$1,255 04	
Appropriation 1904-5	1,250 00	
	5 04	
Outlays for wages and printing material	8,073 59	
	8,078 63	
Services 1904-5, (inclusive of $1,338.67, uncollected on 30 June, 1905)	9,048 94	
		970 31
		$18,036 23

Contra.

Fire premiums:—		
Balance 30 June, 1904	$2,810 28	
Casual premiums 1904-5	754 30	
	3,564 58	
Less charge upon 1904-5 Revenue	2,000 00	
Amount carried forward	1,564 58	
Dining Hall advances	2,093 19	
Granolithic Walks	1,000 00	
Summer Session outlays upon 1905-6 account	38 22	
		$4,695 99
		$13 340 24

SCHEDULE 5 B.

INCOME ACCRUED BUT NOT DUE:

Accounts:	30th June, 1904.	30th June, 1905.
Debentures	$5,674 24	$5,806 60
Mortgages	3,621 11	3,140 43
Park Rentals	6,258 20	6,215 70
School of Science rental	154 58	154 58
Business rentals	833 84	833 84
City of Toronto	1,500 00	1,500 00
Interest from Land sales	1,363 41	1,491 34
Endowment Item Totals	$19,405 38	$19,142 49
Agricultural Fees	68 62	357 47
Fees past due	95 00	163 00
	$19,569 00	$19,662 96

SCHEDULE 5C.

REVENUE, 1904-5.

Interest.	*Estimate.*	*Actual.*
On purchase moneys	$7,219 40	$6,646 80
On loans	11,188 57	10,995 35
On debentures	11,765 60	11,524 67
On bank balances	1,000 00	1,659 48
Medical Faculty, on cost of new building	3,000 00	3,000 00
Medical Faculty, on equipment	1,159 39	1,159 39
Rents.		
University Park	13,346 40	13,324 26
Business properties	3,500 00	3,462 69
School of Science site	925 00	925 00
Medical Faculty	1,900 00	1,900 00
City of Toronto payment	6,000 00	6,000 00
Legislative Grant, 60 Vic. Cap. 59	7,000 00	7,000 00
Wild land sales	2,000 00	1,647 72
Sundry earnings, land	500 00	926 42
University and College Fees	60,000 00	67,056 15
	$130,504 36	$137,227 93
Less interest upon Trust funds reserved	10,430 20	10,262 98
	$120,074 16	$126,964 95
Appropriations as per Estimates adopted by Board on 28 October, 1904	166,164 50	
Less unused thereof (see summary below)	76 87	
		166,087 63
Specific Grant for 1904-5		39,122 68
Estimate of cost of maintaining three departments as per Appendix 3	$48,013 33	
Actual cost thereof	47,632 49	
		380 84
Amount to be received from Provincial Government		$38,741 84

SCHEDULE 5D.

SUMMARY OF REVENUE EXPENDITURES, 1904-5.

No.	Account.	Appropriation.	Supplementary.	Unused.
1	Salaries	$108,771 00	.....	$260 11
2	Bursar's Office	900 00	62	.....
3	Registrar's Office	3,050 00	832 22	.....
4	Vice-Chancellor's Office	750 00	.....	25 00
5	President's Office	900 00	8 82	.....
6	Law Costs	1,250 00	13 07	.....
7	General incidentals	1,250 00	.....	1 00
8	Insurance	2,000 00	.....	.....
9	Telephones	350 00	.....	4 13
10	Convocation Expenses	1,000 00	260 93	.....
11	Examinations	9,095 00	239 48	.....
12	Library	4,335 00	.....	66 85
13	Grounds	3,300 00	.....	13 60
14	Main Building	7,350 00	.....	3 48
15	(a) Biological Building	3,300 00	.....	263 80
	(b) Biological Department	5,091 50	.....	175 53
16	Physiological Department	3,872 00	.....	6 45
17	Psychological Department	450 00	.....	.....
18	Mathematics	50 00	2 83	.....
19	Political Science	50 00	.....	13 15
20	History	125 00	.....	31 50
21	Italian and Spanish	30 00	4 75	.....
22	Advertising (University)	450 00	.....	17 40
23	Incidentals (University)	200 00	.....	4 55
24	University College Departments:—			
	Classics	50 00	.....	50 00
	English	150 00	.....	.....
	French	175 00	5 00	.....
	German	175 00	.....	.....
	Oriental Literature	25 00	.....	.....
	Stationery	75 00	.....	12 74
	Printing	75 00	.....	17 59
	Advertising	75 00	.....	55 34
	Incidentals	575 00	.....	130 23
25	Gymnasium and Students' Union	1,620 00	.....	85 44
26	Dining Hall	500 00	.....	.....
27	University Press	1,250 00	.....	.....
28	Educational Association Reception	250 00	.....	7 00
29	Observatory Removal	1,100 00	.....	25 00
30	Senate Elections	750 00	42 05	.....
31	Unforeseen	1,400 00	.....	216 75
		$166,164 50	$1,409 77	$1,486 64
				1,409 77
	Unused of unforeseen	76 87		76 87
	Total Expenditure from Revenue 1904-5	$166,087 63		

SCHEDULE 6.

SITE LANDS, BUILDINGS AND CONTENTS, 30TH JUNE, 1905.

Valuation 12th October, 1892, of 1,302,360 square feet of Site lands then set apart for direct use of the University.....		$475,361 40
Valuation 12th October, 1892, of lands now transferred to this account:—		
Land on College Street, Registered Lots Nos. 8 and 9, upon which the new Science Building is being erected, and Nos. 3 and 6, the site of the Chemical Building		36,864 00

SCHEDULE 6.—Con.

Hoskin Avenue and Devonshire Place survey	175,356 70	
Unsurveyed block east of Devonshire Place, 596,322 square feet	217,657 53	
Block on S. W. Corner Bloor and North Drive	31,251 00	
Block on E. S. North Drive	44,398 50	
		$980,889 13
Valuation 12 October, 1892, of buildings then in use 711,647 07		
Less value attached to South Lodge written off... 1,000 00		
	$710,647 07	
Cost to complete the Library Building	5,769 72	
Cost to complete the Gymnasium Building	9,815 62	
Cost of Chemical Building	77,287 88	
Cost of Medical Building	125,000 00	
		928,520 29
Valuation 12 October, 1892, of Apparatus and Furnishings	$38,626 00	
Chemical Equipment additions	4,975 30	
Medical Building equipment, Arts Branch	20,000 00	
Printing Plant	3,000 00	
Museum and other outlays	22,956 47	
		89,557 77
Valuation, 30 June, 1893, of Library proper	103,331 93	
Cost of subsequent additions less depreciation adjustments	28,957 01	
		132,288 94
Revised account as of 30 June, 1905		$2,131,256 13
Return of 30th June, 1904	$1,616,751 42	
Transfer to Site lands from Schedule No. 7	505,527 73	
Additions to Library during year	7,108 00	
Equipment, new Medical Building	2,960 39	
Printing Plant	3,000 00	
		$2,135,347 54
Yearly allowance for depreciation of Library		4,091 41
		$2,131,256 13

SCHEDULE 7.

UNPRODUCTIVE LANDS.

Lots in Port Hope	$6,395 00	
Lots near Belleville	1,755 00	
Farm Lands	152 00	
U. C. C. Block, King St., Toronto, approximate value of unsold portion of land	30,000 00	
		$38,302 00

TRANSACTIONS 1904-5.

Transfer of unleased Queen's Park land to Site Lands Account	$505,527 73	
Sale of Belleville Lot for	35 00	
Sale of Port Hope Lands for	162 50	
Upper Canada College Block; Sale of 371 ft. 7 in. x 186 ft. for	36,500 00	
Amount needed to reduce this account to probable realization...	172,875 40	
Sale of 16 feet on Devonshire Place for	1,000 00	
	$716,100 63	
Return of 30th June, 1904	$754,402 63	
		$38,302 00

SCHEDULE 8.

LEASED LANDS.

Victoria College site	$1 00	
Wycliffe College site	2,500 00	
Observatory site	1 00	
School of Science site	18,500 00	
Land leased to City of Toronto	120,000 00	
Park Lands	239,080 00	
Toronto business properties	78,038 10	
Caradoc Farm	2,000 00	
Valuation of lands		$460,120 10

SCHEDULE 8.—Con.

No. 47 St. George Street, house and land	$9,000 00	
No. 59 St. George Street, house and land	8,031 85	
Cumberland house	14,842 75	
Howland House (Women's Residence)	3,000 00	
		$34,874 60
Wycliffe College pavement		1,096 42
Park and business ground rents past due	82	
Accrued but not due, park rentals	6,370 28	
City of Toronto, payment	1,500 00	
Business ground rents, accrued but not due	833 84	
		8,704 94
		$504,796 06

NOTE.

Sale to Ontario Medical Library of Thorne building, upon lot No. 25, Queen's Park		$4,750 00	
Sale of Cavan farm for	$3,500 00		
Balance of account written off	1,000 00		
		4,500 00	
Wycliffe pavement instalment		35 18	
Decrease in Revenue outstanding		377 24	
			$9,662 42
Purchase of Howland Building in Queen's Park		3,000 00	
Purchase of land on St. George Street, 50 x 198, with house No. 47 situated thereon		9,000 00	
			12,000 00
			$2,337 58
Return of 30th June, 1904			502,458 48
Return of 30th June, 1905			$504,796 06

SCHEDULE 9.

INVESTMENTS 30TH JUNE, 1905.

Debentures and Municipal bonds	$339,356 06	
Interest advanced	1,542 90	
Interest accrued but not due	5,806 60	
		$346,705 56
Loans secured by Mortgages on real property	212,149 77	
Advanced as premium upon fire policies	1 75	
Interest past due	1,253 31	
Interest accrued but not yet due	3,140 43	
		216,545 26
Unpaid purchase money upon land sales	140,839 25	
Interest past due	189 25	
Interest accrued but not yet due	1,491 34	
		142,519 84
Medical Faculty, Equipment advance	27,928 85	
Hamilton Cataract Power and Light Co. shares	2,000 00	
		29,928 85
Cheque to be received from Provincial Government, Grant for Revenue deficit, 1904-5	39,122 68	
Less in excess of actual cost of Departments for 1904-5	380 84	
	38,741 84	
Deposit in Canadian Bank of Commerce	81,734 78	
University Press, earnings uncollected	1,338 67	
		121,815 29
		$857,514 80

TRANSACTIONS, 1904-5.

INWARDS.

Debenture Collections	$14,126 80	
Loans repaid	40,834 82	
Purchase money collections	44,703 00	
Decrease in accrued revenue	220 39	
Portion of $2,215.27 paid by Medical Faculty upon equipment advance, applied in reduction of principal	1,055 88	
Withdrawals from Canadian Bank of Commerce	331,576 26	
		$432,517 15

OUTWARDS.

Land Sales	41,449 15	
Debentures purchased	78,359 19	
Mortgage Loans	6,038 50	
Excess of Revenue receivable	1,350 54	
Excess of University Press Accounts	923 89	
Excess due by Provincial Government	6,101 12	
Deposits in Canadian Bank of Commerce	345,601 80	
		479,824 19
Increased outstandings		$47,307 04
Return of 30th June, 1904		810,207 76
Return of 30th June, 1905		$857,514 80

SCHEDULE 10.

FEES.

	Actual receipts during 1904-5		$66,699 30
	Deduct arrears of 30th June, 1904, collected and included in above amount	88 62	
2	Laboratory Fees written off	5 00	
1	Examination Fee written off	10 00	
			103 62
			$66,595 68
	Add arrears of 30th June, 1905 (see note below)		460 47
	Fees, 1904-5		$67,056 15

NOTE.

	Arrears of 30th June, 1905:—		
	Agricultural arrears on 30th June, 1904	$68 62	
	Examination outlay, 1904-5	443 85	
27	Degrees	270 00	
		$782 47	
	Received from Department of Agriculture	425 00	
			$357 47
2	Registration Fees		6 00
3	Library Fees		10 00
1	Degree Fee		15 00
1	Examination Fee		8 00
1	Laboratory Supply Fee		10 00
1	Ad eundem fee		$460 47
	Arrears of 30th June, 1905		60 00
1	Arrear of 30th June, 1904, carried forward		$520 47

APPENDIX II.

FEES RECEIVED 1904-5.

Faculty of Arts.

Subject.	1st Year.	2nd Year.	3rd Year.	4th Year.	Miscellaneous.
	$ c.	$ c.	$ c.	$ c.	$ c.
College fees	6,115 00	5,053 00	3,959 50	3,827 00	55 00
Penalties	32 00	28 00	20 00	24 00	5 00
Dispensations and post-graduate registration	20 00	30 00	35 00	50 00	65 00
Honor certificates	.....	.....	1 00	3 00	63 00
Matriculation	6 00	.....	.....	.....	718 00
Ad eundem	10 00	20 00	.....	.....	30 00
Examination	3,966 00	3,793 00	2,666 00	2,902 00	1,531 00
Degrees	.....	.....	.....	1,530 00	680 00
Chemical supply	98 00	60 00	166 00	60 00	5 00
Mineralogical supply	.....	5 00	24 00	32 00	.....
Biological supply	90 00	92 00	186 00	250 00	2 00
Physical supply	45 00	22 00	124 00	45 00	.....
Psychological supply	.....	.....	60 00	64 00	.....
Physiological supply	.....	.....	.....	30 00	.....
Medical students. Matriculation	.....	2 00	2 00	2 00	.....
Medical students. Ad eundem	10 00	50 00	.....	.....	.....
Medical students. Examination	1,315 00	1,444 00	1,200 00	1,224 00	471 00
Medical students. Degrees	.....	.....	.....	1,880 00	300 00
Medical students. Chemical supply	393 00	408 00	.....	.....	.....
Medical students. Biological supply	262 00	411 00	.....	.....	.....
Medical students. Physiological supply	.....	685 00	.....	.....	.....
Payment by Medical Faculty for Arts subjects	1,806 00	2,070 00	.....	.....	.....
School of Practical Science students	1,672 00	1,095 00	16 00	.....	.....
Laboratory instruction, occasional students	64 00	104 00	32 00	17 00	200 00
Library	554 00	416 00	326 00	312 00	6 00
Totals	16,458 00	15,788 00	8,817 50	12,252 00	4,131 00

Departmental Fees.

Subject.	Law.	Dentistry.	Engineering and Applied Science.	Music.	Pharmacy.	Pedagogy.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Matriculation	70 00	130 00	.....	10 00	215 00	.....
Examination	220 00	873 00	480 00	2,246 00	586 00	100 00
Degrees	220 00	900 00	510 00	20 00	370 00	20 00
Certificates	.....	.....	.....	424 75	.....	.....
Totals	510 00	1,903 00	990 00	2,700 75	1,171 00	120 00

SUMMARY OF 1904-5 FEES.

First year	$16,458 00	
Second year	15,788 00	
Third year	8,817 50	
Fourth year	12,252 00	
Miscellaneous	4,131 00	
Law	510 00	
Dentistry	1,903 00	
Engineering	990 00	
Music	2,700 75	
Pharmacy	1,171 00	
Pedagogy	120 00	
Agriculture	425 00	
Gymnasium	1,433 05	
		$66,699 30

CLASSIFICATION OF SERVICES.

College Fees	$19,009 50	
Penalties	109 00	
Dispensation and post graduate registration	200 00	
Honor Certificates	491 75	
Matriculation	1,155 00	
Ad Eundem	120 00	
Examination	25,017 00	
Degrees	6,430 00	
Chemical Supply	1,190 00	
Mineralogical Supply	61 00	
Biological Supply	1,293 00	
Physiological Supply	715 00	
Physical Supply	236 00	
Psychological Supply	124 00	
Medical Faculty, payments for Arts Subjects	3,876 00	
School of Practical Science Students	2,783 00	
Laboratory Instruction, occasional students	417 00	
Library	1,614 00	
Gymnasium, including lockers	1,433 05	
Agriculture	425 00	
		$66,699 30

APPENDIX III.

DEPARTMENTS MAINTAINED BY THE GOVERNMENT.

SUMMARY OF EXPENDITURES, 1904-5.

	Estimate.	*Expenditure.*
Chemistry:		
Salaries	$10,620 00	$10,620 00
Maintenance	4,410 00	4,054 85
Physics:		
Salaries	12,300 00	12,300 00
Maintenance	6,400 00	6,401 12
Mineralogy and Geology:		
Salaries	7,358 33	7,358 33
Maintenance	6,600 00	6,572 80
Examination Expenses:		
Share of these departments	325 00	325 00
	$48,013 33	$47,632 50

DETAILS.

SALARIES.

(1) Chemistry.

W. R. Lang, Professor	$2,900 00	
W. Lash Miller, Associate Professor	2,200 00	
F. B. Allan, Lecturer	1,375 00	
F. B. Kenrick, Lecturer	1,375 00	
E. Forster, Assistant	500 00	
R. E. DeLury, Assistant	500 00	
E. H. Jolliffe, Junior Assistant	350 00	
L. Gilchrist, Junior Assistant	350 00	
E. Repath, Caretaker and Attendant	550 00	
J. Smith, boy cleaner, etc.	240 00	
G. Donkin, Fireman (8 mos.)	280 00	
		$10,620 00

(2) Physics.

James Loudon, Professor	$3,200 00	
W. J. Loudon, Associate Professor	2,000 00	
J. C. McLennan, Associate Professor	2,000 00	
C. A. Chant, Lecturer	1,800 00	
H. F. Dawes, Miss L. B. Johnson, J. W. Cantelon, Asst. Demonstrators at $500	1,500 00	
W C. Jacques, Lecture Assistant	500 00	
A. Thomson, Class Assistant	125 00	
A. G. McPhedran, Class Assistant	125 00	
L. Gilchrist, Class Assistant	125 00	
G. A. Brown, Class Assistant	50 00	
W. Keast, Class Assistant	50 00	
F. D. Meader, Class Assistant	25 00	
T. S. Plaskett, Mechanician	800 00	
		12,300 00

(3) Mineralogy and Geology.

A. P. Coleman, Professor of Geology	$800 00	
T. L. Walker, Professor of Mineralogy	2,775 00	
H. Montgomery, Curator New Museum (one-third time)	833 33	
W. A. Parks, Lecturer	1,450 00	
H. L. Kerr, Class Assistant	500 00	
W. H. Collins, Class Assistant	500 00	
Wm. Stewart, Attendant	500 00	
		$7,358 33
		$30,278 33

MAINTENANCE.

(1) Chemistry.

(a) Maintenance of Building:	
Elias Rogers Coy., fuel	$703 79
Consumers' Gas Coy., gas	140 96
Tor. Elec. Light Coy., electric current	70 55
City Treasurer, water	87 59
Mrs. Repath, cleaning	99 00
Repairs and Incidentals:	
Harrison & Robertson, plumbing, etc.	89 65
R. Farthing, shelving, etc.	49 72
Fletcher Mfg. Coy., hardware, etc.	23 10
Aikenhead Hardware, hardware, etc.	6 41
Alpha Bicycle Livery, sharpening mower	1 25
Wm. Cane, reglazing	
Can. Oil Coy., floor oil, etc.	36 03
Globe Paint Co., floor oil, etc.	49 00
R. W. Hollinger, soap	13 85
G. & J. Murray, mantles	5 60

(1) Chemistry.—Con.

Can. Gen. Elec. Coy., lamps, etc.	77 28
Robert Simpson Coy., blinds	101 89
John Kay, Son & Coy., cord	3 75
Brown Bros., toilet paper	12 00
E. Repath, washing towels, etc.	17 70
Prof. W. R. Lang, petty accounts	10 00
Special Repairs:	
Warren Bituminous Paving Coy., flooring	125 60
Harrison & Robertson, drain and repairing boilers	170 00
R. Farthing, weather stripping	165 00
Fitting up Phys. Chem. Laboratory:	
Harrison & Robertson, wiring, etc	108 46
Can. Gen. Elec. Coy., motor	12 50
Aikenhead Hardware, hardware	2 15
Chas. Graham, apparatus	16 60
E. Repath, freight	2 43
	$2,202 26
(b) Maintenance of Department:	
Kaehler and Martini, chemicals and glassware	$636 36
Lyman Bros. Coy., chemicals	630 90
Grasselli Chem. Coy., chemicals	141 75
C. W. Irwin, freight, etc.	110 10
Baird & Tatlock, tubing and apparatus	34 37
E. H. Sargent & Coy., dessicators	10 60
Beaver Flint Glass Coy., tubes	95
H. F. Brown, sand baths	5 00
Freyseng Cork Coy., corks	19 65
Fletcher Mfg. Coy., vessels, etc.	7 25
J. W. Paton, glass	2 20
Dean Bros., castings	2 19
Aikenhead Hardware, hardware	28 62
J. J. McLaughlin, gas	7 35
Tor. Liquid Carbonate Coy., gas	4 00
R. W. Hollinger, salt	1 50
United Factories, brushes, etc.	45 33
University Press, stationery and printing	98 84
Brown Bros., blank books, etc.	17 25
United Typewriter Coy., rent of typewriter	31 65
Physical-Chemistry Sub-department:	
Lyman Bros. Coy., chemicals	50 53
Eimer & Amend, chemicals	2 04
E. H. Sargent & Coy., balance and dessicators	13 18
Beaver Flint Glass Coy., tubes	7 65
Fletcher Mfg. Coy., glass cases, etc.	15 70
R. Farthing, boxes, etc.	8 30
Can. Gen. Elec. Coy., supplies	13 79
Harrison & Robertson, gas cocks	75
R. Harvie, mantles	97
Lake Simcoe Ice Coy., ice	6 50
Aikenhead Hardware, hardware	3 13
Tor. Engraving Coy., cuts	8 50
R. E. DeLury, drafting	6 00
Miss F. B. Arnoldi, typewriting	22 75
United Typewriter Coy., rent of typewriter, paper, etc.	31 85
Monarch Typewriter Coy., typewriter and supplies	142 05
Grand & Toy, stationery	3 75
University Press, stationery and printing	6 82
Journal of Physical Chemistry, reprints	1 60
E. Repath, express, etc.	4 62
W. Lash Miller, petty disbursements	1 25
	$2,187 59
Less paid by Professor Lang from Students' Account	335 00
	$1,852 59

(2) Physics.

R. W. Paul, apparatus	$126 25
I. Carpentier, apparatus	125 25
R. Muller-Uri, apparatus	317 31
L. Golaz, apparatus	262 11
W. G. Pye & Co., apparatus	183 05
Camb. Scientific Inst. Co., apparatus	164 41
Spindler & Hoyer, apparatus	121 10
L. Laurent, apparatus	91 65
Societe Centrale, apparatus	67 07
A. Jobin, apparatus	61 62
Societe Genevoise, apparatus	60 21
W. Wilson, apparatus	37 60
George Bartels, apparatus	36 85
A. Hilger, apparatus	29 30
L. Landry, apparatus	27 62
Siemens & Halske, apparatus	22 65
R. Sthamer, apparatus	17 48
Newton & Coy., apparatus	17 25
Buchler & Coy., apparatus	16 56
Harvard Apparatus Coy., apparatus	8 60
Ward's Natural Science Establishment, apparatus	2 68
Ph. Pellin, spectroscope	20 00
Bausch & Lomb, lenses	8 58
Can. Gen. Elec. Coy., supplies, etc.	37 11
Tor. Elec. Light Coy., wiring, etc.	51 78
C. W. Irwin, freight and brokerage	154 00
Davies, Turner Coy., freight	9 40
Can. Express Coy., freight	1 20
Lyman Bros. Coy., chemicals	71 15
Eimer & Amend, chemicals	14 89
Merck & Coy. chemicals	4 05
Wheeler & Bain, cylinders	49 35
G. Sparrow & Coy., cylinders, etc.	40 70
J. A. Brashear Coy., plates	103 35
Chandler & Massey, beakers	1 62
Kemp Mfg. Coy., vessels	8 47
Inland Revenue Dept., balances	30 00
Standard Meter Coy., meter	6 50
Central Electric Supply Coy. electric supplies	122 13
McDonald & Willson, electric supplies	4 15
United Electric Coy., switchboard	46 40
Steinberger, Hendry Coy., discs, etc.	12 35
W. J. McGuire & Coy., pipe	1 36
Fletcher Mfg. Coy., box	2 50
Ontario Rubber Coy., tubing	39 50
Gutta Percha Rubber Coy., rubber	3 00
Billington & Newton, alloy rods	22 22
Can. Metal Coy., lead pipe	3 18
Aikenhead Hardware. hardware	149 13
Dean Bros., castings	16 32
Treloar, Blashford & Cov., castings	3 92
John Wanless & Coy., plating, etc.	11 50
Lee Collins Coy., plating. etc.	5 00
Orr & Membrey plating	2 10
McCausland & Son, silvering, etc.	4 55
Jas. Morrison Coy., screws	4 95
Rice Wire Mfg. Coy., wire cloth	3 00
Emil Greiner, tube	3 18
Baird & Tatlock, tube	1 38
J. J. McLaughlin, gas	6 00
Tor. Liquid Carb. Coy., gas	10 00
C. Potter, laboratory supplies	1 10
J. G. Ramsey & Coy., photo materials	29 02
H. F. Sharpe & Cov., photo materials	2 85
W. C. Jaques, making slides	15 00
Can. Portland Cement Coy., cement	1 50

(2) Physics.—Con.

Rathbone Coy., sand		75
G. & J. Murray, mantles		1 20
T. Eaton Coy., cover		1 65
C. M. Richardson, cartage		2 75
M. Rawlinson, cartage		75
R. Dinnis & Son, tables and cupboards		112 15
J. B. Smith & Coy., tables		33 00
J. Wicksey, fixing up tables		6 00
Office Specialty Mfg. Coy., cabinet		12 20
Bell Piano Coy., repairing bellows		5 00
Hartmann & Braun, repairing apparatus		32 06
Art Metropole, drawing materials, celluloid, etc.		13 56
Brown Bros., cardboard		5 25
Grand & Toy, stationery and supplies		67
Macmillan Coy., books		9 49
University Press, stationery and printing		103 22
Physical Review, reprints		5 85
United Typewriter Coy., rent of typewriter		9 75
Business Alliance, typewriting		9 25
Miss A. M. Gall, typewriting		2 45
Lake Simcoe Ice Coy., ice		23 20
Robt. Simpson Coy., towels		4 13
C. A. Chant, petty disbursements		20 00
W. J. Loudon, petty disbursements		55 65
J. C. McLennan, petty disbursements		133 10
Thos. Hunter, mechanician		122 50
F. Hanmer, mechanician		26 00
E. F. Burton, cataloguing apparatus		150 00
W. P. Near, cataloguing apparatus		150 00
		$3,987 64
W. G. Pye & Coy., liquid air apparatus		488 89
C. W. Irwin, freight on liquid air apparatus		54 89
		$4,531 42
Less paid by Prof. J. C. McLennan from students' account	$80 00	
Less engine sold	50 00	
		130 00
		$4,401 42
Share of maintenance Main Building		2,000 00
		$6,401 42

(3) Mineralogy and Geology.

(a) Mineralogy:	
Apparatus:	
A. T. Thompson & Coy., lantern, etc.	$348 44
Eimer & Amend, apparatus, etc.	156 22
Swift & Son, apparatus, etc.	418 76
Max Wolz, apparatus	191 75
Art Metropole, instruments	9 00
J. J. Griffin & Sons, blow pipe sets	102 40
McKelvey & Birch, blow pipe sets	70 00
J. E. Livingstone, lantern slides	4 02
Wm. Cane, box	2 00
Ontario Rubber Coy., sundries	17 12
C. W. Irwin, freight	38 24
The Bursar, freight	56
Maintenance:	
Chandler & Massey, laboratory supplies	24 97
J. J. Griffin & Sons, laboratory supplies	17 80
Lyman Sons & Coy., charcoal, etc.	28 49
Rice Lewis & Son, carborundum etc.	19 00
Ontario Rubber Coy., tubing	1 73
Wm. Nicol, brass fittings	2 30
Queen City Plate Glass Coy., glass	3 62

(3) Mineralogy and Geology.—Con.

Wm. Cane, keys, etc.	17 15
A. J. Reading, slides	7 40
Macdonald Mfg. Coy., tins	12 50
Duncan Bros., framing	2 40
Dom. Paper Box Coy., trays	24 00
Art Metropole, drawing materials	4 88
Steinberger, Hendry Coy., crayons	2 00
Grand & Toy, supplies	9 52
Brown Bros., binding	16 25
University Press stationery and printing	30 21
C. W. Irwin, freight	26 79
G. T. Railway, freight	65
C. M. Richardson, cartage	1 00
E. Richardson, grinding sections	6 00
John Cross, grinding sections	9 50
J. Gracie, attendant	31 25
T. L. Walker, laboratory disbursements	93 45
T. L. Walker, travelling expenses	313 36
Museum Cases and Specimens:	
J. L. English & Coy., specimens	202 80
Foote Mineral Coy., specimens	167 95
Leon H. Bergstrom, meteorite	75 00
Ward's Natural Science Establishment, specimens	75 10
Voigt & Hochgesang, specimens	68 04
W. J. Nixon, specimens	20 00
Eimer & Amend, specimens	12 10
Chas. Rogers & Sons Coy., locks	11 20
Can. Paper Box Coy., trays	20 00
C. P. Railway, freight	13 74
Dom. Express Coy., freight	2 80
C. W. Irwin, freight	1 10
W. A. Parks cartage	3 25
R. J. Hamilton, analysis books	16 25
R. E. Hore, services classifying specimens	208 00
K. A. Mackenzie, labelling specimens	45 00
W. M. Simmons, labelling specimens	7 50
Share of maintenance, Biological Building	100 00
	$3,114 36

(b) Geology:

Fossils, etc.:	
Ward's Natural Science Establishment, fossils	$249 81
J. Townsend, fossils and reports	222 00
Emile Deyrolle, fossils	92 30
C. J. Sarle, fossils	30 10
E. E. C. Kilmer, fossils	5 00
A. Pilkie, fossils	6 00
Aikenhead Hardware, hardware	41 87
Wm. Cane, apparatus	5 50
G. E. Stechert & Coy., reports	4 16
E. Noel & Coy., freight	11 50
C. W. Irwin, freight	7 53
W. A. Parks, travelling expenses	292 75
Supplies and Sundries:	
J. G. Ramsey & Coy., photo materials	3 55
E. Tozer, slides	1 30
A. J. Reading, slides	24 10
Wm. Cane, slide boxes, etc.	9 00
Ont. Rubber Coy., tubing	4 00
Dom. Paper Box Coy., trays	24 00
Can. Paper Box Coy., trays	144 10
Office Specialty Coy., desk, sections, etc.	120 35
Ward's Natural Science Establishment, specimens	20 60
Art Metropole, drawing materials	4 41
A. T. Thompson & Coy., carbons	12 50
Grand & Toy, supplies	3 60

(3) Mineralogy and Geology.—Con.

G. Sparrow & Coy., labels	5 00
University Press, labels, etc.	31 86
Toronto Plate Glass Coy., glass for labels	1 00
R. J. Hamilton, books	18 00
Carswell Coy. binding	2 55
Schomberg Furniture Coy., repairing tables	11 75
A. Coyell, carpentering	18 45
A. R. Williams, wheel	7 70
Rice Lewis & Son, hardware	8 88
Dom. Express Coy., freight	5 25
C. W. Irwin, freight	3 35
C. M. Richardson, cartage	50
J. Gracie, attendant	31 25
W. A. Parks, petty disbursements	30 73
R. E. Hore, labelling specimens	9 00
R. B. Stewart, labelling specimens	49 00
J. W. Leighton, labelling specimens	31 00
H. L. Kerr, labelling specimens	25 00
J. L. Lang labelling specimens	71 00
G. B. Balfour, labelling specimens	10 00
Students' Book Dept., clerk's services	171 25
Office Specialty Mfg. Coy., catalogue cards	75 98
J. C. Scott Coy., museum cases	1,500 00
	$3,458 53

(4) Examination Expenses.

Share of Examination expenses for Departments of Chemistry and Physics	$325 00

APPENDIX IV.

1. SALARIES, UNIVERSITY AND UNIVERSITY COLLEGE.

(Excluding Departments Sustained by Government.)

1. *Faculty, University of Toronto.*

Dr. James Loudon, President	$ 2,300 00	
Dr. R. Ramsay Wright, Vice-President	400 00	
		$2,700 00
MODERN HISTORY AND ETHNOLOGY.		
Geo. M. Wrong, Professor	$ 3,200 00	
E. J. Kylie, Lecturer	1,300 00	
		4,500 00
POLITICAL SCIENCE.		
James Mavor, Professor	$ 3,200 00	
McGregor Young, Prof. of Constitutional and International Law	1,800 00	
A. H. F. Lefroy, Prof. of Roman Law, Jurisprudence, etc.	1,000 00	
S. M. Wickett, Lecturer	1,300 00	
Fraser Scott, Lecturer, Economics, (one third time)	433 33	
		7,733 33
MATHEMATICS.		
Alfred Baker, Professor	$ 3,200 00	
A. T. DeLury, Associate Professor	2,000 00	
M. A. Mackenzie, Assoc. Professor (one third time)	666 67	
J. C. Fields, Special Lecturer	1,600 00	
J. G. Parker, Fellow	500 00	
		7,966 67

BIOLOGY.

R. Ramsay Wright, Professor	$ 3,200 00	
B. A. Bensley, Lecturer, Zoology, etc.	1,500 00	
W. H. Piersol, Lecturer, Biology, etc.	1,200 00	
J. H. Faull, Lecturer, Botany	1,250 00	
R. B. Thomson, Instructor	500 00	
L. C. Coleman, Lecture Assistant, etc.	500 00	
M. D. McKichan, Class Assistant	100 00	
F. J. Munn, A. C. Hendrick, M. H. Embree, A. J. Mackenzie, E. A. McCulloch, A. H. Adams, J. D. Loudon, } Class Assistants at $50	350 00	
H. M. McNeill, Class Assistant	25 00	
A. B. Rankin, Class Assistant	25 00	
A. Pride, Sub-Curator of Museum	750 00	
D. J. Clark, Attendant and Caretaker	550 00	
C. Routley, Attendant in Laboratory	157 50	
T. D. Hughes, Attendant in Laboratory	20 00	
A. Dowie, Messenger	95 00	
E. Crook, Messenger	7 50	
		10,230 00

PHYSIOLOGY.

A. B. Macallum, Professor	$ 3,200 00	
V. E. Henderson, Demonstrator	600 00	
W. J. O. Malloch, A. C. Hendrick, } Class Assistants at $125	250 00	
Miss M. L. Menten, E. C. Dickson, } Class Assistants at $100	200 00	
A. Henderson, W. P. Kaufmann, } Class Demonstrators at $125	250 00	
		4,500 00

ITALIAN AND SPANISH.

W. H. Fraser, Professor	$ 2,800 00	
F. J. A. Davidson, Lecturer	1,075 00	
E. J. Sacco, Instructor, Italian (3 mos.)	100 00	
E. J. Sacco, Retiring allowance	400 00	
F. J. A. Davidson, Duplicate lectures at Trinity under federation agreement	400 00	
		4,775 00

PHILOSOPHY.

August Kirschmann, Professor	$ 2,600 00	
Frederick Tracy, Lecturer	1,775 00	
A. H. Abbott, Lecturer and Laboratory Assistant	1,300 00	
W. G. Smith, Laboratory Assistant	400 00	
		6,075 00
		$48,480 00

2. *Faculty, University College.*

Dr. M. Hutton, Principal	$ 400 00	
		400 00

ETHICS.

J. G. Hume, Professor	$ 3,200 00	
		3,200 00

GREEK.

Maurice Hutton, Professor	$ 3,200 00	
A. Carruthers, Associate Professor	1,900 00	
W. H. Tackaberry, Instructor	800 00	
		5,900 00

LATIN.

J. Fletcher, Professor	$ 3,200 00	
W. S. Milner, Lecturer and Assoc. Prof. Anc. History	2,000 00	
G. W. Johnston, Lecturer	1,775 00	
		6,975 00

ORIENTAL LITERATURE.

J. F. McCurdy, Professor	$ 3,200 00	
R. G. Murison, Lecturer	1,775 00	
R. Davidson, Instructor	1,000 00	
		5,975 00

ENGLISH.

W. J. Alexander, Professor	$ 3,200 00	
D. R. Keys, Assoc. Prof. Anglo-Saxon	2,000 00	
M. W. Wallace, Lecturer (Easter Term only)	1,000 00	
		6,200 00

FRENCH.

John Squair, Professor	$ 2,800 00	
J. H. Cameron, Associate Professor	2,000 00	
St. Elme de Champ, Instructor	1,000 00	
		5,800 00

GERMAN.

W. H. Vandersmissen, Professor	$ 2,800 00	
G. H. Needler, Associate Professor	1,900 00	
P. Toews, Instructor	1,000 00	
		5,700 00
		$40,150 00

3. *Administrative Departments and General Service.*

BURSAR'S OFFICE.

J. E. Berkeley Smith, Bursar, (6 mos.)	$ 1,200 00	
F. A. Mouré, Accountant (5¼ mos.)	656 22	
F. A. Mouré, Bursar (6¾ mos.)	1,350 00	
G. A. Harcourt, Clerk and Bookkeeper (5 mos.)	416 67	
H. J. Bolitho Fees Clerk	800 00	
Miss A. M. Gall, Clerk, etc., (6¼ mos.)	227 50	
		4,650 39

REGISTRAR'S OFFICE.

James Brebner, Registrar	$ 2,000 00	
Miss A. W. Patterson, Registrar's Assistant	750 00	
Miss L. G. Stoner, Stenographer, etc., 9 mos.	270 00	
Miss E. M. Dickson, Assistant, etc., 8 mos.	240 00	
Miss F. Wells, Assistant, 1 mo.	25 00	
Miss M. White, Assistant, 2 mos.	50 00	
		3,335 00

LIBRARY.

H. H. Langton, Librarian	$ 2,300 00	
Miss M. H. Buchan, 1st Assistant	600 00	
Miss F. B. Arnoldi, 2nd Assistant	550 00	
Miss Hester Young, 3rd Assistant (Cataloguer)	500 00	
Miss F. E. Brown, Delivery Clerk	272 50	
Miss G. Buchan, Delivery Clerk	102 50	
S. H. Fussell, Caretaker	600 00	
		4,925 00

GYMNASIUM.

A. Williams, Instructor	$ 900 00	
George Hare, Caretaker	576 00	
W. G. Wood, Secretary Athletic Association	600 00	
		2,076 00

GENERAL SERVICE.

D. B. Dick, Architect, 6 mos.	$ 50 00	
F. Darling, Architect, 6 mos	50 00	
Robt. Martin, Bedel (with free house)	650 00	
F. Hanmer, Engineer (with house and fuel)	650 00	
A. McConnell, Fireman (8 mos.)	320 00	
J. Wicksey, Carpenter, etc.	650 00	
C. E. Bradshaw, Janitor	550 00	
G. Trotter, Gardener (10 mos.)	375 00	
J. Laballister (for self and wife), Cleaners, Main Building	540 00	
S. Richardson, Cleaner, Main Building (9 mos.)	262 50	
G. Thompson, Boy Messenger	230 00	
G. Hagen, Nightwatchman	567 00	
		4,894 50
		$19,880 89
Total (excluding departments sustained by Government)		$108,510 89

2. BURSAR'S OFFICE.

Grand & Toy, fyling cabinet, stationery and office supplies	$ 237 38
United Typewriter Coy., typewriter and desk	99 50
Mrs. Gripton, rubber stamp	1 50
The Bursar, postage, $85; petty disbursements, $109.04	194 04
University Press, printing estimates, etc.	68 20
W. H. Cross, auditor's remuneration	300 00
	$900 62

3. REGISTRAR'S OFFICE.

University Press, stationery	$ 201 97
Grand & Toy, office supplies	73 80
C. W. Mack, repairing rubber stamp	70
National Typewriter Coy., typewriter and repairs	113 75
Hammond Typewriter Coy., typewriter supplies and repairs	22 25
Miss F. Wells, rent of typewriter	25 00
Dominion Typewriter Exchange, rent of typewriter	8 00
C. M. Richardson, cartage	5 85
The Registrar, petty disbursements	50 00
The Bursar, postage supplied	747 24
R. J. Hamilton, occasional assistance	250 00
Dr. A. H. Abbott, occasional assistance	50 00
Dr. M. A. Shaw, occasional assistance	40 00
Miss A. R. Boys, occasional assistance	40 00
H. F. Dawes, occasional assistance	20 00
W. G. McFarlane, occasional assistance	20 00
University Press, printing	147 03
University Press, printing calendar and curricula	1,966 63
J. Squair, revision of Calendar	60 00
J. R. G. Murray, drafting plans for Calendar	25 00
J. N. McEvoy, services re Calendar	15 00
	$3,882 22

4. VICE-CHANCELLOR'S OFFICE.

Hon. Chas. Moss, Honorarium as Vice-Chancellor	$ 400 00
Hon. Chas. Moss, expense indemnity	325 00
	$725 00

5. PRESIDENT'S OFFICE.

W. H. Fraser, allowance as Secretary to President	$ 200 00
N. Y. Evening Post, subscription	9 10
Miss A. W. Patterson, subscriptions to newspapers	6 00
Miss E. M. Forster, copying	1 95
Grand & Toy, binding cases	1 50
Burke & Herwood, schedule of areas	22 00

5. PRESIDENT'S OFFICE.—Con.

University Press, printing and stationery		29 53
The Bursar, postage supplied		15 00
Prof. A. B. Macallum, travelling expenses, representing President		360 00
Dr. C. A. Chant, travelling expenses, representing President		79 29
Dr. J. H. Faull, travelling expenses, representing President		63 40
Prof. J. Squair, travelling expenses, representing President		56 50
Prof. Ramsay Wright, travelling expenses, representing President		49 50
G. Cooper, travelling expenses, representing President		15 00
		$908 82

6. LAW COSTS.

John A. Paterson, K.C., legal services as solicitor to University.	$1,248 57	
Less Mortgage discharges, etc., paid by the parties concerned...	47 50	
		$1,201 07
J. Fletcher, rebate *re* old Wycliffe Building		35 00
F. A. Benson, services re Port Hope Lots		25 00
F. E. O'Flynne, services re Belleville Lots		2 00
		$1,263 07

7. GENERAL INCIDENTALS.

Stinson & Hollwey, commissions on sales at U. C. College Block		$ 912 50
F. J. Stewart, commission on sale of part Howard property		70 00
Mitchell & Kitchen, commission on sale of Cavan farm		87 50
R. G. Corneil, commission re Irwin Loan		4 00
C. J. Mickle, commission re Sutcliffe loan, etc.		53 00
Speight & Van Nostrand, surveying		95 50
M. Hart, sundry valuations		30 25
City Treasurer, taxes for part 1902 re South Lodge		31 86
London Guarantee & Accident Coy., additional premium on bond of Bursar.		35 59
		$1,320 20
Less refunds on fidelity bonds of officers		71 20
		$1,249 00

8. INSURANCE.

Brought forward from 1903-4		$ 2,810 28
British America Assurance Coy.:		
Insurance contents Science Building	$ 675 00	
Women's Residence and contents	30 75	
" workmen's risk	18 00	
Printing plant	35 35	
		759 10
John A. Paterson, K.C.,		
Adjustment on purchase of 47 St. George Street		27 70
		$3,597 08
Less sundry rebates		32 50
		$3,564 58
Charged to Revenue 1904-5 (balance carried forward)		2,000 00

9. TELEPHONES.

Bell Telephone Coy., Telephone Service:		
Bursar's Office	$ 57 69	
President and Registrar's Office	54 64	
Chemical Building	50 00	
Printing Bureau	50 00	
Main Building	50 84	
Library	45 00	
Biological Building	8 14	
Women's Residence	29 56	
		$345 87

10. Convocation Expenses.

G. Harcourt and Son, hoods	$	112 50
Robt. Simpson Coy., decorations		130 00
48th Highlanders, band		45 00
Booth Lumber Coy., lumber		30 75
T. Henry, labor		19 80
Sundry men, labor		4 00
C. M. Richardson, cartage of chairs, etc.		111 35
Ryrie Bros., engraving invitations		2 25
Dining Hall, refreshments, garden party, etc.		208 00
Alumni Association, share of banquet to graduating class		597 28
		$1,260 93

11. Examinations.

(a) Remuneration to Examiners:

Arts:

W. J. Alexander	$	12 00
J. H. Cameron		24 25
P. Edgar		12 00
P. Toews		30 00
A. R. Bain, $6.50, expenses, 80 cents		7 30
G. M. Wrong		12 00
E. J. Kylie		6 00
J. McG. Young		6 00
J. C. Robertson		6 00
M. Hutton		18 00
A. Carruthers		6 00
A. L. Langford		6 00
G. W. Johnston		7 25
A. J. Bell		7 50
W. S. Milner		6 00
A. H. Abbott		6 00
J. G. Hume		6 25
A. Baker		6 00
A. T. DeLury		6 00
W. J. Loudon		6 00
R. Ramsay Wright		6 00
A. P. Coleman		6 00
R. G. Murison		18 50
A. P. Misener		12 00
C. A. Chant		6 00
H. J. Dawson, (expenses)		3 30
A. L. Langford, (presiding)		30 00
E. J. Kylie, (presiding)		28 50
C. A. Chant, (presiding)		17 00
R. B. Thomson, (presiding)		30 00
W. G. Smith, (presiding)		28 50
G. W. Johnston, (presiding)		30 00
A. P. Misener, (presiding)		34 50
R. Davidson, (presiding)		21 00
M. A. Shaw, (presiding)		12 00
F. W. Broadfoot, (presiding)		18 00
A. L. Harvey, (presiding)		15 00
Miss L. Salter, (presiding)		13 50
W. H. Piersol, (presiding)		6 00
J. H. Kerr, (presiding, $40.00; expenses, $2.70)		42 70
D. Sinclair, (attendant)		9 25
H. Wright, (attendant)		22 50
F. W. Broadfoot, (attendant)		23 25
A. L. Harvey, (attendant)		21 00
B. Place, (attendant)		17 50
J. W. Parrott, (attendant)		33 00
F. Lindner, (attendant)		20 00
D. Armbrust, (attendant)		6 50
B. Fullerton, (attendant)		4 75
W. Ruthven, (attendant)		17 50
J. R. Wood, (attendant)		14 00

11. EXAMINATIONS.—Con.

D. S. Dix, (attendant)		3 75	
W. V. Ottaway (attendant)		1 75	
E. Tozer, (attendant)		4 00	
W. B. Tilley, (attendant)		22 50	
John Hill, (attendant)		27 00	
W. Grant, (attendant)		26 50	
H. McClure, (attendant)		28 00	
J. McClure, (attendant)		23 50	
W. J. Graham, (attendant)		9 25	
J. Squair, revising lists		40 00	
J. C. Robertson, revising lists		40 00	
T. L. Walker, revising lists		20 00	
A. H. Young, revising lists		20 00	
			$1,030 55
Medicine:			
H. B. Anderson	$	40 00	
C. A. Temple		40 00	
C. A. Chant		100 00	
B. A. Bensley		100 00	
F. B. Kenrick		80 00	
A. Primrose		80 00	
C. B. Shuttleworth		80 00	
A. B. Macallum		40 00	
C. P. Lusk		60 00	
F. B. Allan		80 00	
W. H. Piersol		120 00	
J. J. Mackenzie		80 00	
C. Sheard		20 00	
W. T. Stuart		20 00	
H. C. Parsons		40 00	
F. LeM. Grasett		40 00	
A. R. Gordon		60 00	
C. L. Starr		80 00	
H. W. Aikins		80 00	
A. H. Wright		60 00	
A. Baines		20 00	
J. M. MacCallum		80 00	
N. A. Powell		60 00	
A. McPhedran		20 00	
I. H. Cameron		20 00	
R. D. Rudolf		80 00	
J. F. W. Ross		60 00	
W. Oldright		80 00	
R. A. Reeve		40 00	
G. R. McDonagh		40 00	
N. H. Beemer		80 00	
H. T. Machell		20 00	
G. Silverthorn		20 00	
G. A. Bingham		20 00	
K. C. McIlwraith		20 00	
W. H. Piersol, (presiding)		27 00	
A. J. Mackenzie, (presiding)		24 00	
D. MacGillivray, (presiding)		24 00	
E. S. Ryerson, (presiding)		24 00	
C. A. Chant, (presiding)		9 00	
W. Tilley, (attendant)		22 25	
D. S. Dix, (attendant)		15 75	
R. A. Fraser, (attendant)		15 75	
W. V. Ottaway (attendant)		10 25	
W. J. Graham, (attendant)		13 50	
D. Sinclair, (attendant)		13 50	
B. Fullerton, (attendant)		13 50	
			$2,172 50
Law:			
C. A. Moss	$	40 00	
A. R. Clute		40 00	
			80 00

EXAMINATIONS.—Con.

Engineering and Applied Science:			
J. Galbraith	$	40 00	
A. P. Coleman		20 00	
T. L. Walker		20 00	
G. R. Mickle		40 00	
W. R. Angus		40 00	
H. G. McVean		40 00	
C. H. C. Wright		40 00	
P. Gillespie		20 00	
T. R. Rosebrugh		60 00	
J. W. Bain		20 00	
L. B. Stewart		20 00	
W. T. Jennings		20 00	
R. A. Ross		20 00	
			$400 00
Dentistry:			
F. N. G. Starr	$	40 00	
A. Primrose		60 00	
G. Silverthorn		40 00	
W. C. Trotter		40 00	
G. S. Martin		40 00	
G. Bentley		40 00	
D. Clark		40 00	
S. Moyer		40 00	
C. E. Pearson		40 00	
E. C. Abbott		60 00	
C. A. Chant, (presiding)		2 50	
R. B. Thomson, (presiding)		5 00	
S. R. Robinson, (attendant)		5 00	
W. B. Tilley, (attendant)		1 00	
F. W. Broadfoot, (attendant)		7 00	
J. Hill, (attendant)		7 00	
			$467 50
Agriculture:			
W. J. Alexander	$	40 00	
Miss A. Rowsome, $20.00; expenses, $3.35		23 35	
W. P. Gamble, $60.00; expenses, $1.45		61 45	
J. H. Faull		40 00	
W. Lochhead, $20.00; expenses, $3.50		23 50	
M. Cummings		60 00	
H. H. Dean		20 00	
F. C. Harrison		20 00	
W. H. Day, $40.00; expenses, $7.00		47 00	
H. L. Hutt, $40.00; expenses, $3.45		43 45	
C. A. Zavitz, $20.00; expenses, $3.00		23 00	
H. D. Fulmer, presiding, $39.00; expenses, $3.10		42 10	
			$443 85
Music:			
Albert Ham, (incl. expenses, $7.70)	$	97 70	
R. Pocccke, (incl. expenses, $15.70)		35 70	
A. S. Vogt, (incl. expenses, $57.30)		182 63	
W. O. Forsyth, (incl. expenses, $15.65)		47 32	
St. J. Hyttenrauch, (incl. expenses, $10.75)		32 42	
J. E. P. Aldous, (incl. expenses, $6.00)		47 67	
H. M. Field, (incl. expenses, $8.70)		45 37	
C. L. M. Harris, (incl. expenses, $5.00)		125 50	
T. W. Martin, (incl. expenses, $24.00)		74 00	
David Ross, (incl. expenses, $2.00)		12 00	
R. Tandy		13 33	
E. W. Schuch, (incl. expenses, $10.50)		35 50	
F. S. Welsman		96 67	
W. E. Fairclough		60 00	
W. R. Young, (presiding)		34 77	
C. A. Mayberry, (presiding)		4 75	
W. H. Ballard, (presiding: expenses, 50 cents)		8 50	
F. W. Merchant, (presiding; expenses, 50 cents)		7 50	
H. W. Brown, (presiding)		2 00	
Mrs. A. T. Watt, (presiding; expenses, $7.08)		10 08	

EXAMINATIONS.—Con.

Music:			
Wm. Watt, (presiding: expenses, 10 cents)		2 10	
Miss G. E. Fraser, (presiding)		2 00	
W. J. Fenton, (presiding)		5 00	
J. A. Clark, (presiding)		2 00	
T. Carscadden, (presiding)		2 00	
G. L. Johnston, (presiding; expenses, 50 cents)		2 50	
M. Forster, (presiding)		2 00	
J. R. Stone, (presiding; expenses, 25 cents)		3 25	
J. J. Bell, (presiding)		2 00	
W. T. Allison, (presiding)		2 00	
J. R. Patterson, presiding; expenses, 60 cents)		2 60	
L. Conley, (presiding: expenses, 25 cents)		3 25	
J. S. Will, (presiding)		3 00	
H. I. Strang, (presiding)		2 00	
M. A. Shaw, (presiding)		5 00	
J. Henderson, (expenses)		6 00	
Miss A. W. Patterson, (expenses)		7 00	
W. B. Tilley, (attendant)		2 50	
			$1,029 61
Pharmacy:			
C. F. Heebner, (incl. expenses, $79.10)	$	219 10	
G. Chambers, (incl. expenses, $12.00)		72 00	
A. Moir		40 00	
P. L. Scott, incl. expenses, $4.00)		44 00	
C. F. Heebner, (presiding)		15 00	
W. B. Tilley, (attendant)		7 50	
D. S. Dix, (attendant)		7 50	
W. J. Graham, (attendant)		7 50	
W. H. B. Ketchen, (attendant)		7 50	
D. Ritchie, (attendant)		7 50	
D. Sinclair, (attendant)		7 50	
			$435 10
Pedagogy:			
F. Tracy	$	20 00	
F. W. Merchant		20 00	
			40 00
Matriculation:			
W. S. Milner, (presiding)	$	34 00	
H. J. Bolitho, (presiding)		32 00	
Jas. Brebner, (presiding)		8 00	
L. Gianelli, (attendant)		12 00	
J. A. Sharrard, (attendant)		9 75	
			95 75
Household Science:			
Miss A. L. Laird		20 00	
A. B. Macallum		20 00	
J. A. Amyot		20 00	
L. C. Coleman		20 00	
			80 00
Physical Drill:			
E. R. Hooper		6 00	
A. Williams		6 00	
			12 00
			$6,286 86
(b) Stationery and Supplies for Examinations:			
University Press		$578 70	
Grand & Toy		14 00	
Hutchison & Coy., parchments		418 30	
R. M. Williams, engrossing		41 29	
Gourlay, Winter & Leeming, hire of pianos		16 00	
J. F. McDonald, hire of pianos		10 00	
M. Rawlinson, cartage		6 10	
C. M. Richardson, cartage		25 00	
Can. Express Coy., express		55	
R. Martin, petty expenses		6 40	
F. Lindner, messenger service		12 00	
J. S. McCracken, labor		12 00	
T. Hare, labor		8 00	
			1,148 34

EXAMINATIONS.—Con.

(c) Printing Examination Papers and Class Lists:		
University Press	1,972 03	
Less papers sold	14 25	
		1,957 78
(d) Clerical assistance, May, 1904:		
A. G. McPhedran	61 00	
F. W. Broadfoot	57 00	
A. S. Rogers	57 50	
A. L. Harvey	51 00	
Miss L. G. Stoner	40 00	
		266 50
		$9,659 48
Government share for Depts. of Chemistry and Physics		325 00
		$9,334 48

12. LIBRARY.

(a) Maintenance of Building:		
Elias Rogers Coy., fuel	$557 46	
City Treasurer, water	28 96	
Mrs. Long, cleaning	170 00	
Wm. Beers, repairing roof	60 00	
W. J. McGuire & Coy., repairing drain	109 97	
Wm. Cane, repairing chairs	3 00	
J. McIntosh, painting	1 00	
G. Cowling, cleaning marble	4 00	
R. Dinnis & Son, shelving	23 91	
T. G. Rice Wire Mfg. Coy., doors	50 00	
Ontario Rubber Coy. chair tips	5 40	
Rice Lewis & Son, locks, etc.	6 14	
W. J. O'Brien, soap	2 16	
Mrs. Fussell, washing towels	9 40	
		$1,031 40
(b) General Library Appropriation, Books, etc.:		
F. A. Brockhaus, books	$2,427 54	
Cazenove & Son, books	1,996 23	
H. LeSoudier, books	667 26	
B. Seeber, books	34 69	
R. Friedlander & Son, books	13 29	
Gustav Fock, books	40 37	
Chas. Scribner's Sons, books	143 55	
Wm. J. Gerhard, books	4 19	
New Talmud Pub. Coy., books	50 10	
H. T. Bardal, books	2 00	
G. N. Morang & Coy., books	27 53	
Johns Hopkins Press, books	10 13	
P. S. King & Coy., books	4 89	
A. H. Clark Coy., books	13 03	
G. H. Wilkinson & Coy., books	7 50	
Wm. Briggs, books	6 50	
Thomson Pitt Book Coy., books	2 00	
P. G. Roy, books	11 60	
R. J. Hamilton, books	171 95	
Prof. G. M. Wrong, books	3 00	
Dr. A. H. Abbott, books	3 65	
Annual Review Pub. Coy., books	3 00	
Chas. Evans, books	15 00	
Congdon & Britnell, books	14 50	
J. Britnell, books	75	
Burrows Bros. Coy., books	67	
Empire Club, books	1 00	
Lundy's Lane Historical Society, books	82	
Publishers' Weekly, books	8 10	
U. C. C. Old Boys' Association, books	1 00	
Ont. Pub. Coy., books	2 92	
Union Library Association, books	3 92	

EXAMINATIONS.—Con.

(b) General Library Appropriation, Books, etc.:			
"Torontonensis"		3 00	
Physiological Society, periodicals		7 77	
Ont. Library Association, periodicals		2 00	
Educational Monthly, periodicals		1 00	
Biological Bulletin, periodicals		2 25	
Municipal World, periodicals		2 32	
Canada Law Review, periodicals		5 00	
W. H. Guild & Coy., periodicals		176 11	
Gauthier-Villars, periodicals		51 58	
Might Directories, directory		6 00	
Brown Bros., binding		477 40	
Bryant Press, binding		382 86	
Robinson & Heath, freight		93 04	
Steinberger, Hendry Coy., maps		3 25	
United Typewriter Coy., supplies		1 00	
Grand & Toy, cabinet, cards, etc.		52 10	
The Librarian, petty disbursements		75 00	
The Librarian, re Univ. Historical Studies		300 00	
University Press, stationery and printing		53 97	
		$7,388 33	
Less chargeable to:			
Medical Fund	$600 00		
Goldwin Smith Fund	154 85		
Stewart Bequest	60 00		
Local Lectures Fund	55 28		
Library Insurance Fund	3,518 20		
		$4,388 33	
			$3,000 00
(c) Clerical Assistance:			
Miss G. Buchan, assistance		$145 41	
Miss F. E. Brown, assistance		5 00	
Miss S. M. Blackey, assistance		48 00	
P. G. Brown, assistance		5 00	
Miss M. E. Foote, typewriting		33 34	
			236 75
			$4,268 15

13. GROUNDS.

R. Robertson, drains and culverts for new roads	$765 65
R. Dinnis & Son, lumber	54 17
John Wood, sod	21 75
John Cotterill, flowers	166 27
Steele, Briggs Seed Coy., garden tools, seed, etc.	21 35
Elwanger & Barry, trees	12 60
Canadian Express Coy., freight on trees	4 39
Stinson & Coy., bands for trees	20 15
R. F. Hogg, tree labels	46 00
R. B. Thomson, labelling trees	8 66
J. Young, fertiliser	1 50
Aikenhead Hardware, shovels, etc.	7 23
G. Pearsall, sharpening tools	3 90
John Ewing, plough irons	4 00
J. Rydall, trace chains	1 50
F. Finch, hire of horse	4 50
C. M. Richardson, cartage	6 65
Carbon Light & Power Coy., rent of lamp	31 00
Toronto Electric Light Coy., changing poles	20 03
J. Prattis, policeman, 92 days	184 00
Chief of Police, services of constable	6 00
The Bursar, fortnightly pay lists, laborers	1,240 85
New Granolithic Walks: portion charged to this year's account of $1,500 brought forward last year	500 00

GROUNDS.—Con.

Repairs to Gardener's house:	
R. Simpson Coy., paper	17 65
Stewart & Wood, paint	9 70
W. H. Little, plastering	22 00
Wm. Cane, carpentering, etc.	15 00
Stinson & Coy., repairing roof, etc.	36 95
W. J. McGuire & Coy., plumbing	29 95
J. Laballister, papering and cleaning	23 00
14. MAIN BUILDING.	$3,286 40
W. J. McGuire & Coy., changing thermostat system	$967 00
Bennett & Wright, Watchman's recorder	500 00
W. J. McGuire & Coy., repairs to plumbing, radiators, electrical work, etc.	663 14
Johnson Service Coy., repairing heat regulating apparatus	11 50
Forbes Roofing Coy., repairing roofs	323 32
Can. Gen. Elec. Coy., electric supplies, etc.	59 91
John F. Mackay, repairs to electric fixtures	35 60
Robt. McCausland, repairs to windows	38 33
W. McKendry, repairs to clocks	12 50
Bertram Engine Works, repairs to engine	82 11
Jas. McIntosh, painting and glazing	114 25
H. R. Bonthron, painting, etc.	27 55
Stinson & Coy., water heater, etc.	19 35
Rice Lewis & Son, hardware, etc.	15 59
Aikenhead Hardware, hardware, etc.	47 23
R. Dinnis & Son, lumber	193 17
G. Booth & Son, signs	4 75
G. Menzies, carpentering	277 55
J. Wicksey, screen	1 60
Rogers Furniture Coy., chairs	128 25
John Kay, Son & Coy., blinds	10 35
Wheeler & Bain, repairing eave troughs, etc.	36 95
Fletcher Mfg. Coy., hardware, etc.	16 85
G. W. Grant & Coy., engine oil and supplies	64 55
F. M. Cummings, soap, etc.	14 86
Can. Oil Coy., soap, etc.	68 93
John Taylor & Coy., soap, etc.	5 30
R. Simpson Coy., brooms	6 00
Canada Paper Coy., paper	40 11
Beardmore Belting Coy., splicing belt	3 30
Ontario Rubber Coy., hose	24 55
Jas. Morrison Coy., valves, washers, etc.	5 80
G. Cowling, polishing marble	6 50
Grand & Toy, office supplies	6 90
University Press, printing	4 06
R. E. Walker & Coy., towels	14 34
D. Pike Coy., repairing flag	2 00
Wm. Cane, keys	18 20
E. H. Roberts, keys	1 50
Tangent Cycle Coy., repairs to messenger's bicycle	7 00
Mrs. Laballister, washing towels	74 40
S. Richardson, sundry labor	9 00
J. Rossall, sundry labor	3 00
A. W. McConnell, sundry labor	1 50
R. Dinnis & Son, lockers	153 00
Aikenhead Hardware, locks	22 49
Wm. Cane, keys	8 00
Elias Rogers Coy., fuel	3,989 26
City Treasurer, water	203 64
Tor. Elec. Light Coy., electric current	925 40
Consumers' Gas Coy., gas	76 08
	$9,346 52
Government share for Department of Physics	2,000 00
	$7,346 52

15. Biological Department.

(a) Maintenance of Building:	
Elias Rogers Coy., fuel	$1,159 31
Consumers' Gas Coy., gas	104 32
Tor. Elec. Light Coy., electric current	81 00
City Treasurer, water	101 37
Furnishings and Cleaning Materials:	
Fletcher Mfg. Coy., house furnishings	44 07
T. Eaton Coy., carpet and linoleum	86 10
John Kay, Son & Coy., mat and shades	7 00
John Catto & Son, towels, etc.	12 85
Canada Paper Coy., toilet paper	10 50
Canadian Oil Coy., soap, etc.	11 68
Evans & Son, cleaning materials	9 00
Goold, Shapley & Muir Coy., wax	8 00
United Factories, brushes	5 32
Aikenhead Hardware, sundries	22 31
Tor. Auer Light Coy., lights	10 25
University Press, stationery, etc.	11 52
Professor Wright, petty disbursements	17 90
Repairs:	
R. Dinnis & Son, lumber	279 56
S. Pearcy & Coy., paint, etc.	75 06
G. Bullock, painting	74 40
R. Robertson, repairing brickwork, etc.	70 32
Bennett & Wright, repairing plumbing	93 13
W. J. McGuire & Coy., repairing plumbing	67 03
Rennie & Son, repairing roof	72 10
Elliott & Son, glazing	13 40
Fensom Elevator Works, repairing hoist	15 50
C. W. Ketcheson, repairing batteries	7 95
Tor. Elect. Light Coy., repairing wiring, lamps, etc.	45 53
Douglas Bros., repairing downpipe	3 00
Ont. Rubber Coy., chair tips	6 28
Chamberlain Weather Strip Coy., weather strips	41 80
Aikenhead Hardware, hardware	38 10
Rice Lewis & Son, locks and hardware	31 30
Cleaning, etc.:	
Mrs. Clark, charwoman	120 00
C. W. Plowman, boy cleaner	80 00
Prof. Wright, to pay sundry cleaners	171 89
Lockers:	
G. Menzies, making new lockers	127 05
	$3,136 20
Government share for Department of Mineralogy	100 00
	$3,036 20
(b) Maintenance of Department:	
Laboratory Supplies:	
Chandler & Massey, laboratory materials	$28 05
Evans & Sons, chemicals	79 19
Schering & Glatz, chemicals	4 60
J. G. Ramsey & Coy., photo materials	23 20
Estate E. A. McMicking, books	33 75
R. Friedlander & Son, diagrams, books, etc.	12 77
W. Junk, diagrams, books, etc.	3 10
R. & J. Beck, Eikonometer	5 58
Ernst Leitz, apparatus	28 15
Elliott & Son Coy. glass	1 50
Journal of Experimental Zoology, subscription	10 16
Miss Jackson, diagrams	40 00
Jas. Knowles, flour	50
J. A. Simmers, seeds	14 50
Jas. Iredale, repairing stand, etc.	7 50
J. B. Colt & Coy., repairing lamp, etc.	18 70
T. S. Plaskett, repairing microscopes, etc.	16 85

15. Biological Department.—Con.

Laboratory Supplies:	
Robinson & Heath, freight	13 09
University Press, stationery and printing	6 65
Prof. Wright, petty disbursements	22 05
Dr. B. A. Bensley, petty disbursements	2 45
Museum Specimens:	
Prof. Wright, for purchase of specimens in Europe	$400 00
Museum Cases and Supplies:	
Chas. Rogers & Sons Coy., cases	464 10
Jas. Iredale, cases	7 00
Elliott & Son Coy., glass for cases	18 60
Dom. Paper Box Coy. trays	18 25
R. Dinnis & Son, trays	6 25
J. Coulter, trays	7 50
Miss R. E. Jackson, diagrams	27 60
Friedlander & Sohn, diagrams	8 24
J. R. G. Murray, labelling	46 75
Warmbrunn, Quilitz & Coy., glassware	120 16
Adams & Coy., camera, etc.	115 09
P. Wytsman, museum supplies	41 70
Inland Revenue Dept., methylated spirits	43 20
Robinson & Heath, freight	10 96
Dominion Express Coy., freight	12 25
Wm. Briggs, books	5 25
University Press, card cutter, etc.	15 50
Aikenhead Hardware, sundries	1 60
J. W. Anderson, expenses *re* collection	25 00
Prof. Wright, petty disbursements	5 00
Marine and Lake Laboratories:	
B. A. Bensley, expenses	115 00
J. H. Faull, expenses	100 00
J. R. G. Murray, expenses	50 00
L. C. Coleman, expenses	35 00
Students' Laboratory Supplies:	
Appropriation transferred to Biological Students' Supply Fund	1,191 50
Catalogue Preparation:	
E. M. Walker, 7 months' work	175 00
J. B. Williams, 3 months' work	75 00
New Apparatus:	
Bausch & Lomb Coy., projection apparatus	296 35
E. Leitz, microscopes	145 10
J. F. Hartz Coy., microscopes	31 05
Botanical Apparatus and Specimens:	
Carl Zeiss, microscopes	172 22
R. Jung, apparatus	23 80
Cambridge Scientific Instrument Coy., apparatus	27 94
Chandler & Massey, apparatus and cabinet	111 33
Aikenhead Hardware, knife	1 75
James Lomax, specimens	52 25
F. S. Collins, specimens	140 25
A. B. Seymour, material	28 25
J. G. Ramsey & Coy., material	6 30
Robinson & Heath, freight	8 90
C. W. Irwin, freight	4 13
J. H. Faull, travelling expenses collecting specimens, material, etc.	234 51
R. B. Thomson, travelling expenses, herbarium work, etc.	118 00
	$4,915 97

16. Physiological Department.

Maintenance and Laboratory Supplies:	
Vereinigte Fabriken, supplies	$389 06
Eimer & Amend, supplies	77 15
M. Rinck, supplies	147 00
Chandler & Massey, supplies	63 54
Carl Zeiss, supplies	34 81
Harvard Apparatus Coy., supplies	26 80
Lyman Bros. Coy., chemicals, etc.	29 61

16. PHYSIOLOGICAL DEPARTMENT.—Con.

Maintenance and Laboratory Supplies:		
Baker & Adamson Coy., chemicals, etc.		51 12
Merck & Coy., chemicals, etc.		28 79
J. A. Fontaine, frogs		30 00
J. M. Shaw, frogs		36 00
Steinberger, Hendry Coy., blackboards		16 75
Booth Copper Coy., cylinders		16 00
Fletcher Mfg. Coy., water cooler		14 00
V. A. Russill, jars		10 00
Ontario Rubber Coy., tubing, etc.		2 24
G. B. Meadows Coy., screen		7 20
John Kay, Son & Coy., mirrors		5 50
Tor. Elec. Light Coy., batteries		30 00
Rice Lewis & Son, hardware		6 43
Polson Iron Works, castings		4 50
Lake Simcoe Ice Coy., ice		4 10
Robinson & Heath, freight		27 96
Jas. McIntosh, kalsomining		14 50
Students' Book Dept., books		4 50
Brown Bros., blank books, etc.		25 35
University Press, printing, etc.		72 97
V. E. Henderson, petty disbursements, etc.		28 15
Apparatus:		
Owen Ballard, lathe and drill		200 00
Maintenance, Medical Building:		
Medical Faculty, share due by Physiology		2,500 00
		$3,904 03
Less paid by Prof. Macallum from Students' Account		38 48
	17. PSYCHOLOGICAL DEPARTMENT.	$3,865 55
Spindler & Hoyer, philosophical apparatus		$ 00 00
E. Zimmerman, philosophical apparatus		90
August Natterer, philosophical apparatus		22 04
A. H. Abbott, philosophical apparatus		30 00
T. S. Plaskett, work on apparatus		24 95
A. T. Thompson Coy., lenses		33 15
J. B. Colt Coy., lantern slides		5 85
Can. Gen. Elec. Coy., electric supplies		27 07
Central Elec. Coy., electric supplies		75
Lockhart Photo Supply Coy., photo materials		41 70
J. G. Ramsey & Coy., photo materials		95
T. L. Walker, lamp		2 00
B. & H. B. Kent, spectacles		3 00
Citizens' Gas Control Coy., governor		4 20
Burton-Reid Coy., cardboard		1 04
Prang Educational Coy., colors		8 50
J. J. Follett, cloth		4 20
W. A. Murray Coy., cotton		2 00
Gustav Fock, books		11 62
University of Chicago Press, books		10 01
J. W. W. Wallin, books		2 40
R. Dinnis & Son, drawers, etc.		19 42
Yokes Hardware Coy., hardware		51
Office Specialty Mfg. Coy., cabinet		51 20
United Typewriter Coy., on acct. typewriter		26 00
C. W. Irwin, freight		2 25
Dominion Express Coy., freight		1 55
Fraser Storage Coy., cartage		1 00
University Press, stationery, etc.		20 09
W. G. Smith, petty disbursements		98 55
		$599 90
Less refund from Schmidt & Haensch on account paid last year		89 90
		$450 00

18. MATHEMATICS.

University Press, printing	$7 33
I. J. Birchard, reading papers	17 50
H. J. Dawson, reading papers	28 00
	$52 83

19. POLITICAL SCIENCE.

University Press, stationery, etc.	$14 00
A. J. Reading, lantern slides	16 85
E. Repath, assistance *re* lantern	6 00
	$36 85

20. HISTORY.

J. S. Carstairs, reading essays	$25 00
H. H. Langton, reading essays	25 00
A. F. Barr, reading essays	25 00
Brown Bros., pamphlet cases	10 00
Copp Clark Coy., maps	8 50
	$93 50

21. ITALIAN AND SPANISH.

A. J. Reading, lantern slides	$21 19
W. H. Fraser, books	1 20
Beck Duplicator Coy., duplicator	5 20
University Press, printing, etc.	2 36
Students' Book Dept., books	2 50
Dominion Express Coy., freight	2 30
	$34 75

22. ADVERTISING (University).

Alumni Association, annual grant	$200 00
Alumni Association, advertisement in University Monthly	100 00
"Torontonensis," advertisement	15 00
St. Margaret's College Chronicle, advertisement	8 00
Toronto Globe, advertisement	67 50
Toronto Mail and Empire, advertisement	1 50
Toronto World, advertisement	4 00
Toronto Star, advertisement	26 60
Canadian Almanac, advertisement	10 00
	$432 60

23. INCIDENTALS (University).

R. M. Williams, engrossing resolutions and addresses	$35 15
P. W. Ellis & Coy., engraving medals	6 23
University Press, sundry printing	10 54
Toronto Weekly Railway Guide, subscription	5 20
Wm. Jay & Son, funeral wreaths	40 00
Chief of Fire Brigade, attendance of firemen at functions	22 00
Diamond Dry Powder Coy., fire extinguishers	40 00
J. B. Colt Coy., lantern, etc.	30 23
The Bursar, sundry petty disbursements	6 10
	$195 45

24. UNIVERSITY COLLEGE DEPARTMENTS.

English:	
Miss A. R. Riddell, reading essays	$100 00
J. S. Carstairs, reading essays	50 00
	$150 00
French:	
St. Elme de Champ, scientific lectures	$150 00
W. C. Jacques, lantern slides	25 91
University Press, stationery	4 09
	$180 00

24. UNIVERSITY COLLEGE DEPARTMENTS.—Con.

German:		
P. Toews, scientific lectures		$150 00
A. J. Reading, lantern slides		22 60
Steinberger, Hendry Coy., mounting pictures		2 40
		$175 00
Oriental Literature:		
J. F. McCurdy, books		25 00
Stationery, etc.:		
University Press, supplies		$2 26
The Bursar, postage supplied to Registrar		60 00
		$62 26
Printing:		
University Press		$57 41
Advertising:		
"Torontonensis," advertisement		$15 00
Toronto Globe, advertisement		46
Toronto Telegram, advertisement		1 72
Toronto News, advertisement		1 68
Toronto Star, advertisement		80
		$19 66
Incidentals:		
Mrs. M. White, physical instruction to women students		$125 00
Gourlay, Winter & Leeming, hire of pianos		43 25
R. M. Williams, engrossing		12 25
J. B. Colt Coy., lantern		25 00
W C. Jacques, lantern slides		40 00
A. J. Reading, lantern slides		43 10
Newton & Coy., lantern slides		18 10
R. G. Murison, lantern slides		15 00
G. W. Johnston, lantern slides		8 50
H. F. Dawes, lantern slides		26 50
University Press, cards		72
R. Dinnis & Son, lockers		58 00
Jas. McIntosh, staining lockers		14 75
Aikenhead Hardware, locks for lockers		14 60
		$444 77

25. GYMNASIUM AND STUDENTS' UNION.

Elias Rogers Coy., fuel		$575 93
City Treasurer water		120 16
Consumers' Gas Coy., gas	$98 32	
Less paid by Students' Societies	31 63	
		66 69
Mrs. Catherine Wood, cleaning		75 00
W. J. McGuire & Coy., repairing plumbing, etc.		255 10
R. Robertson, repairing brickwork		10 93
R. Dinnis & Son, partition		110 00
J. Mansfield, painting		4 00
J. Laballister, glazing		1 25
Rice Lewis & Son, hardware, etc.		15 00
G. Cowling, polishing marble		4 00
Canada Paper Coy., paper		10 50
Can. Oil Coy. oil, etc.		40 00
Steele, Briggs Seed Coy., horse mower for Athletic Field		120 00
Athletic Association, services of boy		126 00
		$1,534 56

26. DINING HALL.

University Dining Hall Committee, grant towards maintenance	$500 00

27. UNIVERSITY PRESS.

Plant Account:		
Amount appropriated for final payment on original purchase of presses and type		$650 00
Additions to type and equipment:		
Miller & Richard, type	$444 61	
John Haddon & Coy., type	146 88	
Rice Lewis & Son, steel figures	2 55	
Poole & Coy., chases	7 00	
Gibson Marble Coy., slabs	4 00	
		605 04
General Expenses:		
Fortnightly Pay Lists, wages of printers	$3,394 61	
Brown Bros. paper etc.	1524 49	
Barber & Ellis Coy., paper, etc.	239 01	
Kinleith Paper Co., paper, etc.	186 62	
Canada Paper Coy., paper, etc.	130 29	
Buntin, Reid & Coy., paper, etc.	122 63	
W. J. Gage & Coy., paper, etc.	111 45	
Copp, Clark Coy., paper, etc.	37 70	
Lincoln Paper Mills Coy., paper, etc.	24 00	
Grand & Toy, paper, etc.	21 30	
Warwick Bros. & Rutter, paper, etc.	2 85	
Rolph & Clark, parchments and lithographing	110 75	
Royle Engraving Coy., cuts	32 25	
Littlejohn & Vaughan, electros	31 65	
Can. Printing Ink Coy., ink, etc.	22 38	
Hart & Riddell, Bristol board	10 00	
Alexander & Cable, lithographing	8 82	
Whaley, Royce & Coy., music plates	7 15	
Standard Embossing Coy., embossing	30 27	
West & Gillis, folding and binding	226 45	
Lawson & Wilson, binding, etc.	61 07	
W. A. Blashford, binding	66 50	
Anderson Printing Coy., presswork, binding, etc.	493 00	
R. G. McLean, composition, printing, etc.	906 92	
Dudgeon & Thornton, printing	9 50	
Mail Job Printing Coy., printing	4 75	
Brown-Searle Printing Coy., printing	11 00	
H. Jewell, engrossing	10 00	
Dom. Paper Box Coy., tubes	4 35	
Art Metropole, drawing paper, crayons, etc.	18 17	
P. W. Ellis & Coy., tags	60	
Kilgour Bros., cotton	1 05	
C. W. Mack, rubber stamp	45	
C. C. Custance, repairing die	3 25	
Westman & Baker, grinding	75	
E. Carroll, grinding	50	
G. & J. Murray, benzine	3 60	
W. J. Harris, wipers	1 00	
Aikenhead Hardware, hardware	7 78	
Rice Lewis & Son, hardware	3 45	
Wm. Cane, keys	1 25	
Miller & Richard, printers' supplies	6 72	
John Haddon & Coy., printers' supplies	8 40	
Kemp Mfg. Coy., pans	1 03	
R. Dinnis & Son, type trays and cases	59 66	
Office Specialty Mfg. Coy., tray	1 05	
A. Welch, stove	8 76	
Elias Rogers Coy., fuel	44 78	
Breakey's Cartage Agency, cartage	10 00	
Haynes' Transfer, cartage	14 25	
T. W. Langstone, petty expenses	25 66	
Atlas Assurance Coy., insurance on paper in hands of binders	7 17	
G. H. Needler, German translation	2 50	
		$8,073 59
		$9,328 63

27. UNIVERSITY PRESS.—Con.

Receipts:

H. M. Allen	$15 60
Alumni Association	24 24
Anglo-Canadian Music Pub. Association	15 00
Athletic Association	121 41
Atwell Fleming Coy.	5 51
J. Brebner	3 86
J. P. Charlebois	1 65
Class of 1895	2 81
Class of 1905	12 09
Class of 1906	11 95
W. H. Collins	57
Dining Hall	8 26
Mrs. Russell Duncan	7 58
Enigneering Societv. S. P. S.	29 30
Faculty Union	7 11
Field Coy. Canadian Engineers	21 80
W. H. Fraser	88
Gourlay, Winter & Leeming	15 00
R. J. Hamilton	24 97
C. L. M. Harris	31 10
Historical Club	5 57
W. R. Lang	1 60
W. J. Larkworthy	3 25
Literary and Scientific Society	37 54
J. Loudon	1 65
Medical Faculty	688 38
W. Lash Miller	4 29
Modern Language Club	2 22
Hon. Chas. Moss	1 22
J. R. G. Murray	1 44
A. B. Macallum	11 76
R. G. McLean	2 50
J. C. McLennan	3 78
J. L. McPherson	1 37
Natural Science Association	10 07
G. H. Needler	7 11
Old Lit. Party	6 67
Ont. Societv of Architects	18 52
Miss A. W. Patterson	1 25
R. A. Reeve	7 37
Royal Astronomical Society	10 77
Royal College of Dental Surgeons	19 66
School of Practical Science	2 64
H. Shumer	4 25
Sigma Pi Fraternity	6 58
J. Squair	5 01
Students' Account, Biology	134 78
Students' Volunteer Union	1 24
Miss Salter	85
St. Margaret's College	161 13
R. B. Thomson	27 89
Toronto Ladies' Golf Club	2 66
Undergraduates' Union	14 70
University Sermon Committee	19 10
University Studies	43 81
"Varsity"	5 15
Victoria College	156 29
Victoria College Missionary Society	93
T. L. Walker	1 56
Whaley, Royce & Coy.	15 00
J. Wicksey	83
Women's Literary Society	10 25
R. Ramsay Wright	2 80
Wycliffe College	10 37
Y. M. C. A.	47 90
McGregor Young	1 71

27. UNIVERSITY PRESS.—Con.

Departments:		
Bursar's Office	68 20	
Registrar's Office	2,315 63	
President's Office	29 58	
Examinations	2,550 73	
Senate Elections	287 05	
Library	53 97	
Main Building	4 06	
Biological Department	33 67	
Physiological Department	72 97	
Psychological Department	20 09	
Italian and Spanish	2 36	
Mathematical Department	7 33	
Political Science Department	14 00	
Chemistry	105 66	
Physics	103 22	
Mineralogy and Geology	62 07	
Incidentals	10 54	
University College Departments	64 48	
Summer Session	13 22	
T. W. Langstone, cash sales	5 33	
	$7,710 27	
Accounts receivable	1,338 67	
		$9,048 94
		$279 69
Balance 30th June, 1905		970 31
		$1,250 00

28. EDUCATIONAL ASSOCIATION RECEPTION.

University Dining Hall, refreshments	$150 00
T. S. Plaskett, electric wiring	5 00
Tor. Elec. Light Coy., arc lights	5 00
H. Maughan, use of moving picture machine	25 00
J. K. Williams, cloak room service	6 00
F. Hanmer, labor and attendance	9 00
J. Parrott, labor and attendance	9 00
J. Laballister, labor and attendance	8 00
C. E. Bradshaw, labor and attendance	6 00
G. Thompson, labor and attendance	3 00
J. Wicksey, labor and attendance	2 00
C. M. Richardson, cartage	15 00
	$243 00

29. OBSERVATORY REMOVAL.

R. F. Stupart, compensation for vacation of premises	$1,000 00
W. F. Davison, compensation for vacation of premises	75 00
	$1,075 00

30. SENATE ELECTIONS.

University Press, stationery and printing	$287 05
The Bursar, postage supplied to Registrar	165 00
H. H. Langton, scrutineer	50 00
A. Carruthers, scrutineer	50 00
Jas. Brebner, services	50 00
Miss E. M. Dickson, clerical assistance	135 00
F. W. Broadfoot, clerical assistance	14 00
J. A. Sharrard, clerical assistance	23 00
S. A. Cudmore, clerical assistance	8 00
R. Cochrane, clerical assistance	5 00
C. E. Bradshaw, clerical assistance	5 00
	$792 05

31. Unforeseen and Unprovided Items.

A. Millard, funeral of the late Bursar	$108 25
Mrs. Hannah Smith, gratuity to widow of late Bursar	600 00
James Brebner, honorarium in connection with leave of absence	300 00
J. Russell MacLean, lectures on Public Speaking	75 00
Prof. W. J. Loudon, towards experiments in Atmospheric Electricity	100 00
	$1,183 25

APPENDIX V.

MEDICAL FACULTY.

Receipts.

Fees:		
First year	$14,660 00	
Less Arts portion	1,806 00	
		$12,854 00
Second year	14,716 00	
Less Arts portion	2,070 00	
		12,646 00
Third year		12,196 00
Fourth year		15,687 00
Fifth year		150 00
Miscellaneous		890 00
Registration		805 00
Examination		1,856 00
Psychology		500 00
Interest on Bank Account		638 08
New Medical Building, share of maintenance from Physiological Department		2,500 00
New Medical Building, rent of rooms to Provincial Board of Health		500 00
Sale of animals		18 75
		$61,240 83

Expenditure.

Summary.

Salaries		$38,814 80
Maintenance:		
Anatomical Department	$4,173 72	
Departments other than Anatomy	6,910 76	
New Building	5,738 57	
General Expenses	4,780 59	
		21,603 64
Balance 30th June, 1905		822 39
		$61,240 83

Details.

Salaries.

Professors:	
A. Primrose, Anatomy	$2,000 00
J. J. Mackenzie, Pathology, etc.	2,000 00
J. H. Cameron, Surgery and Clinical Surgery	950 55
F. LeM. Grasett, Surgery and Clinical Surgery	922 05
G. A. Peters, Surgery and Clinical Surgery	950 55
L. Teskey, Surgery and Clinical Surgery	922 05
A. McPhedran, Medicine and Clinical Medicine	950 55
J. L. Davison, Clinical Medicine	922 05
C. Sheard, Preventive Medicine	922 05
J. Algernon Temple, Operative Obstetrics, etc.	922 05
A. H. Wright, Obstetrics	950 55
W. Oldright, Hygiene	950 55

Salaries.—Con.

Professors:		
J. F. W. Ross, Gynæcology	633 70	
J. M. MacCallum, Pharmacology, etc.	633 70	
N. A. Powell, Medical Jurisprudence	614 70	
R. A. Reeve, Ophthalmology, etc.	380 22	
G. R. McDonagh, Laryngology, etc.	380 22	
W. H. Ellis, Toxicology	316 95	
G. S. Ryerson, Ophthalmology, etc.	245 88	
G. H. Burnham, Ophthalmology, etc.	253 48	
		$16,821 85
Associate Professors:		
H. A. Bruce, Clinical Surgery	$506 96	
D. J. G. Wishart, Laryngology, etc.	289 06	
G. A. Bingham, Clinical Anatomy and Clinical Surgery	614 70	
W. P. Caven, Clinical Medicine	633 70	
H. W. Aikins, Anatomy	633 70	
A. M. Baines, Clinical Medicine	614 70	
J. T. Fotheringham, Clinical Medicine	614 70	
H. B. Anderson, Clinical Medicine	614 70	
C. Trow, Ophthalmology, etc.	368 82	
F. N. G. Starr, Clinical Surgery	380 22	
J. A. Amyot, Pathology	380 22	
W. B. Thistle, Clinical Medicine	380 22	
C. L. Starr, Orthopædics	380 22	
R. D. Rudolf, Medicine, etc.	380 22	
A. R. Gordon, Medicine, etc.	380 22	
R J. Dwyer, Medicine, etc.	380 22	
H. T. Machell, Obstetrics, etc.	266 14	
W. T. Stuart, Medical Chemistry	500 00	
		$8,318 72
Demonstrators and Associates:		
G. Boyd, Clinical Medicine	264 00	
G. Chambers, Clinical Medicine	264 00	
F. Fenton, Clinical Medicine	158 40	
H. C. Parsons, Clinical Medicine	158 40	
W. Goldie, Clinical Medicine	158 40	
W. McKeown, Clinical Surgery	264 00	
C. A. Temple, Clinical Surgery	264 00	
A. H. Garratt Clinical Surgery	264 00	
C. B. Shuttleworth, Clinical Surgery	158 40	
T. B. Richardson, Clinical Surgery	158 40	
J. F. Uren, Clinical Surgery	158 40	
K. C. McIlwraith, Obstetrics	264 00	
F. Fenton, Obstetrics	158 40	
C. B. Shuttleworth, Anatomy	450 00	
W. J. McCollum, Anatomy	150 00	
W. J. O. Malloch, Anatomy	150 00	
G. Elliott, Anatomy	150 00	
E. R. Hooper, Anatomy	150 00	
W. J. Wilson, Anatomy	150 00	
A. C. Hendrick, Anatomy	150 00	
A. J. MacKenzie, Anatomy	150 00	
D. McGillivray, Anatomy	150 00	
E. S. Ryerson, Anatomy	150 00	
F. W. Marlow, Anatomy	100 00	
W. A. Scott, Anatomy	50 00	
T. D. Archibald, Pathology, etc.	250 00	
G. Silverthorn, Pathology, etc.	150 00	
C. J. Wagner, Pathology, etc.	150 00	
M. M. Crawford Pathology, etc.	150 00	
F. A. Clarkson, Pathology, etc.	150 00	
W. H. Penler, Pathology, etc.	150 00	
H. C. Parsons, Pathology, etc.	150 00	
H. S. Hutchison, Clinical Laboratory	250 00	
F. E. Watts, Pathology, etc.	100 00	
E. S. Ryerson, Pathology, etc.	100 00	
A. H. W. Caulfield, Pathology, etc.	50 00	

Salaries.—Con.

Demonstrators and Associates:		
C. P. Lusk, Pharmacy, etc.	250 00	
V. E. Henderson, Pharmacology	500 00	
D. McGillivray, Medicine	50 00	
G. W. Howland, Medicine	50 00	
T. D. Archibald, Medicine	50 00	
		$7,192 80
General Service:		
A. Primrose, Secretary to Faculty	$1,200 00	
J. J. Mackenzie, Assistant Secretary	100 00	
Thos. Motton, Caretaker	720 00	
J. S. Pollock, Chief Engineer	766 68	
J. Magee, Assistant Engineer (4½ mos.)	203 00	
C. Powers, Assistant Engineer (1½ mos.)	59 42	
Alex. Wilson, Janitor	600 00	
George Lynne, attendant, Anatomy Dept.	660 00	
J Sherman, attendant, Anatomy Dept., (9½ mos.)	327 00	
H. Harrison, Laboratory boy (4 mos.)	64 00	
J. Henry, Laboratory boy (1 mo.)	20 00	
Miss M. Armour, Stenographer	528 00	
Miss M. E. Foote, Library Assistant (7 mos.)	233 33	
		5,481 43
Miscellaneous:		
Dr. N. H. Beemer, Psychology fees	500 00	
Dr. J. H. Richardson, Honorarium as retired Professor	250 00	
Dr. Uzziel Ogden, Honorarium as retired Professor	250 00	
		1,000 00
		$13,814 80
Maintenance:		
(a) Anatomical Department:		
J. H. Millard, Subjects	$75 00	
D. J. Harris, Subjects	100 00	
D. Bellegham, Subjects	100 00	
A. H. Dodsworth, Subjects	75 00	
S. Goodwin, Subjects	80 00	
J. G. Frost, Subjects	50 00	
J. B. McIntyre, Subjects	60 00	
J. M. Crawford, Subjects	40 00	
J. Rogers, Subjects	40 00	
R. White, Subjects	20 00	
C. Ranney, Subjects	20 00	
A. W. Joyce, Subjects	20 00	
Jas. Bain, Subjects	15 00	
A. Millard, fees as Inspector of Anatomy, expenses re Subjects, and burial of remains	474 40	
Dr. Primrose, expressage re Subjects	291 70	
Inland Revenue Department, methylated spirits	222 56	
W. Lloyd Wood, chemicals	165 40	
Lyman, Sons & Co., chemicals	3 88	
Chandler & Massey, laboratory supplies	2 62	
Burgess, Powell Co., rubber gloves	2 50	
Wm. Cane, vats	168 75	
John Catto & Son, cotton and towels	21 39	
Mrs. Clark, washing towels	23 93	
Michie & Co., soap, etc.	20 05	
Art Metropole, drawing materials	1 49	
J. A. Carveth, books	8 50	
R. J. Hamilton, atlas	3 50	
J. T. Wilson, trays, etc.	60 55	
J. T. Reynolds, metal polish	50	
Haynes' Transfer, cartage	1 00	
A. Pride, backing diagrams	50 00	
Bell Telephone Coy., telephone service	56 00	
University of Toronto, annual payment for occupation of part of Biological Building	1,900 00	
		$4,178 77

Maintenance.—Con.

(b) Departments other than Anatomy:		
Eimer & Amend, apparatus and chemicals	$378 23	
Collin, apparatus	20 68	
E. Leitz, apparatus	9 90	
Carl Zeiss, apparatus	18 78	
Evans & Sons, chemicals	39 81	
W. Lloyd Wood, chemicals	124 98	
Lyman Bros. & Co., chemicals	30	
F. J. Moore, cases	379 74	
W. J. Mason, cages	33 75	
Chandler & Massey, laboratory supplies	197 09	
J. A. Carveth, laboratory supplies	7 15	
Randall, Faichney Coy., laboratory supplies	1 34	
A. Jaffray, sponges	1 00	
J. F. Hartz Coy., test tubes and surgeons' appliances	36 70	
Beaver Flint Glass Coy.. test tubes	6 08	
Ontario Rubber Co., tubing etc.	26 04	
Freyseng Cork Co., corks	4 80	
Toronto Liquid Carbonate Co., gas	8 00	
Inland Revenue Dept., methylated spirits	94 09	
J. G. Ramsay & Coy., photo materials	6 75	
Fletcher Mfg. Co., trays, etc.	22 25	
Queen City Oil Coy., wax	1 05	
Art Metropole, crayons	2 65	
Lake Simcoe Ice Coy., ice	45 00	
C. W. Irwin, freight	44 66	
W. J. McGuire, gas fittings	14 09	
T. Motton, food for animals, and sundries	131 39	
R. Dinnis & Son, partition	31 15	
Matthews Bros., moulding	5 14	
Aikenhead Hardware, tiles	2 90	
University of Toronto, interest on New Building account...	3,000 00	
Interest and second instalment on Equipment account ...	2,215 27	
		$6,910 76
(c) Maintenance New Building:		
Elias Rogers Coy., fuel	$2,462 44	
City Treasurer, water	397 09	
Consumers' Gas Coy., gas	135 04	
Tor. Elec. Light Coy., electric current	321 50	
A. E. Giddens, cleaner	492 50	
W. Fenton, cleaner	492 50	
W. J. McGuire & Coy., plumbing	182 87	
Eureka Mineral Wool Coy., covering pipes	69 00	
Rice Lewis & Son, hardware	192 30	
Aikenhead Hardware, hardware	16 37	
Vokes Hardware Coy., bolts	3 37	
Dodge Mfg. Coy., pulley	1 26	
A. E. Coates Coy., wire	2 30	
Polson Iron Works, pumping engine, etc.	45 75	
W. Lowe, forging, etc.	1 10	
Crucible Steel Coy., steel	2 73	
Fletcher Mfg. Coy., water cooler, trays, etc.	28 15	
Consolidated Plate Glass Coy., glass	4 21	
Jas. Morrison Brass Mfg. Coy., taps, etc.	11 64	
Schooley Bros., lumber	15 37	
Salmon Lumber Coy., lumber	7 29	
Rogers Furniture Coy., ladder	4 25	
R. Dinnis & Son, sawdust, etc.	7 80	
United Factories, brushes, etc.	50 64	
D. Bell, soap, etc.	52 00	
McColl Bros., soap, oil, etc.	15 08	
Stewart & Wood. oil, etc.	44 60	
G. W. Grant & Coy., engine oil	49 55	
Canadian Oil Coy., oil, etc.	37 29	
W. C. McFarland, paint, etc.	173 20	
J. Mansfield, painting	8 00	

Maintenance.—Con.

(c) Maintenance New Building:		
Queen City Oil Coy., wax	1 10	
S. Pearcy & Coy., plaster	2 50	
McDonald & Willson, shades	6 00	
T. Eaton Coy., shades	18 00	
Ontario Rubber Coy., mat	3 44	
Wanless & Co., clock	15 00	
E. H. Roberts, keys	60	
Chandler & Massey, glasses	11 50	
Wm. Junor, tumblers	2 00	
Chas. Potter, thermometers	6 40	
T. Motton, washing towels	116 81	
E. B. Eddy Coy., toilet paper	24 37	
Can. Gen. Elec. Coy., electric supplies	8 00	
Central Elec. Coy., electric supplies	50 78	
Jones & Moore Elec. Coy., electric supplies	65	
J. A. Carveth & Coy., chalk	15 95	
Art Metropole, drawing materials	1 28	
A. J. Reading, slides	29 60	
Lyman Bros., chemicals	12 75	
Bell Telephone Coy., telephone service	83 40	
J. A. Simmers, grass seed	1 25	
		$5,738 57
(d) General Expenses:		
Queen's Quarterly, advertising	60 00	
Educ. Publishing Coy., advertising	150 00	
Presbyterian S. S. Publications, advertising	58 33	
Can. Journal Med. and Surg., advertising	80 00	
Westminster Coy., advertising	115 00	
Dominion Medical Monthly, advertising	40 00	
St. Andrew's College Review, advertising	10 00	
Alumni Association, advertising	100 00	
Acta Ridleiana, advertising	15 00	
Trinity College School Record, advertising	9 00	
Ontario Educational Association, advertising	20 00	
'Varsity, advertising	35 00	
Acta Victoriana, advertising	50 00	
Torontonensis, advertising	30 00	
Can. Practitioner and Review, advertising	100 00	
Canada Lancet, advertising	25 00	
Montreal Medical Journal, advertising	60 00	
Ontario Publishing Coy., advertising	75 00	
Trinity University Year Book, advertising	25 00	
University Press, printing calendar, etc.	827 09	
Brown Bros., stationery, etc.	108 20	
Office Specialty Mfg. Coy., cards.. etc	34 70	
J. A. Carveth & Coy., cards, etc.	1 65	
Wm. Tyrrell & Coy., almanac	40	
R. J. Hamilton, books	5 50	
F. W. Beebe, ink	1 50	
Steinberger, Hendry Coy., crayons	5 25	
United Typewriter Coy., supplies	14 50	
Superior Mfg. Coy., stamp	2 00	
G. Gripton, rubber stamps	8 25	
Dr. Primrose, general disbursements, postage, etc., for session	1,156 09	
Ryrie Bros., engraving medals	8 50	
Hutchison & Coy., medals	48 52	
Toronto Silver Plate Coy., trophy	54 74	
A. J. Reading, photos	2 00	
Might Directories, addressing circulars, etc.	18 63	
John Kay, Son & Coy., chairs	7 25	
Lyman Knox & Clarkson, medical supplies	167 62	
E. Merck, sundries	20 14	
J. C. Scott Coy., horse and carriage shelter	100 00	
City of Toronto, taxes re removal of snow	16 23	

Maintenance.—Con.

(d) General Expenses :			
Lake Simcoe Ice Coy., ice		2 00	
J. Cotterill, flowers		12 50	
W. S. Lemon, Clark prize		30 00	
F. J. Snelgrove, Clark prize		20 00	
University Library, medical books		600 00	
Dr. R. A. Reeve, expenses as Dean of the Faculty		450 00	
			$4,780 59
			$21,603 64

APPENDIX VI.

UNIVERSITY OF TORONTO AND UNIVERSITY COLLEGE.

ANALYSIS OF EXPENDITURE FOR THE YEAR ENDING 30TH JUNE, 1905.

UNIVERSITY.

Cost of Administration relative to University		122,347 47	
Less 1. University Fees	$44,890 60		
2. City grant for one chair	3,000 00		
the Government	47,632 49		
3. City grant for one chair	3,000 00		
		95,523 09	
Portion to be derived from General Income			$26,824 38

UNIVERSITY COLLEGE.

Cost of Administration relative only to University College		$41,264 10	
Less 1. College Fees	$19,118 50		
2. City grant for one chair	3,000 00		
		22,118 50	
Portion to be derived from General Income			19,145 60

GENERAL INCOME.

1—From Endowment	$55,524 06		
2—Regular grant from Government	7,000 00		
3—Wild Lands sales applicable as Revenue	1,647 72		
4—General Fees (Gymnasium and Library)	3,047 05		
5—Deficit to be paid by Government	39,122 68		
	$106,341 51		
Less interest on trust funds reserved	10,262 98		
		$96,078 53	
Cost of General Administration		50,108 55	
Balance of General Income			$45,969 98

Proportion of General Income needed for		
University	$26,824.38,	equal to 58.35 per cent.
College	19,145.60,	equal to 41.65 per cent.
	$45,969.98	

THIRTY-FIRST ANNUAL REPORT

OF THE

Ontario Agricultural College

AND

Experimental Farm

1905

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1906

WARWICK BRO'S & RUTTER, Limited, Printers
TORONTO

To the Honourable WILLIAM MORTIMER CLARK, K.C.,

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Ontario Agricultural College for 1905.

Respectfully submitted,

NELSON MONTEITH,

Minister of Agriculture.

TORONTO, 1906

The Ontario Agricultural College

AND

Experimental Farm, Guelph, Ont.

HON. NELSON MONTEITH, Minister of Agriculture, Toronto, Ont.

STAFF OF PROFESSORS, LECTURERS AND DEMONSTRATORS,

1906.

G. C. CREELMAN, B.S.A., M.S. ..... President.
H. H. DEAN, B.S.A. ..... Professor of Dairy Husbandry.
C. A. ZAVITZ, B.S.A. ..... Professor of Field Husbandry and Experimentalist.
J. HUGO REED, V.S. ..... Professor of Veterinary Science.
G. E. DAY, B.S.A. ..... Professor of Animal Husbandry and Farm Superintendent.
H. L. HUTT, B.S.A. ..... Professor of Horticulture.
J. B. REYNOLDS, B.A. ..... Professor of Physics and Lecturer in English.
S. F. EDWARDS, M.Sc. ..... Professor of Bacteriology.
W. R. GRAHAM, B.S.A. ..... Manager and Lecturer in Poultry Department.
W. LOCHHEAD, B.A., M.S. ..... Professor of Biology and Geology.
R. HARCOURT, B.S.A. ..... Professor of Chemistry.
FRANKLIN SHERMAN, Jr., B.S.A., ... Professor of Entomology and Zoölogy.
H. R. ROWSOME ..... Lecturer in Apiculture.
W. P. GAMBLE, B.S.A. ..... Lecturer in Chemistry.
H. S. ARKELL, B.S.A. ..... Lecturer in Agriculture.
T. D. JARVIS, B.S.A. ..... Lecturer in Entomology and Zoölogy.
E. J. ZAVITZ, B.A., M.S.F. ..... Lecturer in Forestry.
W. H. DAY, B.A. ..... Lecturer in Physics.
J. BUCHANAN, B.S.A. ..... Lecturer in Field Husbandry.
F. H. REED ..... Dean of Residence and Instructor in English and Mathematics.
ALICE ROWSOME, B.A. ..... Assistant in Library and Instructor in French and German.
V. W. JACKSON, B.A. ..... Demonstrator in Botany and Geology.
E. G. DE CORIOLIS, B.S.A. ..... Demonstrator in Chemistry.
H. S. PEART, B.S.A. ..... Demonstrator in Horticulture.
B. BARLOW, B.S. ..... Demonstrator in Bacteriology.
E. THOMPSTONE, B.Sc. ..... Demonstrator in Botany.
CAPTAIN CLARK ..... Instructor in Drill and Gymnastics.

Office Staff.

S. SPRINGER ..... Bursar.
J. B. FAIRBAIRN ..... Secretary.
MISS ANNIE HALLETT ..... Stenographer.

Physician.

W. O. STEWART, M.D.

Staff of Instructors, Macdonald Institute.

S. B. MCCREADY, B.A. ..... Professor of Nature Study.
MISS M. U. WATSON ..... Director of Home Economics.
JOHN EVANS ..... Professor of Manual Training.
E. W. KENDALL ..... Instructor in Manual Training.
T. D. JARVIS, B.S.A. ..... Assistant in Nature Study.
MISS HELEN GIVEN ..... Instructor in Domestic Science.
MISS HELEN HOLLAND ..... Assistant in Domestic Science.
MISS MURIEL I. SPELLER ..... Instructor in Domestic Art.
ANNIE ROSS, M.D. ..... Instructor in Physiology, Home Nursing, and Emergencies.
MISS GRACE GREENWOOD ..... Instructor in Normal Methods.
CAPTAIN CLARK ..... Instructor in Drill and Gymnastics.

ONTARIO AGRICULTURAL COLLEGE

AND

EXPERIMENTAL FARM

FOR THE YEAR 1905.

GUELPH, December 30th, 1905.

To the Honorable the Minister of Agriculture:

SIR,—I have the honor to transmit herewith the Thirty-first Annual Report of the Ontario Agricultural College and Experimental Farm, including the Report of the Macdonald Institute.

The following is a brief review of the work contained in this Report:

I have the honor to be, Sir,

Your obedient servant,

G. C. CREELMAN,

President.

ONTARIO AGRICULTURAL COLLEGE.

PART I.

THE PRESIDENT.

The year 1905 has been one of steady progress at this Institution. The classes have all been large, and the Professors, Instructors, and Officers have worked faithfully and well. Very little sickness has prevailed, and we close the year with a record of good work well done in the different departments.

CHANGES IN THE STAFF.

During the year three good men have resigned to take positions in other Institutions. Prof. F. C. Harrison and Prof. William Lochhead have attached themselves to the new Macdonald College at St. Anne, Quebec. When Prof. Lochhead resigned, it was thought necessary to change the work in Biology and make two Departments. The services of Prof. F. Sherman, jr., of Raleigh, North Carolina, were secured for the Department of Entomology and Zoology. The Department of Botany has not yet been supplied permanently, but Prof. Lochhead has come back to us temporarily, for the winter months. He has charge of the botanical work. For the Department of Bacteriology, Prof. S. F. Edwards, a graduate of the Agricultural College, Michigan, was appointed on the 1st of October, and since that time has had charge of the department. Each of these men is doing efficient work.

Mr. Melville Cumming, Lecturer in Animal Husbandry, resigned on the 1st of February last to accept the Presidency of the new Agricultural College at Truro, Nova Scotia. To replace Mr. Cumming at this Institution we were fortunate in securing the services of Mr. H. S. Arkell, of Teeswater, a graduate of this College. He has started well in the work.

During the year a Department of Forestry has been added to the College, with Mr. E. J. Zavitz, M.S.F., in charge. Mr. Zavitz is a Canadian, a graduate of McMaster University, Toronto, and of the School of Forestry in connection with the University of Michigan.

In last year's report, we had occasion to mention the sad death of Dr. W. H. Muldrew, who had charge of our Nature Study Department. We found his position very hard to fill, but believe we were fortunate in securing the services of Prof. S. B. McCready, Science Master at the London Collegiate Institute.

Work in Manual Training, under Prof. John Evans, had made rapid progress. According to the rules of the Education Department of Ontario, this is the only Institution recognized by them for the training of teachers in Manual Training. As this, of course, includes the working with metals as well as with wood, we found it necessary to provide Mr. Evans with an assistant, and on the 1st of October secured the services of Mr. E. W. Kendall, of the University of Chicago. Mr. Kendall is a Canadian, having been reared near the town of Brockville.

During the year, Mr. B. S. Pickett, my Secretary, resigned his position to take up an advanced course of study at Illinois State University. Mr. J. B. Fairbairn, of the third year, was appointed as his successor.

Attendance.

In our report for 1904 we stated that 833 students had attended lectures at the College during the year. This was a great advance over any previous year, but we have to report again for 1905 a marked advance over that of 1904, as will be seen in the summary on another page. 1,004 students actually attended one or more of our courses during the year. Of these, the great majority were from Ontario, and every other Province of the Dominion was represented as well. England contributed twenty-two; Argentine, thirteen; the United States, sixteen; and the following named countries sent one or more: Australia, Belgium, France, Jamaica, Japan, Jersey Isle, Newfoundland, New Zealand, Orange River Colony, Panama, Switzerland, Spain, Scotland, and Uruguay. You will note that the average age of our students is twenty years.

Changes in the College Report.

For the first time the College Report contains an account of the work done in connection with the new departments of Entomology and Zoology, and Forestry. The head of each of these departments has entered upon this work with enthusiasm and zeal. In the forest nursery about half a million trees have been grown this year and will be ready for distribution among the farmers, some in the spring of 1906 and the rest of them in the spring of 1907. This work has been started on the College grounds north of Macdonald Institute, but there is such a preponderance of clay in this soil as to render it unsuitable for the growing and transplanting of young trees. Arrangements have therefore been made to rent for five years about four acres of land just west of the city of Guelph on the river Speed. This land is of light, sandy loam and well adapted for the growing of seedlings It is proposed now to grow the most of our forest seedlings on this new ground.

Macdonald Institute.

This department of our College work has grown very much during the past two years. In 1905, 509 students in all took some work in the departments of Domestic Science, Nature Study, or Manual Training. In Domestic Science alone, 215 young ladies received instruction in the arts of cooking, sewing, and laundry work. Some changes occurred among the officers during the year. Miss Robarts, who had charge of the work in Domestic Art, resigned in June, and her place was filled by the appointment of Miss M. I. Speller, of Toronto, a graduate of Pratt Institute, New York. Miss Mary Pierce, Instructor in Normal Methods, also resigned, and her place was filled by the appointment of Miss Grace Greenwood, of Teachers' College, New York.

In Macdonald Hall, Miss Kennedy resigned as Matron in July, and her place was filled by the appointment of one of our own graduates, Miss Ethel Tennant. Dr. Annie Ross, in addition to her duties as Lecturer, has this year assumed the responsibility of Assistant Superintendent in the Hall. Her duties are much the same as those of the Resident Master in the boys' dormitory.

Consolidated Rural School.

This school continues to do most excellent work. Another school section has been added this year to the territory covered, and an additional teacher engaged. There are now on the staff seven teachers, with an attendance of 225 pupils. As this is the only school of its kind in the Province

of Ontario, it has attracted during the year a number of school inspectors, teachers, and others from England, Australia, and the other Provinces of Canada. The teachers-in-training in Domestic Science at the Macdonald Institute take advantage of the teaching of Domestic Science in the Consolidated School, and attend each week to observe the methods of teaching.

College Work and Progress.

The work in the various departments of the College has gone on pretty much as usual during the past year. The class-room and laboratory work has been heavier than formerly on account of the increased attendance of students; the boys' dormitory is again filled to its utmost capacity, and we have had to take the Doctor's office and the rooms in the hospital and turn them into bed-rooms for the accommodation of extra students. We are asking this year for increased dormitories and trust that the Government will see fit to grant our request.

Through the employment of a College painter by the year we have been enabled to improve very materially the appearance of the College halls, dining-room, and reading-room.

We have also fitted up a special reading-room in the Residence under the auspices of the Young Men's Christian Association, whereby the students are enabled to be comfortably seated while looking over current magazines without having to go out of the Residence building.

The bulletins prepared by members of the College Staff and published by the Department of Agriculture during the past year are as follows:

138. "The Composition of Ontario Feeding Stuffs," by W. P. Gamble.

139. "An Experimental Shipment of Fruit to Winnipeg, by J. B. Reynolds.

140. "The Result of Field Experiments with Farm Crops," by C. A. Zavitz.

141. "Gas-producing Bacteria and Their Effect on Milk and its Products," by F. C. Harrison.

142. "Outlines of Nature Study," by William Lochhead.

143. "Dairy School Bulletin," by The Dairy School Staff.

144. "Apple Culture," by H. L. Hutt.

145. "Butter Preservatives," by H. H. Dean and R. Harcourt.

Athletic Instruction.

In the early days of the College, when there was only a small number of students in attendance, it was possible for all students to be provided with work in the Outside Departments, at least three times a week. As the number of students increased from year to year, it soom became evident that there would not be work to go round. Then, the third and fourth year men were excused from outside work and provided with work in the different laboratories. As the College became better equipped in its scientific departments it was found practicable to give second year students laboratory work in the afternoons of the second term. Hence, a large number or students do not do any manual labor during the winter. To offset this, in order to keep students in good health, the College gymnasium was erected, but no regular course of instruction in general athletics was ever provided. During this year an arrangement has been made whereby a young man with an athletic training was induced to take our College course and to give his spare time to the training of the other students on

the foot-ball field and in the gymnasium. This has worked most satisfactorily, and great credit is due to the Instructor, Mr. G. Hibberd. He is gentlemanly in his bearing, active in his work, and has aroused great enthusiasm among the students along the line of athletic training.

Captain Clark, who has so long and faithfully served the interests of the College, still continues to give, with apparently increasing vigor, special instruction to the first year men in setting-up drill, marching, club-swinging, and dumb-bell exercises. In addition to this, Captain Clark conducts classes each week with the young ladies in the gymnasium of Macdonald Hall.

Short Courses.

So many of our farmers, who are in complete sympathy with the work we are doing here, find it impossible to leave home for many consecutive weeks. It was with the view of accommodating such persons that short courses in dairying, live stock judging, grain judging, and poultry raising, were started at this College some three years ago. That these courses are being appreciated is evidenced by the fact of the continued large attendance. Last year there were 78 students in the Dairy Course, 203 in Stock and Seed Judging, and 16 in the Special Course in Poultry. Specialists in their several departments were brought to the College from other Provinces and some of the States of the Union to assist our own Professors in the Instruction work in the Short Courses.

Stock Judging at Chicago.

For a number of years a team consisting of five students has gone from this College to the great International Exposition at Chicago and has competed for a trophy given for the best aggregate score in the judging of horses, cattle, sheep, and swine. In December of this year five students from the Senior Class, all Ontario farmers' sons, were successful in winning the coveted trophy. Their names and addresses are as follows: J. Bracken, Seeley's Bay, Leeds, Ont.; H. A. Craig, North Gower, Carleton, Ont.; W. A. Munro, Chesterville, Dundas, Ont.; H. B. Smith, Wanstead, Lambton, Ont.; and G. G. White, Perth, Lanark, Ont. For their success, much credit must be given to the splendid training given the students by Prof. G. E. Day and his Assistant, Mr. H. S. Arkell. Such training as our boys receive in the judging, handling, and feeding of live stock must have far reaching results. Ontario is primarily a stock-raising country and most of the farmers' products are being fed to live stock. It is, therefore, most essential that our farmers get a thorough knowledge of live stock conditions, if they are going to get the very best results from food-stuffs grown on their own farms.

Excursions.

Farmers' Institute excursions to the College during the month of June continue to be as popular as ever. The number of persons who came to the College during June, 1904, must have reached 40,000. They arrive here about eleven o'clock in the morning, are conducted at once to the College gymnasium, where lunch is provided, during the progress of which the President takes occasion to point out what is being done in the different departments in the College, calling special attention to those features which, in his opinion, are of special interest to the practical farmer. After

lunch visitors are conducted over the farm, through the experimental plots, through the dairy and poultry buildings and into the orchard and garden. They then inspect the forest nursery and examine the different trees and shrubs growing on the campus, with a view to taking away with them a list of names of those ornamental shrubs and trees suitable for improving the home grounds.

Ladies who come on these excursions are given an opportunity of seeing the workings of Macdonald Institute, where demonstrations in cooking, sewing and laundry work are being carried on—all of which should specially interest farmers' wives. The Rural Consolidated School also attracts many visitors, especially trustees from rural school sections, and they are given an opportunity of thoroughly inspecting every department of this School.

Teachers' Conventions.

Since the building of Macdonald Institute, with Departments of Domestic Science, Nature Study, and Manual Training, the College is attracting large numbers of teachers from the different parts of the Province. During the past year the following teachers have held Conventions here and have personally inspected the different Departments of the College: County of Brant and City of Brantford, May 19th and 20th; Halton, May 23rd; North and South York, May 26th; Wellington, May 26th and 27th; Hamilton, June 2nd; Perth, June 9th; West and North Grey, Oct. 12th and 13th; South Grey, Oct. 13th; Middlesex, Oct. 27th.

We feel that the outlook of the College is hopeful, so long as our teacher friends think it worth while to come long distances to inspect the work we are doing, and we take this opportunity of thanking them, one and all, for the kind words which they have had to say from time to time about the workings of the Institution.

Women's Institutes.

This movement has grown in the Province of Ontario until the superintendent now reports many thousands of members of this important organization. On the 13th and 14th of December, during the progress of the Winter Fair, the Women's Institutes of Ontario held their annual convention at the College, with over 300 women, mostly from Ontario farms, in attendance. They seemed very much pleased with the workings of Macdonald Institute and Hall, and we are hoping, as a result of their visit and with their assistance from time to time, to have a larger percentage of farmers' daughters each year in attendance at Macdonald Institute.

Visit of the Governor-General.

His Excellency, Earl Grey, visited the College on Friday, December the 15th, and was given an opportunity of inspecting in detail the work of the different departments of the College and seemed much pleased with what he saw. We were delighted with His Excellency's candor, and the personal interest he displayed in our works. On returning home he wrote us as follows:

Dear Mr. Creelman,— The enjoyment I derived from my visit to your College and Institute yesterday was so great that I must write you a line of personal thanks, congratulations, and good wishes. The College is doing really important work in many directions, and the influence and example that will radiate from it in ever increasing force so long as the present splendid spirit prevades it, will bring strength and character to the Dominion.

I shall be obliged if you will send me the latest reports of your College and Macdonald Institute. Please also send me any printed papers that may show what has been the the result of the experiments in crossing wheat and barley.

I am sending you as a Christmas card two sets of books, which I hope will be of use to the male students, and also to the charming young ladies whose acquaintance I made yesterday. You will find in "The Empire and The Century," an excellent article by Dr. Robertson. I should be glad if it were possible to impress your lady students who are about to become teachers, with the contents of "The Empire and The Century." There are few forces so evil as those of selfishness and parcchialism, and it is impossible for any one who reads this volume not to realize that the possession of British Citizenship is the greatest privilege mortal man can enjoy.

I remain, Yours truly,

GREY.

We shall all long remember His Excellency's visit to this Institution.

EXPERIMENTAL UNION.

This organization has become an important factor in the progress of the College. We find, by convassing the student body, that more new students come to the Institution each year through the personal influence of ex-students of the College than from any other source. Further than that, the co-operative work which has been done by ex-students throughout the country tends materially, from year to year, to increase the quality and the quantity of the output from our farms. On the 11th and 12th of December the Experimental Union held its annual session at the College, and a larger number than ever of Old Boys came back to visit their Alma Mater and renew old acquaintances. Students from as far back as 1874 were in attendance, and almost every year, from 1880 to the present, furnished representatives.

Of this year's graduating class, the majority are engaged in farming, and the following are the names of those who have secured positions:

Agriculture.

R. G. Baker, Forman of the Department of Forestry, O.A.C., Guelph.

H. G. Bell, Experimental Department, O.A.C., Guelph.

R. J. Deachman, Representative of the Farmer's Advocate, Calgary, Alberta.

E. D. Eddy, Assistant Editor of the Weekly Sun, Toronto, Ont.

C. W. Esmond, Editor of the Maritime Farmer, Sussex, N. B.

T. B. R. Henderson, Chief Clerk of the Department of Agriculture, Edmonton, Alberta.

J. A. Hand, Assistant Editor of the Canadian Horticulturist, Toronto, Ontario.

H. H. LeDrew, Managing Editor of the O.A.C. Review, Guelph, Ont.

F. M. Logan, in the Live Stock Branch of the Dominion Department of Agriculture.

H. McFaydan, Agricultural Editor of the Mail and Empire, Toronto.

W. C. McKillican, Good Seeds' Division, Dominion Department of Agriculture, Ottawa, Ont.

A. W. Mason, Chemist, Ontario Sugar Co., Berlin, Ont.

R. W. Wade, Professor of Animal Husbandry, Agricultural College, Fayetteville, Arkansas.

Manual Training.

T. E. Runions, Instructor in Manual Training in Public Schools of Calgary, Alberta.

W. Snider, Instructor in Manual Training in Ottawa Public Schools, Ottawa, Ont.

Domestic Science.

Miss Elizabeth Berry, Domestic Science teacher in Vancouver, B.C., Public Schools.

Miss Lorna Culham, Domestic Science teacher in Woodstock Public Schools.

Miss Edna Ferguson, Domestic Science teacher in Kingston Y.M.C.A., with Public School Classes.

Miss Margaret Johnston, Domestic Science teacher in Renfrew Public Schools.

Miss Lottie L. Ross, Domestic Science teacher in Charlottetown, P.E. I., Public Schools.

Miss Ethel Tennant, Housekeeper in Macdonald Hall, O.A.C.

Miss Jean G. Allan, Housekeeper somewhere in the United States.

Miss Jean McPhee, Flour Experimentalist with Ogilvie Mill Co., Montreal, Quebec.

Buildings Erected During 1905.

We have been fortunate this year in securing a liberal grant from the Legislature for much needed buildings. For some time we have found it difficult to keep competent help on the farm, because of the lack of house facilities for the men. This year we have been able to build four cottages, two of which have been allotted to the Farm, one to the Horticulurtal Department, and one to the Experimental Department. These are now all occupied and the houses are proving very convenient and satisfactory.

We have also in course of erection a double brick house, for the accommodation of the foremen of the Farm and Experimental Departments. This also meets a long felt want.

The new building to be devoted to farm mechanics, the demonstration of farm implements, and manual training is in process of construction. The place for the foundation has been excavated and the foundation partly laid. We hope to be able to report next year a well finished, up-to-date building for the purposes for which it will be required.

Outside Lecturers.

Early in the year we inaugurated a system of outside Lecturers, and invited from Toronto and elsewhere prominent men who were specialists in particular lines of work to deliver before our student body addresses on their own particular subjects. This has proved very satisfactory, and in each and every instance the addresses or demonstrations have been very much appreciated by the students. The following were among the speakers who delivered special lectures during the year:

C. J. Atkinson, Toronto. "Broadview Boys' Institute."
Dr. A. H. Abbott, Toronto. "Education."
David Boyle, Toronto. "Indian Lore."
Dr. J. F. Clark, Toronto. "Forestry."
Dr. Jas. Fletcher, Ottawa. "Insect Life."
Prof. D. Fraser, Toronto. "Italian Art."
Dr. C. F. Hodge Worcester, Mass. "Nature Study."
Chancellor A. C. Mackay, Toronto. "Astromony."
E. Stewart, Ottawa. "Forestry."

Needs of the College.

A growing, progressive Institution is always in need of new equipment and additional buildings. The Agricultural College is no exception to this rule. Among the most pressing needs at the present time are the reconstruction of the Dairy Department and the addition to the Chemical Laboratory.

Our Dairy Department has done good work for a number of years, but the time has come when, in my opinion, we need to divide the Course of Instruction. First, there should be provided space and equipment for the instruction of butter and cheese-makers who have had little or no experience in the business; and secondly, there should be an advanced course for experienced butter and cheese-makers, that they may improve themselves still further, from year to year, in their own particular line of work. This will mean the reconstruction of our present dairy plant, for which there is plenty of room on the present site.

The addition to the Chemical Laboratory is necessary because of the increased number of agricultural students taking the Course, and more especially, because of the classes of young ladies who now come to the Chemical Laboratory for all of their instruction in Chemistry.

Conclusion.

In conclusion, let me congratulate you, sir, upon your appointment to the very responsible position of Minister of Agriculture in the Ontario Cabinet. In so honoring you we feel that the College has itself been highly honored, indeed, for as a graduate of this Institution you have always, and I am sure, will always, stand for the very best education that can be secured for the farmers of this great Province.

I have the honor to be,

Your obedient servant,

G. C. CREELMAN,

President.

Guelph, Dec. 30th, 1905.

STUDENTS OF THE YEAR.

Attendance.

The total number of students registered for work at the College in 1905 was 1,004, as follows:

General Course	336	
Specials in General Course work	13	
Dairy Courses	78	
Short Courses in Stock and Seed Judging	203	
Short Course in Poultry Raising	16	
		646
At Macdonald Institute:		
Domestic Science	215	
Nature Study	127	
Manual Training	16	
		358
Total in all Courses		1,004

There were also 151 students from the Guelph Collegiate Institute who received instruction in Domestic Science at Macdonald Institute during the year.

Analysis of College Roll (General Course) 1905.

From Ontario.

Algoma	1	Huron	5	Perth	6
Brant	11	Kent	1	Prescott	2
Bruce	6	Leeds	3	Peel	3
Carleton	8	Lincoln	6	Parry Sound	2
Dufferin	5	Lanark	3	Russell	1
Dundas	3	Lambton	4	Simcoe	14
Durham	3	Lennox	2	Stormont	1
Elgin	8	Middlesex	10	Victoria	1
Essex	1	Muskoka	4	Wentworth	14
Grey	8	Northumberland	3	Welland	6
Glengarry	7	Norfolk	2	Wellington	22
Hastings	2	Ontario	5	Waterloo	3
Halton	9	Oxford	7	York	35

From other Provinces of the Dominion.

Assiniboia	1	New Brunswick	2	Quebec	16
British Columbia	4	Nova Scotia	8	Saskatchewan	1
Manitoba	5	P. E. Island	2		

From other Countries.

Argentina	13	Japan	1	Switzerland	1
Australia	1	Jersey Isle	1	Spain	2
Belgium	1	Newfoundland	1	Scotland	4
England	22	New Zealand	1	U. S. A.	16
France	1	Orange River Colony	1	Uruguay	2
Jamaica	4	Panama	1		

Ages and Religious Denominations.

The limits of age of students in the General Course, 1905, ranged from 16 to 41 years. The average age was 20.

The religious denominations were represented as follows:

Presbyterians	102	Methodists	90	Episcopalians	67
Baptists	30	Roman Catholics	29	Congregationalists	9
Disciples	5	Friends	5	No religion	4
Christadelphian	1	Plymouth Brethren	1	New Jerusalem	2
Jewish	1	Unitarian	1	Free Thinker	2

Bachelors of the Science of Agriculture.

R. G. Baker	Swarthmore, Penn., U.S.A.
H. G. Bell	Orangeville, Ont.
F. E. Brereton	Bethany, Ont.
D. Bustamante	Jujuy, Argentine.
R. J. Deachman	Gorrie, Ont.
E. D. Eddy	Scotland, Ont.
C. W. Esmond	Blessington, Ont.
John Evens	Randolph, Ont.
R. E. Everest	Scarboro' Junction, Ont.
J. Granel	Buenos Ayres, Argentine.
T. B. R. Henderson	Rockton, Ont.
J. A. Hand	Stanton, Ont.
J. B. Hoodless	Hamilton, Ont.
J. E. Howitt	Guelph, Ont.
A. Irvine	Uxbridge, Ont.
H. H. LeDrew	Cupids, Newfld.
A. Leitch	Cornwall, Ont.
W. J. Lennox	Newton Robinson, Ont.

F. M. Logan	Amherst Point, N.S.
H. McFayden	Caledon, Ont.
W. C. McKillican	Vankleek Hill, Ont.
A. W. Mason	Norwich, Ont.
H. Mayberry	Ingersoll, Ont.
R. E. Mortimer	Honeywood, Ont.
N. M. Rudolf	Hampstead, Jamaica.
G. B. Rothwell	Hillsdale, Ottawa, Ont.
R. W. Wade	Smithville, Ont.
G. G. Whyte	Grand View, Ont.
R. H. Williams	Dundalk, Ont.

Recipients of Associate Diploma.

J. Baker	Sclina, Ont.
P. M. Ballantyne	Arbroath, Scotland.
G. R. Bell	Glanford Station, Ont.
T. H. Binnie	Bunessan, Ont.
M. C. Brownlee	McDonald's Corners, Ont.
T. G. Bunting	St. Catharines, Ont.
W. E. Byers	Stepney, Ont.
C. P. Clark	Alliston, Ont.
F. A. Clowes	Toronto, Ont.
F. H. Dennis	O. A. C., Guelph.
J. C. Harkness	Annan, Ont.
S. A. Hosmer	Batavia, N.Y.
H. F. Hudson	Forest Gate, Essex, Eng.
P. Diaz	Ferrol, Spain.
W. S. Jaccbs	Barrie, Ont.
M. A. Jull	Burford, Ont.
J. W. Kennedy	Apple Hill, Ont.
G. E. Knight	Sardis, B.C.
H S. Lewes	Melbourne, Australia.
H. H. Miller	Brome Centre, Quebec.
C. G. Montgomery	New Richmond, Que.
R. J. McBeath	St. Francois Xavier, Man.
G. D. McVicar	Ailsa Craig, Ont.
E. H. Porter	Port Midland, N.S.
T. Reeves-Palmer	Bow, North Devon, Eng.
G. E. Sanders	Round Hill, N.S.
W. F. Stewart	Strath Gartney, P.E.I.
W. J. Thompson	Carleton Place, Ont.
C. B. Twigg	O. A. C., Guelph.
H. C. Wheeler	Hubbard, Ohio, U.S.A.
J H. Willows	Phillipsville, Ont.
R. M. Winslow	London, Ont.

First Class Men.

The work of the College is divided into departments, and all candidates who obtain an aggregate of seventy-five per cent. of the marks allotted to the subjects in any department are ranked as first class men in that department. The following list contains the names of those who gained a first class rank in the different departments at the examinations held in April, 1905, arranged alphabetically.

First Year.

Arkell, T. R. Arkell, Wellington, in three departments; English and Mathematics, Physical and Biological Science.

Austin, H. S. Lynn Valley, Norfolk, in one department; English and Mathematics.

Carpenter, J. F. Fruitland, Wentworth, in one department; English and Mathematics.

Curran, G. B. Orillia, Simcoe, in one department; English and Mathematics.

Frier, G. M. Shediac, N.B., in three departments; English and Mathematics, Physical and Biological Science.

Gilmour, J. D. Doe Lake, Parry Sound, in one department; English and Mathematics.
Kerr, W. A. Ashburn, South Ontario, in one department; English and Mathematics.
Knight, A. A. Brackenrig, Muskoka, in three departments; English and Mathematics. Physical and Biological Science.
Goulding, G. C. Toronto, York, in one department; Biclogical Science.
Murray, Chas. Avening, Simcoe, in one department; English and Mathematics.
Patch, A. M. W. Torquay, Devonshire, Eng., in one department; Biological Science.
Rose, D. M. Woking Village, Surrey, Eng., in three departments; English and Mathematics, Physical and Biological Science.
Row, C. A. Langhorn, Pa., in two departments; English and Mathematics and Biological Science.
Salkeld, D. G. Goderich, Huron, in one department; English and Mathematics.
Slater, A. E. Lunbridge, Wales, Eng., in one department; Biological Science.
Smith, J. E. Shallow Lake, Grey, in two departments; English and Mathematics and Biological Science.
Wolverton, H A. Brandon, Man., in two departments; English and Mathematics and Physical Science.
Walker, W. E. Carluke, Wentworth, in one department; Biological Science.
Warren, F. B. Gamebridge, Ont., in one department; Physical Science.

Second Year.

Homer, R. S. Toronto, York, in one department; English and Economics.
Hartman, W. J. Woodbridge, York, in one department; Biological Science.
Kennedy, J. W. Apple Hill, Glengarry, in one department; English and Economics.
Mills, R. W. Toronto, York, in two departments; Physical and Biological Science.
Winslow, R. M. London, Ont., in three departments; English and Economics, Physical and Biological Science.

Scholarships.

Scholarships of $20 each in money were awarded for groups of subjects in first year work as follows: Highest standing with a minimum of forty per cent. of the marks for each subject, and an aggregate of seventy-five per cent. of the total number of marks allotted to the subjects in the group:

English and Mathematics—G. M. Frier, Shediac, N.B.
Physical Science—H. A. Wolverton, Brandon, Man.
Biological Science and Horticulture—D. M. Rose, Woking, Eng.

Prizes—Second Year.

Prizes amounting to $10 each, in books, were given as follows:

First in General Proficiency, First and Second Year work, Theory and Practice—R M. Winslow, London, Ont.

Essay, "Implements on the Farm and Their Uses," J. W. Kennedy, Apple Hill, Glengarry, Ont.

Medal—Second Year.

Governor-General's Silver Medal—First in General Proficiency, 1904-1905, R. M. Winslow, London, Ont.

Professional Dairy School Certificates Issued During 1905.

Davies, A. E.	Lindsay, Ont.	Buttermaking.
Dennison, R. P.	Kingsey, Que.	Buttermaking.
Freund, A. A.	Hilbert, Wis.	Cheesemaking.
Fockler, P.	Ringwood, Ont.	Buttermaking.
Greensides, G. P.	Tyrell, Ont.	Cheesemaking.
Icldmay, C. W.	Blacksburg, Va.	Buttermaking.
MacKenzie, D. E.	Kinmount, Ont.	Buttermaking.
Sutherland, L. R.	Rossburn, Man.	Buttermaking.
Southworth, L.	Cannington, Ont.	Buttermaking.

FINANCIAL STATEMENT, 1905.

COLLEGE DEPARTMENT.

EXPENDITURE.

Salaries and Wages		$41,150 20
Lecturer in Apiculture		200 00
Food: Meat, fish and fowl		5,829 88
Bread, biscuits		1,157 35
Groceries, butter, fruit		7,093 04
Household Expenses:		
Laundry, soap and cleaning		399 30
Women, servants, wages		2,660 28
Business Department:		
Advertising, printing, postage, stationery		2,986 59
Miscellaneous:		
Maintenance of Chemical Laboratory		810 20
" Physical Laboratory		531 97
" Biological Laboratory		693 00
" Bacteriological Laboratory		456 38
Library, reading room, books, papers, etc.		1,999 65
Scholarships		80 00
Unenumerated		932 97
Short Courses in Stock Judging		519 92
School Assessment, S.S. No. 7		64 80
Temporary Assistance		877 00
Travelling Expenses		689 49
Student Labor		4,229 15
Maintenance and Repairs of Government Buildings:		
Furniture and furnishings		1,484 88
Repairs and alterations		1,795 47
Fuel		8,894 80
Engine-room supplies		588 56
Sewage disposal		504 67
Ministerial Services and Extra Lectures		385 00
**Telephone Service*		387 50
Total Expenditure		$87,402 05

*Transferred to Miscellaneous in Auditor's Report.

REVENUE.

Tuition and Laboratory Fees		$4,839 25
Board		15,859 26
Supplemental Exams.		25 00
Rent of Postoffice Boxes, Sept., '05, to Sept., '06		39 00
Breakages and Fines, Sept., '04, to Sept., '05		373 85
Chemical Laboratory, sale of Alkaline Solution	$3 00	
Analysis of Sand	5 00	
" Stone	4 00	
" City Water	2 00	14 00
Bacteriological Laboratory, Sale of Tuberculin	2 00	2 00
Sale of Bread to N. S. Students		2 58
" Hams left over from June Excursions		9 40
" Old Shed		10 00
Refund duty on Forestry Trees		15 20
Revenue		$21,189 54
Net Expenditure		$66,212 51

FORESTRY DEPARTMENT.

Wages, trees, seeds, furnishings, repairs, etc.	$2,836 20

MACDONALD INSTITUTE AND HALL.

Expenditure:

Salaries and wages	$14,199 44	
Bread, meat, groceries, furnishings, and repairs	9,130 17	
Fuel	2,972 96	
Laundry, advertising, library, books	1,076 28	
Engine room supplies	309 43	
Maintenance of Laboratories:		
Nature Study, Home Economics, Manual Training	2,993 13	
Total expenditure		$30,681 41

Revenue:

Tuition and laboratory fees	$4,536 00	
Board	11,380 97	
Sale of supplies to Nature Study Students	8 37	
Refund express on Manual Training Appliances	55	
		$15,925 89
Net expenditure		$14,755 52

Student Labor, 1905.

Total per month:

January	$ 66 35
February	289 21
March	336 45
April	405 96
May	84 86
June	201 14
July	321 30
August	362 88
September	203 80
October	470 33
November	635 08
December	851 79
	$4,229 15

To different departments:

College	$274 54
Macdonald Institute	54 60
Grading Macdonald grounds	7 36
Forestry	27 53
June excursions	60 35
Chemical Laboratory	93 97
Bacteriological	15 18
Biological	121 77
Physical	192 01
Horticultural Department	418 97
Mechanical	503 33
Farm	997 54
Experimental	745 80
Poultry	442 04
Dairy	269 36
Short Courses	4 80
	$4,229 15

FARM DEPARTMENT.

Expenditure:

Permanent improvements	$ 362 98	
Maintenance:		
Wages of foreman, men and stenographer	4,589 09	
Purchase of live stock, and cattle for feeding	4,968 79	
Feed and fodder	1,325 95	
Seed	254 14	
Binder twine	61 00	
Repairs, alterations, blacksmithing, etc.	723 39	
Furnishings	263 53	
Tools and implements	600 02	
Advertising, printing, postage and stationery	335 85	
Fuel and light	8 60	
Contingencies	176 19	
Expenditure		$13,669 53

REVENUE:		
Sale of cattle:		
3 bulls, $205.00; 5 heifers and cows, $247.00; 5 calves, $65.00	$ 517 00	
27 cattle (auction sale Oct. 25, 1905)	1,085 00	
29 cattle, 38,550 lbs. at from 5c. to 5¾c. per lb.	2,162 10	
Pigs:		
27 boars, sows and young pigs	137 00	
48 " " " auction sale Oct. 25, '05	740 00	
73 hogs 14,141 lbs., at from 5¼c. to 7¼c. per lb.	846 76	
Sheep:		
9 rams and ewes	45 00	
25 rams and ewes (auction sale Oct. 25, 1905)	420 00	
6 sheep, 920 lbs., at from 4½c. to 6½c. per lb.	49 40	
Carcasses, used at Short Courses in Stock Judging	410 12	
Service of animals	195 50	
Sale of wool, 378 lbs., at from 14c. to 15c. per lb.	55 87	
Hides	12 74	
Old team of horses	110 00	
Grain, 191½ bu., at from 60c. to 75c. per bu.	116 50	
Old iron	5 00	
Hay, 3 loads, at $4.00	12 00	
		$6,920 08
Net expenditure		$6,749 45

N.B.—Nothing allowed the Farm department for the feed of Dairy Stock, feed, etc., of the departments' horses, and supplies for the College.

EXPERIMENTAL DEPARTMENT.

EXPENDITURE:		
Permanent improvements	$588 47	
Foreman	750 00	
Specialist in Plant Breeding	800 00	
Assistant Experimentalist	358 34	
Stenographer	350 00	
Teamsters	722 83	
Laborers	2,702 61	
Seeds	424 96	
Manure and special fertilizers	56 50	
Furnishings, repairs, blacksmithing, etc.	307 59	
Printing, postage and stationery	109 74	
Implements and tools	29 01	
Purchase of horse	175 00	
Contingencies	101 35	
Expenditure		$7,476 40

DAIRY DEPARTMENT.

EXPENDITURE:		
Permanent improvements	$274 33	
Wages of foreman	560 00	
" cheesemaker	400 00	
" buttermaker	425 00	
Temporary assistance	418 17	
Engineer	297 50	
Cattleman	480 00	
Milk	9,051 34	
Cows	555 30	
Feed	538 38	
Furnishings, repairs, etc.	882 57	
Fuel and light	621 06	
Laboratory chemicals, etc.	59 03	
Stenographer (part time)	157 38	
Contingencies	171 34	
Expenditure		$14,891 40

REVENUE:		
Butter: 42,731 lbs. at from 15c. to 25c. per lb.	$8,634 84	
Cheese: 12,588 lbs. at from 5c. to 12c.	1,412 85	
Milk: 4,090 quarts at 4c.	163 60	
18,453 lbs. at $1.60 cwt.	295 21	
Skim milk and whey: 248,200 lbs. at 10c. per cwt.	248 20	
Cream: 736¾ quarts at 20c.	147 35	
95¼ gals. at 60c.	57 30	
Fees	3 00	
Cattle: 1 bull, 8 cows and 1 heifer	319 00	
9 calves	56 00	
Prize money for cows	50 00	
Sundries: 30 bales shavings, $6.00; old iron, $13.50; milk testers, .40; rennet, .25; old rope, $2.00; old tanks, $4.50; testing milk, $2.15; refund express, .25; refund duty on pasteurizer, $28.25	57 30	
		$11,444 65
Net expenditure		$3,446 75

N.B.—Allowing nothing for milk and cream supplied by Dairy Department to the College.

DAIRY SCHOOL DEPARTMENT.

EXPENDITURE:		
Permanent improvements	$ 272 21	
Wages of Instructors and Janitor	1,899 50	
Cleaning, painting, repairs, etc.	54 38	
Appliances, separators, vats, etc.	692 59	
Expenses of Cheese and Butter Judges	9 75	
Travelling expenses, inspecting factories	15 95	
Books, magazines, papers, etc.	14 87	
Advertising, printing, postage, stationery	161 23	
Fuel and light	611 44	
Purchase of milk for use in school	3,926 15	
Contingencies	64 27	
Expenditure		$7,722 34
REVENUE:		
Fees: 9 non-resident, $54.00; 25 resident, $25.00	$ 79 00	
Breakages	5 05	
Butter: 16,565 lbs. at from 15c. to 25c.	3,828 55	
Cheese: 5,198¾ lbs. at from 8c. to 11c.	540 20	
Skim milk and whey: 16,000 lbs. at 10c. cwt.	16 00	
Milk: 1,618 qts. at 4c.	64 72	
" 9,766 lbs. at $1.60 cwt.	156 22	
Cream: 444¾ qts. at 20c.	88 95	
One Pasteurizer	112 50	
		$4,891 19
Net expenditure		$2,831 15

N.B.—Allowing nothing for milk and cream supplied to the College by Dairy School.

POULTRY DEPARTMENT.

EXPENDITURE:		
Permanent improvements	$ 76 52	
Temporary assistance	436 00	
Stenographer (part time)	114 12	
Purchase of stock	174 85	
Furnishings and repairs	360 91	
Feed	466 20	
Fuel and light	161 61	
Experiments (incubator and fattening)	1,037 34	
Contingencies	101 94	
Expenditure		$2,929 49
REVENUE:		
Eggs for hatching: 145 1-6 set at from $1.00 to $2.50, $176.00; 472 eggs at from 4 to 5c., $21.60	$197 60	
Eggs for domestic use: 838 doz. at from 15c. to 30c. per doz.	165 09	
Live poultry: 213 birds	327 50	

Dressed poultry: 2,428¾ lbs. at from 8c. to 15c. per lb. ...	419 96	
51 pair at from 60c. to $1.00 per pr. ...	49 05	
50 broilers, 105 lbs., at 30c. per lb. ...	31 50	
Feathers, $3.65; old steps, .25; old bones, $2.25 ...	6 15	
		$1,196 85
Net expenditure ...		$1,732 64

HORTICULTURAL DEPARTMENT.

EXPENDITURE:

Permanent improvement ...	$175 16	
Foreman in gardens ...	800 00	
Florist ...	700 00	
Assistant in greenhouses and night fireman ...	450 00	
Assistant in gardens (6 months) ...	190 00	
Teamsters (two) ...	891 00	
Stenographer (part time) ...	88 00	
Laborers ...	2,041 55	
Manure ...	125 24	
Trees, plants, bulbs, seeds ...	267 22	
Implements, tools, furnishings, repairs, etc. ...	812 40	
Fuel and light ...	925 78	
Wax fruit models ...	399 60	
Contingencies ...	87 16	
		$7,953 11

NOTE.—Products supplied to College.

MECHANICAL DEPARTMENT.

EXPENDITURE:

Foreman ...	$800 00	
Tools, etc. ...	149 08	
		$949 08

SUMMARY.

College expenditure ...	$87,402 05		
Revenue ...		$21,189 54	
Macdonald Institute and Hall expenditure	30,681 41		
Revenue ...		15,925 89	
Forestry expenditure ...	2,836 20		
Total expenditure ...	$120,919 66		
Total revenue ...		$37,115 43	
Net expenditure ...			$83,804 23
Farm expenditure ...	$13,669 53		
Revenue ...		$6,920 08	
Experimental expenditure ...	7,476 40		
Dairy expenditure ...	14,891 40		
Revenue ...		11,444 65	
Dairy School expenditure ...	7,722 34		
Revenue ...		4,891 19	
Poultry expenditure ...	2,929 49		
Revenue ...		1,196 85	
Horticultural expenditure ...	7,953 11		
Mechanical expenditure ...	949 08		
Total expenditure ...	$55,591 35		
Total revenue ...		$24,452 77	
Net expenditure ...			$31,138 58
Total net expenditure ...			$114,942 81

Yours truly,

S. SPRINGER,

Bursar.

PART II.

THE DEAN OF RESIDENCE.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith my second annual report as Dean of Residence and Instructor in English and Bookkeeping.

As Dean of Residence, my duties have been to preside in the College dining-hall, to inspect the residence building and furniture, to conduct roll-call and prayers, to superintend evening study, and in so far as possible, to act as a friend and advisor of each student.

Many improvements have been made in the residence during the year. The dormitories and corridors have been repainted, and the walls of the dining-hall have been tastefully calcimined and hung with appropriate pictures. A number of electric gongs have been placed in the halls for summoning the students to meals and lectures. As these gongs may be heard in all the rooms, the students no longer crowd the reading-room in boisterous numbers while waiting for meals. A Y.M.C.A. reading-room, provided by the College and furnished by the Association, affords a bright and comfortable room, to which many of the students repair for an hour after supper. This room not only gives opportunity for regular access to the library and current literature of the association, but also serves as a committee room and centre for the work of the association. So great has been the success of this experiment that I would suggest that if possible, similar rooms might be provided for the Athletic Association and Literary Society. Though many books and magazines are published on athletic and literary society work, we have no literature of this kind in the College. If association reading-rooms were provided, they would not only be conducive to securing literature on these two important branches of student activity, but would also enable the executives to avoid the present inconvenient practice of holding committee meetings in students' rooms. The good work now being done by these Associations would, I feel sure, be greatly augmented if centres of interest and discussion were thus provided.

The addition of an Athletic Instructor to the Staff has given a very great impetus to both field athletics and gymnasium exercise. This is directly beneficial to the students in improved physique, straighter shoulders, and more graceful carriage, and indirectly beneficial to the residence, in that the students now take their exercise on the campus and in the gymnasium, instead of in the rooms and corridors of the residence.

Compulsory attendance at church on Sunday mornings was for years a rule of the residence. Now, however, a chapel service, conducted by one of the ministers of the city, or by some prominent visiting clergyman, is held on Sunday afternoon in Massey Hall. Excellent music, rendered by a choir of Macdonald Institute and College students, forms an attractive feature of these services, which are regularly attended by many of the officers and almost all the students of both Institutions. Attendance at church is, for this reason, no longer compulsory, but I may add that though not compulsory, the great majority of our students regularly attend church.

It is gratifying to note the growth of a wholesome College spirit, and a broader perception of increased opportunities for improvement, keeping pace

with the rapid development of the Institution. Almost all our students now come here realizing that their College course is the great opportunity of their lives and determined to make the best use of the two or four years spent at the College. This being the case, I have had the support of the whole student body in securing a quiet "study-hour," and I find that all the students realize the necessity for regular and systematic study.

Contact with character rather than contact with curriculum, therein lies the hope of our College. In character development, life in residence is a stronger factor than even study and class-room work. Appreciating this, I have endeavored, in every possible manner, to make the life in residence conducive to the development of strong, manly character. The proudest boast of our College is not that we make farmers, or professors, or college presidents, or ministers of agriculture, but that we make men.

As Instructor in English my work has comprised lectures in Grammar, Composition and Rhetoric, and Literature. In Grammar, as many students have forgotten even the rudiments, it is necessary to review the whole subject. As this must be done in one year, the work must be somewhat elementary, but I have sought to give to the students a working knowledge of the laws governing the use of words, their forms, inflections, and combinations. In Rhetoric, the course has consisted of such a study of the fundamental rules of English prose construction as would enable the students to write good prose and to study intelligently and appreciatively the style of English prose authors. The advantage of, and methods for securing a good vocabulary have first been studied. The form and structure of sentences has then been dealt with, the combining of sentences into paragraphs, and the union of paragraphs into a connected essay. In Composition, the object has been to give practice in the application of the laws of rhetoric, and training in clear thinking and correct, forcible expression. For this reason I have had the classes write essays on such topics as: "The Improvement of Farm Animals," "The Political Destiny of Canada," "My Favorite Book," "The Child is Father of the Man," and "How I came to be a Student at the College." These essays I have read and returned, with corrections and suggestions for improvement. In Literature a change has been made in the text selected for study. For the First Year, "Ivanhoe" has been substituted for "The Sketch Book," and for the Second Year, "Julius Caesar" has been replaced by "The Merchant of Venice," and "The Mill on the Floss," by Macaulay's "Essay on Warren Hastings." From the study of literature the students acquire a wider vocabulary and larger ideas, and unconsciously imitate the style of the authors studied, thus securing greater facility and correctness of expression. As many of our students have done but little reading, it has been my aim in teaching both prose and poetry, to arouse the interest of the students, not alone in the text studied, but by frequent quotations and references, to awake a lasting interest in English Literature.

In Bookkeeping, the course comprises business correspondence, commercial forms, and the keeping of farm and other accounts.

Owing to the improved conditions of life in the residence, the demand for rooms is greater than at any previous time. We have been forced to refuse a number of applications, and increased accommodation, both in dormitories and in the dining-hall, is one of the pressing needs of the College.

Respectfully submitted,

F. H. REED.

PART III.

THE PROFESSOR OF PHYSICS AND LECTURER IN ENGLISH.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith my eleventh annual report in the departments of Physics and English:

WORK IN ENGLISH.

Since last year there have been some changes in the prescribed course in English. The amount of work required is about the same as in previous years, the change being in the selections and the authors. In the First Year a number of specified short poems from Alexander's Anthology, and Scott's Ivanhoe, constitute the course in English Literature. Besides this, there is the usual amount of grammar and composition. In the Second Year other specified selections from Alexander's Anthology; Shakespeare's Merchant of Venice; and Macaulay's Essay on Warren Hastings. In the Second Year the work in grammar and composition is continued. The Third Year course consists in reading Shakespeare's Henry IV, part 1; Scott's Old Mortality; Milton's L'Allegro, Il Penseroso, and Lycidas; and Tennyson's Œnone, Ulysses; and a few cantos of the In Memoriam. In addition to this, in the Third Year a course of rhetoric and English Composition is taken with Genung's Outlines of Rhetoric as textbook. A number of essays are written on specified subjects. In the Fourth Year the selections are Milton's Paradise Lost, book I; a number of Wordsworth's Sonnets; Wordsworth's Highland Girl, Intimations of Immortality, and Tintern Abbey; Tennyson's In Memoriam, cantos 57-99 inclusive; and Carlyle's Essay on Johnson. The work in composition is continued in this year.

Besides the study of literary selections, of grammar and rhetoric, and the practical work in composition, the classes in the Second and Third Years have also a course of practical instruction in public speaking. This instruction takes the most practical form possible, namely, a number of students are asked to prepare an address the following week on any subject they may choose. The class is assembled, and these addresses are delivered. The instructor then takes five or ten minutes at the conclusion of the class in criticisms upon these addresses. There is no attempt at elocution; the object of these classes is to train men to speak intelligently and forcibly on any subject they may choose.

This year the instruction to the Second Year has been given by Mr. Jackson, and to the Third Year by myself. The other work in English, that is, the literature, grammar, and composition, has been given by Mr. Reed, the Dean of the Residence, in the First and Second Years, and the Third and Fourth Years by myself.

Besides the regular classes in public speaking, I have been in the practice of assigning topics for discussion in the regular courses of instruction in both Physics and English. This work is usually done by way of review. After any given subject has been covered in the course of lectures, a number

of topics under that subject are assigned to students in the class, and they are required to deal with those topics before the class, and are encouraged particularly to speak rather than read from manuscript. In this way, in my own department at least, a considerable amount of this exercise is afforded, and I believe that the work might be extended to the other departments of instruction with great advantage to the students. It should be observed that not only do they get the practice of appearing before an audience, but they require to review one topic at least of the subject carefully, and thus become well informed on that one topic at least. It is well known that unless one can present a subject clearly and intelligently before an audience, one is not fully informed on that subject.

Work in Physics.

The work in Physics is now grouped under three divisions:

First, *Agricultural Engineering*. This division includes Mechanics, a study of the principles of mechanics and the application of those principles to farm machinery; Surveying, consisting entirely of work with the surveyor's chain in measuring land areas; Levelling, consisting of work with the spirit level, making plans for drainage; Hydraulics, that is, as we study it, the mechanics of water supply for the farm,—the flow of water through pipes and the different kinds of machines for pumping water; Electricity, this subject is taken with a view to understanding the possible applications of electricity to farm purposes, such as the use of the dynamo, the use of storage batteries, the principles of the telephone, and electrical transmission of power.

Second, *Meteorology and Climatology*. This combined subject consists in a study of the weather, and the various causes that control the weather; the conditions favorable to frost and possible means of forecasting and preventing frost; the effects of climate considered generally first, and then particularly for Ontario and Canada; the influence of climate on the distribution of plants; climatic conditions favorable to fruits, vegetables, and cereals.

Third, *Soil Physics*. This subject is taken in the First and Fourth Years. In the First Year elementary work in soil physics in given, and its application to the principles and practices of tillage. Our aim is to make this subject in the First Year particularly as practical as it can possibly be made. That we have succeeded in doing this is indicated by a note which was appended to one of the examination papers last spring by a First Year student. At the conclusion of his paper in soil physics he took the opportunity to add that he had learned a great deal of practical value in the management of the soil. In the Fourth Year this work is continued and enlarged, and the whole question of the proper time and method of cultivation for various purposes is fully considered. All our discussions are, of course, based on the first-hand study of the different types of soils and their peculiarities as indicated by experience and by laboratory work.

The work in physics, so far as instruction is concerned, is now on a satisfactory basis. The different parts of our work seem to be properly correlated and arranged to suit the requirements and capacities of the various classes.

Investigation in Physics.

Our facilities for investigation in physics are, however, not all that might be desired. In the first place, as I have already pointed out, the

English requires so much of my time in the way of preparation during the summer, and delivering lectures during the fall and winter, that I have little time in which my undivided attention can be given to original investigation in this work. Mr. Day, the Lecturer in Physics, is able to devote the summer to original work in physics, and has commenced some promising lines of investigation. We require, however, a glass house or conservatory in which our investigations can be carried out under proper control. The necessity for this is, I believe, fully recognized by you and by the Minister, and we hope that you will be able to secure the required accommodation this coming year. Some work that we commenced this year we were unable to manage to our satisfaction or to bring to completion on account of lack of means for controlling the conditions. With a glass house, however, in which temperature, humidity, and light are under control, we shall be able to work out some important soil problems relating to the older parts of the Province, and also to the newer part now being opened up.

Physical Analysis of Soils.

Until recently the chemistry of the soil has been regarded as its chief scientific application. Although important results have been reached in soil chemistry, these are not in proportion to the amount of work that has been done. This disproportion is due to the slighting or ignoring by chemists, and by those who have followed the directions laid down by chemists as to soil management, of the conditions on which the value of the chemistry of the soil depends. These conditions are physical. It is now generally recognized by soil investigators, and to a less extent by farmers themselves, that before manures and fertilizers can have their full effect on the soil, the soil must first be put into the right physical condition; that is, into a state of tilth. The physical conditions of the soil, those conditions that decide its behaviour towards air and moisture, are, therefore, of the first importance in agriculture. The proper cultivation of the soil—the right time and manner of cultivation—should be the first consideration of the farmer in soil management, for the value of manuring and fertilizing, and the healthy and vigorous condition of his crops generally will depend upon the tilth of the soil. To be able to cultivate intelligently at the right time and in the right way, the farmer must undertsand the nature of the particular soil that he is dealing with, that is its texture.

By texture we mean the ultimate size of the soil grains when these are separated from one another, as by washing or powdering. Soils of fine texture are those in which the individual grains are derived principally from a rock called feldspar, which rock when broken down into the smallest fragments makes clay soil. Soil of coarse texture is generally derived from quartz rock, which when broken down forms particles of sand and quartz that do not weather so readily as clay, and that, therefore, remain on the whole larger particles in the soil. If a soil of fine texture in a powdery condition is examined, even with the naked eye, or, better still, under the microscope, it may be seen in groups of adhering grains rather than of single grains standing separate from one another. The same soil in field condition will generally be found in a more or less lumpy state,—the single grains of which the soil is composed being cemented together. This is the outstanding characteristic of clay soil, namely, its facility for forming groups or compound arrangements. A sandy soil, on the other hand, may be seen to consist of grains standing separate from one another, even when examined under field conditions. This tendency to form compound groups of grains, and under certain

conditions to form lumps and clods and become baked, or the lack of such tendency, determines the physical character of soils, and, besides, their behaviour to water and air. For the structure of the soil, namely, the size and arrangement of its separate grains or groups of grains, determines the character of the empty spaces throughout the soil. If the soil is sandy, consisting merely of coarse grains, these spaces are large and allow the air and water to move freely through the soil. If a clay soil becomes powdery, that is, reduced to single grain structure, the spaces in the soil are extremely small and the soil in this condition offers a high resistance to the movement of air and water. Hard packed clay is almost impervious to air and water.

One may gain a knowledge of the physical peculiarities of the soil, that is, the way in which it will probably behave toward air and moisture, either by experience or by an examination of the soil texture. Anyone who is skilled in recognizing the physical types of soils can describe pretty accurately how a certain type will behave under certain conditions of moisture, and how it should be treated in order to secure the best possible tilth. The physical analysis of the soil divides the soil into its granular parts of gravel, sand, silt, and clay, differing only, so far as the method of analysis is concerned, in the sizes of the grains in each division. The proportion of large, medium, and coarse grains in the soil indicates the texture of the soil, and declares to the informed observer what will be the behaviour of that soil under certain methods of treatment.

Physical Analysis of Abitibi Soils. In the year 1904, Mr. Archibald Henderson, a member of a party sent out by the Department of Lands and Mines, collected from the Abitibi district some forty or more samples of soil, representative of that district. These soils were variable in their physical character, varying from heavy clay to light sandy loam. A number of soils when analysed seemed to be composed entirely of clay, with little or no admixture with quartz particles. Such soils when placed in water and the lumps allowed to dissolve had no gritty feeling when the sediment in the water was examined with the fingers. Of the forty-two samples forwarded by Mr. Henderson for analysis, five per cent. were of this character, that is, possessing no quartz, and were classified as heavy clay. Thirty-nine per cent. of the samples possessed from fifteen to twenty-five per cent. of coarse or fine quartz particles,—the remainder being clay, and these were classified as clay soils. Nineteen per cent. of the samples possessed from twenty-five to forty per cent. of sand and silt, the remainder being clay, and these classified as clay loam. Fifteen per cent. of the samples classified as loam, that is, about one-half of the particles were sand and silt, and the remainder clay. Seven per cent. of the samples were classified as sandy loam, from sixty to seventy-five per cent. of each sample being sand and silt. Five per cent. were light sandy loam, and five per cent. were sand, that is, consisting of from ninety to one hundred per cent. of sand and silt. The remaining five per cent. were swampy soils, and had but little or no mineral constituents, so were not capable of physical analysis.

These soils, especially those possessing a large percentage of clay, seem to have large proportions of lime in their composition. Many of them were, in spite of their very fine texture, friable to a high degree. Others, of course, were very stiff in their character. This friability seems to be a peculiar quality in many of the Northern Ontario soils, even those of very fine texture. Not only those from Abitibi exhibit this quality, but I observed the same characteristic in the Temiskaming soils during my visit this summer, and also in the soils from the Rainy River district that were forwarded to me for analysis.

Another characteristic of these soils is the small proportion of vegetable matter present, compared with virgin soils of other parts of Canada. The considerable depth of almost pure vegetable matter of the Prairie soils, and the high proportion of the same constituent in Southern Ontario virgin soils, present a marked contrast to the comparatively barren soils of New Ontario. This deficiency in vegetable matter is due undoubtedly to the destructive fires that have raged over these districts within recent years. It is evident that one of the first courses of the New Ontario farmer will be to increase the amount of vegetable matter in the soils in all instances where the amount present seems to be deficient. The increase in vegetable matter will not merely increase the fertility of the soil by increasing the amount of plant food, but will improve in a marked degree the physical character of the soil by warming and mellowing it.

Another lot of soils has been forwarded this year by Mr. Henderson from other parts of the Abitibi district, which he visited this year again in company with the surveying party. I have been unable to complete the examination of these soils in time for this report, but may say that, in general, their character seems to be similar to the character of the soils analysed last year from the same district.

While in the Temiskaming district I collected about forty samples of soil from the ten townships that I visited there. I have examined and analysed most of these soils, and find that they are noticeably similar in their physical structure and appearance to the Abitibi soils reported on above. While a number of the Temiskaming soils are of a sandy nature, the majority of them are of the clay type, and consist, in some instances, entirely of clay with no admixture of quartz, and in other instances, principally of clay with a small percentage of sand. My object in securing these samples was to have them for experimental and demonstration work in soil physics, and also to exhibit them in our section of the museum as New Ontario soils. Further, I intend, after making a complete examination of them, sending a report of these soils direct to the persons who were kind enough to assist in securing the samples. A full report on these soils to each person, showing the different types, and some observations on the methods that would give the best results in cultivating, will, I think, be the most correct and serviceable way for securing value for the amount of work involved in the collection and the analysis.

The Drainage of Farm Lands.

There appears to be an awakening of interest among farmers in Ontario generally respecting the question of land drainage. After having cleared their land, erected suitable buildings thereon, and stocking their farms to their satisfaction, our farmers are progressive enough to consider what more they may do in the way of improving their holdings, and, undoubtedly, the next important step in such improvement will be secured by under drainage. It is not my intention here to enter into a consideration of the benefits of drainage, but I wish to announce a proposition which has been previously announced in various ways, and by means of which I hope to enter into active co-operation with the farmers of Ontario in the important matter of land draiange.

Early in the past summer I submitted the following proposition to the Minister of Agriculture for his approval: In instances where farmers had considerable areas of land to drain, presenting engineering difficulties, the department of Physics would take the levels over the areas of land and

prepare a working plan whereby a system of drainage could be carried out. The terms under which this work is to be done are, that the owner of the land shall pay all necessary travelling expenses for one person who goes out to do the work, and shall, further, provide an assistant in the field for taking the levels.

This proposition is based on the well known fact that many tracts of land that might be made valuable are almost valueless solely from the want of proper drainage, and that such lands usually present difficulties in the way of preparing a plan of drainage that debar the farmer from undertaking the work. The difficulties arise from the situation of the land and from the character of the surface, namely, low lying land with a flat surface, in which the finding of an outlet presents a practical difficulty; and in which the direction and the amount of fall of the ground surface are not readily determined by the eye. In such instances as these, the use of an accurate levelling instrument is almost, if not quite, essential. There are some successful drainers who claim that they can drain any kind of land which is capable of being drained at all without the use of the levelling instrument; merely with the use of water in the ditch bottom. Without disputing the probability of success by this method in the hands of a man properly skilled in its use, it nevertheless remains a fact that many farmers are hindered from draining their land because they cannot determine the position, direction, and depths of the drains with certainty. It is to meet this difficulty that the above proposition is made. I am glad to say that the Minister of Agriculture signified his approval of the plan, and, accordingly, upon being asked to speak at the National Exhibition on the subject of Farm Drainage, I there for the first time announced to the farmers what I was prepared to do in this direction. The report of my address appearing in the agricultural journals afterwards, I received a number of communications gladly accepting the proposition. I have correspondence from Grimsby, Exeter, Wiarton, Mount Forest, Whitby, Fergus, and Lancaster, all inquiring about the details of my proposition and requesting assistance. It is likely that arrangements will be made for complying with these requests early next season. I have communicated with the Superintendent of Farmers' Institutes upon the matter, and have suggested that field meetings be arranged, somewhat after the plan of the orchard meetings that have been held in recent years. At such field meetings, the ground having been gone over previously to determine its character, an address can be delivered on the subject of farm drainage, and the particular field be used as an object lesson.

The condition of things that makes such a proposition necessary is that, although there is no lack of competent drainage engineers in this country, farmers are not in the habit of employing them. I happened to meet an engineer of my acquaintance a few weeks ago who is employed the greater part of his time in municipal drainage. I asked him if he had ever been employed by a farmer for private work in drainage. He replied in the negative. It appears, therefore, that while this sort of work is absolutely necessary, yet the work is not being done, and I think it is a good opportunity for my department to put itself more closely in touch with farming interests in Ontario.

Lightning Report.

The following is a tabulated statement of destruction and damage by lightning in 1905, as compared with previous years. Of course, I do not pretend that this report includes anything like the total amount of such

damage and loss for Ontario. It represents only a summary of the reports received by my department. The sources from which I obtained reports were: (1) From blank forms filled in by students and ex-students of the College. Each spring I hand to students of the College blank forms of reports, with a request to fill in these forms whenever any instances of damage by lightning are brought to their notice. (2) From local newspapers. Circulars were sent out to most, if not all, of the newspapers of Ontario, especially to those published in villages and small towns, requesting that a copy be forwarded whenever it happened to contain a report of destruction by lightning. I have not expected that this could be attended to at all completely by newspapers, for, unavoidably, such a request is often forgotten. Nevertheless, I have received a considerable number of reports from this source. (3) From daily newspapers. All references of destruction by lightning in Ontario were clipped from one or more of the daily papers as the reports appeared. (4) From direct correspondence with those suffering losses. Whenever the newspaper report came to hand, if the details were not sufficiently clear or definite, a circular was sent directly to the person most nearly concerned; and a large number of complete reports were obtained in this way.

In spite, however, of these various sources of information, it is impossible to secure complete reports of all occurrences under this head, or to secure exact data respecting these occurrences. On this account, we cannot with any certainty compare our reports of one year with those of another. The object of continuing the collection of lightning data is from the average of a number of years to be able to draw conclusions respecting the circumstances in which lightning is most liable to play havoc.

This year we have received fewer reports than we received in 1904, and, evidently, there have been fewer instances of damage over the country, though in one or two sections the loss has been somewhat severe. The general conclusions from our reports so far serve only to emphasize statements made in my previous annual reports, namely, as to the efficiency of lightning rods when they are correctly installed; as to the value of trees, especially belts of trees in the neighborhood of barns and other buildings as lightning conductors. I am inclined to think too that metal roofing, if metallically connected with a lightning conductor entering the ground and continued to moist ground, may prove a safe-guard against lightning.

There is an old superstition that lightning does not strike twice in the same place. There may be some warrant for this idea merely in the fact that often lightning having once struck leaves very little to be struck again; but where a barn has once been struck and another barn has been erected on the same site, that second barn is just as likely to be struck as the first barn was, and in some instances, more likely. I have reports during this year's observations in which a number of successive buildings on the same spot have been struck by lightning. One instance occurred in the neighborhood of Alma, in the county of Wellington, in which a third barn on the same site had been struck and burned to the ground. Where such instances occur, they must be due to the geological formation of the ground or to the presence of moist earth or other material of good conductivity, which affords to the lightning a path of least resistance. It would certainly be unwise for anyone to build a third barn on the site on which two previous barns had been struck.

One of my correspondents from the county of Welland states that a number of trees have been struck at different times in that locality. These trees were isolated, and were principally elm and oak.

Trees Struck.

Year.	Elm.	Pine.	Oak.	Basswood.	Maple.	Ash.	Poplar.	Cedar.	Apple.	Hemlock.	Willow.	Spruce.	Beech.	Chestnut.	Balsam.	Hickory.	Butternut.	Fir.	Total.
1901	7	8	1	5	2	...	...	...	...	2	...	...	...	1	...	...	...	...	26
1902	6	1	5	2	4	2	1	...	...	...	1	...	1	...	1	1	...	...	25
1903	5	3	1	...	...	1	1	...	1	...	1	...	...	...	...	...	...	...	13
1904	6	4	1	...	...	1	2	...	2	...	...	...	...	...	...	...	1	...	17
1905	4	1	1	...	1	...	...	3	...	...	...	1	...	...	...	...	...	1	13
Total	28	17	9	7	7	4	4	3	3	2	2	1	1	1	1	1	1	1	94

Animals and Buildings Struck.

Year.	Animals struck.					Buildings struck.	
	Cattle.	Sheep.	Horses.	Pigs.	Total.	Barns.	Other buildings.
1901	33	7	11	1	52	26	6
1902	22	47	17	3	89	39	19
1903	8	1	2	...	11	24	8
1904	32	9	8	...	49	62	19
1905	19	...	8	...	27	28	14
Total	114	64	46	4	228	179	66

WEATHER REPORT, 1905, AT THE O. A. C., GUELPH.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Mean Temperatures	15.4	14.3	29.4	41.2	52.8	62.6	67.7	63.9	61.6	48.2	34.3	28.5	43.6
Departure from normal	—2.2	—1.1	1.0	—0.4	—1.4	0.3	—1.1	0.8	1.1	—0.2	—0.7	6.0	0.4
Lowest Temperatures	—3.5	—15.0	—0.5	21.0	32.0	39.0	49.0	46.0	29.0	24.0	9.3	3.0	—15.0
Highest Temperatures	39.0	34.0	73.5	72.0	77.0	85.0	89.0	86.0	86.6	80.5	55.0	43.0	89.0
Snowfall in inches	9.50	18.25	4.25	0.66	...	...	...	...	...	0.50	8.00	6.00	47.
Rainfall in inches	0.0	0.0	0.21	1.75	3.89	3.24	4.60	1.98	2.85	2.88	1.83	1.00	24.18
Precipitation in inches	.95	1.83	0.64	1.82	3.89	3.24	4.60	1.98	2.85	2.88	2.63	1.60	28.90
(Rain and Melted Snow.)													
Departure from normal	—0.49	0.09	—0.50	—0.14	1.26	0.40	0.68	—0.31	0.27	—0.16	1.07	0.00	—2.14

Year.	Mean temperature.	Date of last frost in spring.	Date of first frost in autumn.	Length of period without frost.
1899	42 1	May 15th	Sept. 23rd	130 days.
1900	45.6	May 10th	Oct. 17th	158 "
1901	43.1	May 15th	Oct. 4th	141 "
1902	43.3	May 11th	Oct. 2nd	143 "
1903	44.4	May 5th	Sept. 29th	146 "
1904	40.1	April 22nd	Sept. 22nd	153 "
1905	43.6	May 21st	Sept. 26th	127 "
Average	43.2	May 10th	Sept. 30th	142 "

Date of last killing frost in spring, April 24 (29.5°).
Date of first killing frost in autumn, Sept. 26th (29.0°).
No. of days between killing frosts, 154.

WEATHER REPORT FOR OUTSIDE STATIONS. 1905.

—	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.	Lat.
Mean Temperatures.														° ′
St. Catharines	20.0	17.3	30.0	44.2	53.0	63.1	75.3	68.6	63.3	51.7	37.1	31.6	46.3	43 10
Maitland (Grenville Co)	8.6	7.2	23.3	41.5	54.3	62.7	69.1	64.1	56.8	46.4	34.4	23.5	41.0	44 40
Magnetawan (Parry S'nd)	.....	.....	.....	.....	.....	.....	.....	62.1	57.4	43.7	28.1	19.3	.....	45 40
Marksville (St. Joseph)	.....	.....	.....	.....	.....	.....	.....	63.7	58.9	43.8	32.6	27.2	.....	46 12
Milberta (Temiskaming)	—4.0	—0.5	17.8	34.7	46.7	59.5	63.3	59.9	56.1	41.1	23.3	14.2	34.3	47 39
Highest Temperatures.														
St. Catharines	45.0	38.0	64.5	73.5	83.0	87.0	93.5	90.0	83.0	85.0	60.0	48.0	93.5	
Maitland	37.0	39.0	61.0	72.0	77.0	83.0	86.0	82.0	78.0	79 0	54.0	47.0	86.0	
Magnetawan	.....	.....	.....	.....	.....	.....	.....	88.0	90.0	82.5	48.0	40.0	.....	
Marksville	.....	.....	.....	.....	.....	.....	.....	79.0	78.0	74.0	52.0	44.0	.....	
Milberta	34.0	40.0	70.0	67.0	72.5	85 0	86.0	79.5	85.0	80.0	46.0	39.0	86.0	
Lowest Temperatures.														
St. Catharines	1.0	—9.0	0.0	26.0	32.0	42.0	50.5	47.0	37.0	21.5	13.0	7.5	—9.0	
Maitland	—16.0	—24.0	—11.	21.0	29.0	40.0	47.0	47.0	32.0	21.0	5.0	—14.0	—24.0	
Magnetawan	.....	.....	.....	.....	.....	.....	.....	34.0	23.0	12.5	—3.0	—18.5	.....	
Marksville	.....	.....	.....	.....	.....	.....	.....	39.0	84.0	20.0	2.0	7.0	.....	
Milberta	—37.0	—32.5	—32.0	18.0	22.0	29.0	34.0	29.5	22.0	8.0	—15.0	—27.5	—37.0	

—	Date of last killing frost in spring.	Date of first killing frost in autumn.	Number of days.
St. Catharines	April 23 (30.0°)	October 26 (25.0°)	186
Maitland	May 1st (29.0°)	" 21 (26.0°)	173
Magnetawan	.....	Sept. 14 (27.5°)	.....
Marksville	.....	October 11 (30.0°)	.....
Milberta	June 7 (29.0°)	Sept. 26 (22.0°)	110

Precipitation.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
St. Catharines:													
Rain	.....	.....	0.72	1.21	2.97	2.74	3.74	1.92	3.01	2.54	1.85	2.22	22.92
Snow	13. 0	3.00	2.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	18.50
Precipitation in inches of rain	1.30	0.30	0.97	1.21	2.97	2.74	3.74	1.92	3.01	2.54	1.85	2.22	24.77
Maitland:													
Rain	.....	.....	1.16	1.79	3.14	3.84	8.06	3.35	1.56	3.94	1.74	2.09	30.67
Snow	13.50	23.50	.....	2.50	.....	.....	.....	.....	.....	.....	.....	12.50	52.00
Precipitation in inches of rain	1.35	2.35	1.16	2.04	3.14	3.84	8.06	3.35	1.56	3.94	1.74	3.34	35.87
Magnetawan:													
Rain	.....	.....	.....	.....	.....	.....	.....	4.04	4.72	4.25	2.76	0.91	.....
Snow	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.75	18.90	.....
Precipitation in inches of rain	.....	.....	.....	.....	.....	.....	.....	4.04	4.72	4.25	4.03	2.80	.....
Marksville:													
Rain	.....	.....	.....	.....	.....	.....	.....	2.21	3.31	1.82	2.10	.....	.....
Snow	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.00	9.00	12.00	.....
Precipitation in inches of rain	.....	.....	.....	.....	.....	.....	.....	2.21	3.31	2.02	3.00	1.20	.....
Milberta:													
Rain	.....	.....	1.07	1.86	2.18	1.77	5.28	5.29	3.20	1.59	.....	.....	22.24
Snow	14.00	10.50	9.75	5.50	.....	.....	.....	.....	.....	.....	15.00	11.00	65.75
Precipitation in inches of rain	1.40	1.05	2.05	2.41	2.18	1.77	5.28	5.29	3.20	1.59	1.50	1.10	28.82

I submit herewith a section of the report prepared by Mr. W. H. Day, Lecturer in Physics. On account of my frequent and prolonged absences during the summer on Institute work and other business, Mr. Day had charge of practically all of the investigation that has been conducted in this Department. Just here I wish to say that Mr. Day has conducted this work with great painstaking and skill, and when proper facilities are afforded for continuing the work under proper control, I am satisfied that he will reach valuable conclusions.

The work herein described comes under three heads: First, the improving of peat soil by physical methods; second, the aeration of soils and its effect on the various crops; and third, the amount of water used by various crops in average field conditions.

(1) It has been the practice heretofore to subject peat soils to chemical analyses and to recommend generally some chemical treatment for their betterment. We recognize, however, that while such soils are frequently lacking in some chemical constituent, just as frequently they are physically defective. This defect is generally one of moisture with its attendant results. It is well known by soil physicists that a vegetable soil composed entirely or principally of vegetable matter, has a peculiar behaviour toward water. The movement of water through such soils is generally slow, so that when dry they may fail to absorb a sufficient quantity of the rainfall, shedding off the surface a large proportion and leaving the subsoil dry. Further, such soils have very slow capillary action, and the surface may become dry by the action of the growing crops, while the subsoil still holds a quantity of moisture. On the other hand, when such soils become saturated, the amount of moisture that they retain is excessive. The following experiment describes a test of various methods for improving the behaviour of a vegetable soil toward water. The capillary action must be improved and the capacity for retaining moisture must be diminished. In these experiments, so far as we have gone, it is evident that lime intensifies the unfavourable character of vegetable soils in this respect, and, therefore, is not to be recommended. Marl seems to improve it, and so do sand and ordinary field soil when mixed with the vegetable matter. In brief, it seems that thorough drainage combined with a top dressing of sand or field soil seems to be the most practicable method for improving the productiveness of such soils, not only the physical behaviour toward moisture, but the power of the soil to sustain crops being improved by such treatment.

(2) One assumed advantage of thorough drainage and tillage is the increased movement of air through the soil, and consequently the abundant supply of atmospheric nitrogen, oxygen, and carbonic acid to the roots of crops. The experiments in aeration consist in forcing air through soil on which crops were growing and noting the relative effects of the aerated and unaerated soils.

(3) The experiment on transpiration and evaporation establishes in a very interesting way the disproportion between the amount of rainfall during the growing season, and the amount of water required for crops for best results. While the crops were growing they consumed more than twice as much water as was supplied by the rainfall. The crocks in which the crops were grown being very shallow, there was no supply of moisture in the subsoil such as exists in actual field conditions, and, therefore, the amount which the crops used in addition to the rainfall had to be supplied artificially. To apply our results to conditions in the field, we see that the necessity for a thorough tillage of the land with a view to absorption and conservation of the water supply, is illustrated and emphasized. The problem of soil management is to store up and to conserve this supply of moisture which the crops demand in addition to the average rainfall. It has been customary in talking about tillage of the soil to dwell chiefly on summer cultivation for the conservation of moisture. This is important. It is, however, equally important to dwell on autumn cultivation for the absorption of moisture. The soil in the autumn should be loosened up to a sufficient depth to take in as much of the autumn rains and the melting snow in the winter as possible rather than shed these off the surface. The experiments here described are not by

any means complete or conclusive, and we expect to continue and extend them as opportunity permits.

Experiments on Peat Soil.

A communication was received from Mr. J. H. S. Cronk, of Woodstock, re the soil on his lot. He complained that it had given him very much trouble in the matter of moisture. He stated that it was almost impossible to keep it moist during the growing season, that it would bake and crack, and that a heavy shower of rain would run away through these cracks, without wetting the soil to an appreciable depth. At our request Mr. Cronk sent in a sample of both the surface and the subsoil.

The notes we made upon the samples were as follows:

Surface soil—black, peat-like, very wet.

Subsoil—sample (1) sand and clay with marl; sample (2) good quality of marl.

The data furnished by Mr. Cronk were:

Surface soil—four feet deep.

Subsoil—sample (1) extends eighteen inches below surface soil; sample (2) underlies sample (1) to a depth of two feet.

Determinations of moisture and vegetable matter resulted as follows:

Per cent. of moisture, oven dried at 110°C. 59.6
Per cent. of moisture, air dried 56.7
Per cent. of moisture, oven dried at 42°C.....56.4
Per cent. of vegetable matter in air dried soil 84.68

Tubes of the air-dried soil mixed with loam, marl, lime, and sand, were then set in water to note the effect of the different treatments on the capillary action of water. The treatments and their effects may be seen from the following table:

Tube No.	Treatment.	(1) Height of water in tubes at end of four days.	(2) Amount of water per centimetre of depth.
I.	Loose peat	16.2 cm.	6.64 grams.
II.	Packed peat	17.0 "	6.36 "
III.	25 per cent. loam and rest peat	22.0 "	5.48 "
IV.	75 per cent. loam, rest peat, packed	28.0 "	4.05 "
V.	10 per cent. lime, rest peat, packed	9.1 "	6.95 "
VI.	10 per cent. marl, rest peat, packed	23.0 "	5.60 "
VII.	25 per cent. sand, rest peat, packed	18.0 "	6.67 "
VIII.	50 per cent. sand, rest peat, packed	22.1 "	5.7 "

From column (1) it will be seen that 25 per cent. loam, 10 per cent. marl and 50 per cent. sand increased the capillary rate by about 25 per cent., as compared with the rate in pure peat, so that soil treated in any of these ways is capable of supplying water to the plants much more rapidly than in the untreated state. 10 per cent. lime, on the other hand, decreased the capillary rate by about 50 per cent as compared with pure peat.

Column (2) shows that tubes III, IV, and VI, though wet to greater height (column (1)) do not require as much water per centimeter of depth, *i. e.*, the soils in these tubes are not as wet as in the slower tubes. This is an important fact, since excessive moisture predisposes the plants to attack of "damping off." Tube No. V, 10 per cent. lime, is worthy of note; al-

though it causes the water to rise slowest it contains more water per centimeter of wet soil than any of the others.

Crocks of soil were then treated in the same way as that in the tubes, except that no crock with marl was prepared, as only a very small amount of it had been received. More marl was sent for, but it arrived too late for experiment this season. When the crocks had all been prepared, they were planted with oats, all crocks in a similar manner and with fifty grains of oats per crock. The peat was used in its field state, i. e., with 59 per cent. water; the loam contained 16 per cent. water; the sand 8 per cent. The lime, air-slaked, was used dry. All were planted on July 25th and set outside on July 26th. A very heavy rain occurred on July 29th, amounting to .60 inches.

The following table will give the data concerning the crocks:

Crock No.	Treatment.	July 31st.		August 1st.		August 12th.	
		Grains up.	Remarks.	Grains up.	Remarks.	Plants alive.	Strong plants.
27	Packed peat.	28		36		29	14
28	25% loam	37	Strong, uniform growth.	45	Strong growth. 1 "damped off."	47	16
29	40% "	35		41	1 "damped off."	47	25
30	50% "	26		30		49	39
31	67% "	37		45		48	45
32	75% "	40		50		49	49
33	5% lime	20		26	5 dead.		
34	10% "	0					
35	20% "	0					
36	20% sand	42		47	8 "damped off."	47	23
37	50% "	43		46	3 " "	46	20

Notes on July 31st show that germination was best in crocks 36 and 37, treated with sand, next in the 75 per cent. loam, and third in the 25 per cent. loam. August 1st shows that the 75 per cent. loam had the most plants, next the sand, and third the 25 per cent. loam. But it will be seen that on the 1st of August several plants showed that some disease had attacked them. It proved to be a "damping off," and by August 12th it had attacked about half the plants in most of the crocks. On August 1st the 25 per cent. loam showed the *strongest*, most *uniform* growth, but the report of the 12th shows that the "damping off" attacked most actively the crocks that contained the most peat. It looked at this stage as if the grain in several of the crocks would be ruined, viz.: Nos. 27, 28, 29, 30, 36, and 37, but some dry weather followed and the plants rallied considerably, though these crocks never gained their place as compared with Nos. 31 and 32. Between Nos. 27, 28, 29, 30, 36, and 37 there was little to choose, but 31 and 32 were much superior.

The "damping off" manifests itself just at the surface of the soil. Here the stem turns white, soft, and watery, and the plant lops over, lying on the soil. The disease is due to a spore in the soil, whose growth is fostered by excessive moisture.

Owing to the blight striking only part of the crocks, the test was hardly a fair one of what might take place under uniform conditions, but a careful examination of the data will show that the peat can be much improved by adding either loam or sand, but seriously injured by 10 per cent. of lime.

Barring "blights," 25 per cent. loam and 20 per cent. sand seem to be the best treatments tested. Further tests will be made with marl and with lime in smaller quantities and water-slaked before using.

Experiments on Aeration.

A large number of four-gallon jars were fitted up as in figure (1). A is a four-gallon jar, B is a rubber stopper, and C is a glass tube with perforated

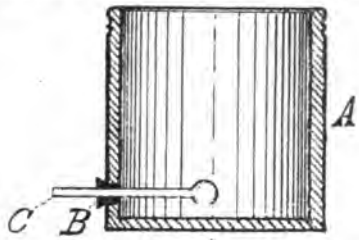


Fig. I.

Section of crock used in aeration tests.

bulb on end. The bulb is filled with glass wool to prevent the soil from entering the tube.

When the jars were in readiness they were filled with loam that had just been brought from one of the College fields, care being taken to pack

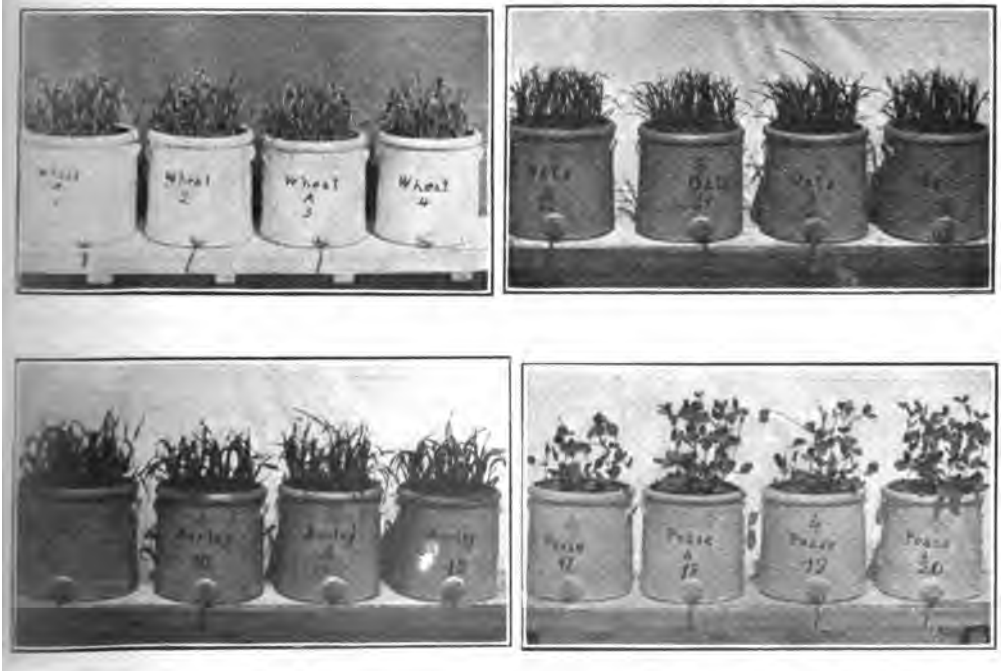


Fig. 2. Photographs on June 14th, showing effect of aeration one month after the crops were planted.

the soil well under the tube. The jars were then planted with wheat, barley, oats, and peas, as follows: Jar Nos. 1 to 8, wheat; 9 to 12, barley; 13 to 16 oats, and 17 to 20, peas; fifty grains each of wheat, barley, and oats, and

thirteen of peas to a crock. When all had been planted the jars were set outside, on a roof about 15 feet from the ground.

Once each day during the growing season air was drawn through half the crocks of each kind of grain, enough to completely change the air in the crocks. Observations were taken on the germination, the growth of the plants, the yield, the rainfall, and the water added.

The grain was planted on May 16th. The photographs in Fig. (2) show the crocks as they appeared on June 14th. The aerated crocks are marked each with an "A." It will be seen that in the wheat, barley, and oats there is a slight advantage in favour of the aerated crocks, but in the peas there is a decided advantage.

The following table gives notes taken on June 14th:

Crock No.	Grain.	Grains planted.	Number of plants.	Total length of vines.	Average length.
1A	Wheat	50	46		
2	"	50	46		
3A	"	50	47		
4	"	50	47		
5A	"	50	49		
6	"	50	49		
7A	"	50	45		
8	"	50	47		
9A	Barley	50	35		
10	"	50	36		
11A	"	50	39		
12	"	50	35		
13A	Oats	50	48		
14	"	50	50		
15A	"	50	48		
16	"	50	47		
17	Peas	13	8	59.75 inches	7.47
18A	"	13	10	103.50 "	10.35
19	"	13	8	67.25 "	8.40
20A	"	13	11	109.25 "	9.93

In this table we may note that so far as germination is concerned there is no marked difference between the aerated and unaerated crocks of wheat, barley and oats, but in the case of the peas there is a great difference. The aerated crocks germinated twenty-one out of twenty-six grains or 80.9 per cent., while the unaerated crocks germinated only sixteen out of twenty-six, or 61.5 per cent., a difference of 19.4 per cent. in favour of the aerated crocks.

The growth of pea-vine is also worthy of note. In the two aerated crocks combined the growth was 212.75 inches as against 127 inches in the unaerated, and the average length in the aerated crocks 10.13 inches, but in the unaerated crocks only 7.92 inches.

On June 29th the vines were measured again with the following result:

Total length aerated, 481.25 in.; unaerated, 365.25 in.

Average length aerated, 22.92 in.; unaerated, 22.83.

Here we find there is still a very marked difference in the total, but only very little difference in the average. In the unaerated crocks the individual vines are gaining, but the weight of numbers is against them, hence their total growth is still inferior.

From the photograph on August 2nd, Fig. 3, we see that the same difference was maintained throughout. The plants though of about equal height in all four crocks, are much thicker in 18A and 20A than in 17 and 19.

Crocks 17 and 19 budded, bloomed, podded, and ripened earlier than 18 or 20.

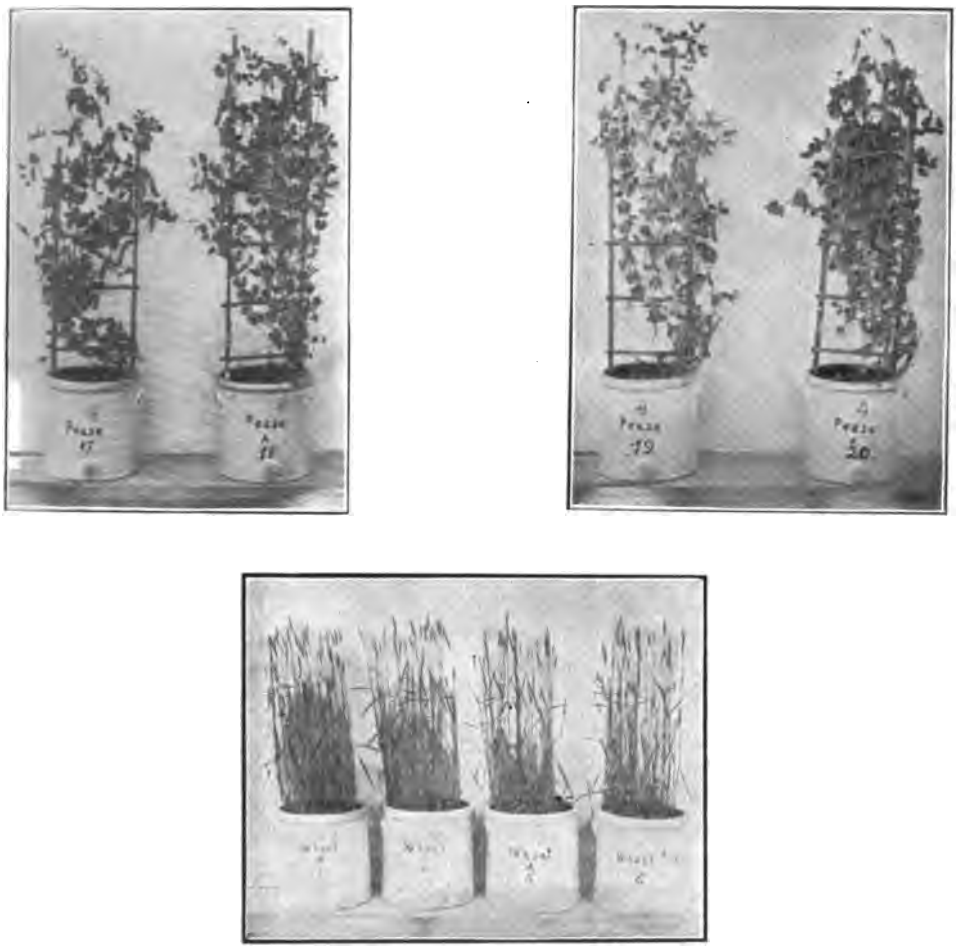


FIG. III.

Between the aerated and unaerated wheat, barley, and oats little or no difference could be observed on August 2nd, as may be seen from the photographs taken on that date.

When the grain began to fill great trouble was experienced to protect it from sparrows. The wheat, barley, and oats, were so injured by them that results of the yield are not given. The yield of peas was as follows: aerated 66.96 grams, unaerated 61.42 grams, showing an advantage of 5.54 grams, or about 9 per cent. in favour of the aerated. Another important fact is that the sample of peas was much superior in the aerated crocks. Though the *number* of peas was greater in the unaerated crocks, their total *weight* was less; the average weight per pea in unaerated crock was .341

grams, and in the aerated .406 grams, a difference of 19 per cent., or nearly one-fifth in average weight in favour of the aerated crocks.

The facts regarding yield are given in the following table:

Crock No.	Number of pods.	Number of peas.	Total weight.	Average weight per pea.
			grams.	grams.
17 & 19.....	45	180	61.42	.341
18A & 20A.....	51	165	66.96	.406

Water was added when rain was insufficient, but the aerated and unaerated were always given the same amounts, a circumstance which would keep the aerated soil drier than the unaerated, since the plants in the former transpired more than those in the latter. Had the *percentage* of moisture in the crocks been maintained the same, the aeration would likely have produced even greater benefit.

These results point to the importance in the case of legumes (peas) of having the soil thoroughly loosened up so as to permit thorough aeration to begin with, and the free entrance of air afterwards. Further investigation along these lines will be carried on during the coming season.

Experiments on Evaporation and Transpiration.

It is a well known fact that much water is used by a crop during a season, part of which is lost through the plants, "transpired," and part directly from the soil by evaporation. To determine the total amount of water required by an average crop of various grains under our Canadian field conditions, and also what proportion of this amount is lost respectively by transpiration and evaporation, it was decided to conduct a series of experiments.

In these experiments many difficulties have been encountered. Experiments for such determinations have usually been conducted in the following manner: Two similar vessels are filled with the same kind of soil, and one planted with the kind of grain upon which determinations are to be made, the other left unplanted. The two vessels are weighed to begin with and at intervals during the time of experimentation, weighed amounts of water being added from time to time to keep the percentage of water in the soil as nearly constant as practicable. The difference between successive weighings, due allowance having been made for the water added, gives the loss by evaporation or transpiration or both, according to conditions. Before the grain comes up in the planted vessel the loss from it is found equal to that from the unplanted one; but as the plants grow up the loss from the former exceeds that from the latter. Then it is assumed that the evaporation from the *soil* in the two vessels is the same, and that hence the difference between the losses from the two vessels shows the amount of water transpired by the plants. This seems to me to be an error, for the soil in the planted vessel is shaded from the sun and sheltered from the wind, and hence evaporation from it cannot be as rapid as from the soil in the unplanted vessel. Hence a method was sought that would allow for this difference in evaporation. It occurred to me that with two evaporimeters that would record equal evaporation under the same conditions this allowance could be made. One could be placed over the bare soil, and the second among the plants in the other

vessel, and the difference in rates of evaporation determined, and hence the proper correction made. Accordingly several "Piche" evaporimeters were procured for the purpose.

Before beginning the experiment proper it was thought well to compare the evaporimeters, and here arose the first difficulty: they would not record the same amount of evaporation under the same conditions, nor even amounts bearing constant ratios to one another. After a long series of attempts no method of adjustment was found to overcome the defect, and hence the evaporimeter and soil checks were discarded for the present, and the experiment resolved itself into a determination of the amount of water necessary for wheat, barley, oats, and peas during the season.

For this experiment the same crocks were used as in the aeration tests. These crocks, with soil containing the best amount of moisture for crop growth were weighed, when filled, and planted. Records of the rain that fell and the water that was added to the crocks were kept.

From these data we find that the wheat up to August 3rd, when it was about ripe, had used 2.15 times as much water as the rain that had fallen. The barley to July 20th, 2.25 times as much water as had fallen, and the oats during the same period 2.57 times the amount of rain. The peas up to August 15th had used 2.19 times the rain during that period. Hence, in case of these four grains much more water for the sustenance of the crop must come from the store held in the earth from the winter and spring rains than from the summer rains. This has an important bearing upon the questions of tillage and drainage. Drains, while carrying off the excessive water supply, at the same time by rendering the soil more porous, increase its capacity to store up water against the drouth of the summer season. Subsoiling late in autumn has a like beneficial effect.

The following table shows the actual amount of water used by each crock during the season, in pounds per crock, also in inches.

Crock No.	Water added.	Rain.	Total water.	Average per crock.	
	lbs.	lbs.		lbs.	inches.
Wheat		To Aug. 3.			
1	36.19	29.85	66.04		
2	35.81	"	65.66		
3	35.38	"	65.23		
4	30.75	"	60.60	64.19	22.60
5	34.94	"	64.79		
6	35.69	"	65.54		
7	34.56	"	64.41		
8	31.38	"	61.23		
Barley		To July 20			
9	29.81	23.55	53.36		
10	29.19	"	52.74	52.84	18.52
11	28.44	"	51.99		
12	29.63	"	53.18		
Oats		To July 20			
13	36.69	23.55	60.24		
14	37.06	"	60.61	60.65	21.15
15	37.44	"	60.79		
16	37.19	"	60.74		
Peas		To Aug. 15			
17	41.56	35.50	77.06		
18	43.56	"	79.06	77.86	27.3 8
19	42.13	"	77.63		
20	42.19	"	77.69		

Two feet of water for the production of a crop of grain seems enormous. yet that, as seen by the last column, is not far from the actual amount. It occurred to me that possibly the amount used on the roof was excessive, so when the grain was just heading out some of the croks were removed to the garden, where part were set on the ground and part sunk in it till nearly level with the surface. Whether they sat *on* or *in* the ground made no appreciable difference in the loss of water; and there was only a slight difference in loss between those in the garden and those on the roof.

Once during the experiment the plants were allowed to reach their wilting point, and then enough water was added to the crocks to produce percolation. The soil was about ten inches deep, and the crocks ten inches in diameter, and it required an average of 7.4 pounds per crock, which is equal to a rain of 2.6 inches. Hence, we see why in time of drought a very heavy rain is necessary to do any lasting good; to "break" the drought requires a rain of, say, two inches.

The original problem, viz., the proportion of water respectively transpired by the plant and evaporated from the soil still remains, but we hope to attack it again next season. At the present time we are constructing an evaporimeter of new design and principle in the hope of eliminating the unsatisfactory features of the Piche.

My report on "An Institute Trip in Temiskaming" will be found in the Farmers' Institute Report, Part I, 1905, and a report on "Packing Houses and Co-operation for Fruit Growers" will be printed in the Appendix to the Fruit Growers' Report for 1905.

Respectfully submitted,

J. B. REYNOLDS,
Professor of Physics and Lecturer in English.

PART IV.

THE PROFESSOR OF BOTANY AND GEOLOGY.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to present herewith my eighth annual report:

In July the Biological Department was divided into the Departments of Botany and Geology, and Entomology and Zoology, each with its own staff. This division had become necessary on account of the gradual yet rapid growth of the Biological Department in recent years, and the increasing importance of the biological subjects as foundation studies in a course of agriculture, and for their economic value in practical agriculture.

The reorganization of the two new Departments with the increased staff will make it possible to give more time hereafter to research work, which is a most desirable feature to emphasize in any College. It is not fair to any department to ask its staff to devote all their time to routine and teaching work, for each member of the staff has a reputation to make and uphold before the public as well as before the students in the class-room. The Biological Staff, it can truly be said, for many years lived a strenuous life, for they were compelled to perform this double duty towards the students and the public with scarcely help enough to give instruction to the large number of classes assigned to their charge. With your experience, sir, in similar work in other institutions you saw at once, when you became President, the unequal struggle we were waging. We felt that we had your sympathy, and we hoped soon for an improvement in the condition of affairs. The improvement came last year when you gave us an extra demonstrator, and again this year when with the division of the original department three members were assigned to Botany and Geology, and two to Entomology and Zoology.

THE STAFF. Under the new arrangement, Mr. T. D. Jarvis is transferred to the Department of Entomology and Zoology under Prof. Franklin Sherman. I am sorry to lose Mr. Jarvis' services, for he was a hard worker, and a most agreeable and obliging assistant.

I retain, however, Messrs. V. W. Jackson and E. Thompstone as Demonstrators, and by their unselfish labors they have made themselves invaluable. Both are excellent teachers and investigators, and most popular with all the students.

REVIEW.

FROM 1898 TO 1906. As I sever my connection with this College in April to assume similar duties in the Macdonald College, I take the liberty of outlining briefly the progress of the Biological Department during the last eight years,—since 1898, when I took charge of the work here.

For the first three years I had but one assistant, Mr. M. W. Doherty. Our laboratories, then in the Horticultural Building, were far too small for our classes, and we labored under great disadvantages. In 1901 Mr. T. D. Jarvis, B.S.A., was appointed Helper and Fellow, and in 1902 was completed the present building, which gave us commodious laboratories and class-rooms. In this same year, Mr. Doherty, who had been made Associate-Professor, resigned on account of ill-health, and I lost an eloquent lecturer, an able instructor, and an agreeable co-worker. Mr. A. Henderson, B.A., was appointed in his place and did good service for one year, when he re-

signed to study medicine. He was succeeded by Mr. J. W. Hotson, M.A., who left after but one year's service to assume the Principalship of the Macdonald Consolidated School. Mr. Hotson proved to be an excellent teacher. In September 1904 Mr. Jarvis was made Lecturer, and Mr. V. W. Jackson, B.A., joined our staff. A month later Mr. E. Thompstone, B.Sc., was appointed to help us with the ever-increasing duties of our Department.

With 1905, however, a new era dawned upon the Biological Department. The possibilities for increased usefulness are great, and signs are not wanting that "the time is rapidly approaching when the farmer and gardener will as little attempt to neglect the study of the physiology and pathology of plants as the surgeon attempt to practise without a knowledge of anatomy, or the sailor become a captain without studying navigation." To these essential requirements of farmers and gardeners should be added a knowledge of insects and insect life. To give this and to prepare trained investigators who will be able to work out the life-histories of, and the best remedies for, the diseases induced by insects and fungi is one of the services of the two new departments. Within the past eight years the services of men trained to investigate were needed in Ontario on six or seven great biological problems which arose, namely, the San Jose Scale, the Hessian Fly, the Pea Weevil, the Grain Rusts, the Grape Rots, the Fumigation of Nurseries, and the applications of spraying for the control of orchard and garden pests. Problems more or less difficult are continually coming forward for solution, and trained men will always be in demand for such services. It is to be hoped that the increased facilities for doing good work, which the new reorganized departments will furnish, will lead to the achievement of even better results that have been attained in the past.

The following is a list of the bulletins which have appeared from time to time during the last eight years from the Biological Department:

Insects and Fungous Diseases, 1899.

The San Jose Scale and other Scale Insects, 1900.

The Hessian Fly in Ontario, Bulletin 116, 1901.

The Spray Calendar, Bulletin 122, 1902.

Nature Study, or Stories in Agriculture, two lessons, "The Story of the White Cabbage Butterfly" by myself, and "The Story of the Birds" by Associate-Professor Doherty, Bulletin 124, 1902.

Peas and the Pea Weevil, Bulletin 126, in co-operation with Prof. Zavitz, 1903.

The Weeds of Ontario, a revised edition, Bulletin 128, 1903.

The Present Condition of the San Jose Scale in Ontario, Bulletin No. 133, 1903.

Certain Chapters in "Hints in Making Nature Collections in Public and High Schools," Bulletin 134, 1904.

Outlines of Nature-studies, Bulletin 142, 1905.

Chapters on Insects and Fungous Diseases of the Apple in "Apple Culture," Bulletin 144, 1905.

We have under way three bulletins, a revision of the Weeds of Ontario, one on the Grasses of Ontario, and a third dealing with recent experiments against the San Jose Scale. These will appear in due time in 1906.

In addition to these Bulletins, I prepared for publication three Annual Reports as Inspector of Fumigation Appliances, which position I held during 1899, 1900, and 1901.

Besides, I contributed the following articles for the last eight Annual Reports of the Entomological Society of Ontario:

1898. Entomology in Schools,

1899. Injurious Insects of the Orchard, Garden, and Farm for the Season of 1899,
Notes on Some Insects of Coniferous Shade Trees,
Nature-study Lessons on the Cabbage Butterfly.
1900. Insects of the Season of 1900.
Nature-study Lessons on the Squash Bug,
The Silk Worm Industry in Ontario.
A Plea for the Systematic and Economic Study of the Forest—Insects of Ontario,
The Present Status of the San Jose Scale in Ontario.
1901. Injurious Insects of the Season of 1901,
The Hibernation of Insects,
Nature-study Lessons on the Mosquitoes,
1902. The Pea Weevil,
Some Common Butterflies, and Some Noted Butterfly Hunters,
The Insects of the Season,
A Key to Orchard Insects.
1903. The Progress of Economic Entomology in Ontario (President's Address),
The Insects of the Season,
A Key to the Insects Affecting the Small Fruits.
1904. Injurious Insects of the Season 1904,
Recent Experiments Against the San Jose Scale,
Recent Progress in Entomology (President's Address),
An Elementary Study of Insects,
1905. Injurious Insects for 1905 in Ontario,
Spraying Experiments Against the San Jose Scale.

Many special articles were also contributed to the *Canadian Horticulturist, Farmer's Advocate, Weekly Sun, Farming World, Ottawa Naturalist, and O. A. C. Review.*

The chief outstanding improvement in the Biological Courses during the last eight years has been the development of the laboratory method of instruction. Under the old conditions in the Horticultural Building, it was impossible to give the proper amount of attention to laboratory instruction, on account of inadequate facilities and equipment; but in our present quarters, where the rooms are commodious and the equipment quite ample for present needs, great stress has been laid upon the laboratory and field work.

ARTICLES CONTRIBUTED TO THE PRESS AND SPECIAL PAMPHLETS IN 1905.

I contributed the following articles during the year:

1. "No danger From Eating Sprayed Fruit," Gueph *Herald*, March 2nd.
2. "Geology and Agriculture," *O. A. C. Review*, April.
3. "Struggle with the Codling Moth," *Canadian Entomologist*, June.
4. "Spraying Experiments in the Niagara Region," *Canadian Horticulturist*, June.
5. "Spraying Demonstrations," *Canadian Horticulturist*, October.
6. "Rural Education in Canada," *Farming World*, September.
7. "Mustard Spraying," *Farmers' Advocate*, October 5th.
8. "Testing Sulphur Washes Across the Line," *Canadian Horticulturist*, June.
9. "The Codling Moth," *Press Bulletin*, April.

10. Chapters on Insect and Fungous Diseases of the Apple in Bulletin No. 144, "Apple Culture."

11. "The Time to Apply the Lime Sulphur Wash," *Canadian Horticulturist,* February.

12. "Black Rot of Grapes," *Canadian Horticulturist,* March.

13. "Nature Observations at Home," *Ottawa Naturalist,* December.

In June The Department of Agriculture of Ontario published Bulletin No. 142, "The Outlines of Nature-studies;" and in September, with the assistance of Mr. V. W. Jackson, a "Syllabus of First and Second Year Botany at the Ontario Agricultural College" was prepared for the use of our students.

MEETINGS ATTENDED. During the year I addressed a large number of Teachers' Associations on the subject of Nature-study, which is now interesting our teachers so much on account of the fact that instruction along this line forms part of the regular curriculum.

Stratford Teachers' Association, February 17th.
Hamilton Teachers' Association, February 24th.
North Wellington Teachers' Association at Harriston, May 18th.
Dufferin Teachers' Association at Shelburne, May 25th.
Wentworth Teachers' Association in Massey Hall, June 1st.
North Grey Teachers' Association, Massey Hall, October 12th.
Toronto Teachers' Association, Massey Hall, October 27th.

I attended also the following Annnual Meetings: The Dominion Seed Growers' Association in Ottawa from June 23 to 26th; The Niagara Fruit Growers' Association, March 13th and 14th,—Meetings held at Stoney Creek and Grimsby; The Quebec Pomological Society at St. Hilaire, August 23rd and 24th; Entomological Society of Ontario at Guelph October 18th and 19th. At all of these meetings I presented papers.

In the month of June, during the Farmers' Excursions, Mr. Thompstone and Mr. Jackson conducted an Inquiry Bureau on Weeds, Weed Seeds, Insects, and Plant Diseases, where farmers, gardeners and those interested could inquire and discuss biological problems.

These gentlemen also paid visits to various parts of the Province during the summer to investigate orchard troubles. Mr. Jackson attended the Simcoe Fair in October and had charge of a special exhibit from the College, relating to weeds, weed seeds, insects and fungous diseases. Mr. Jarvis had charge of a similar exhibit at the Hamilton Horticultural Show in September, at the Dominion Exposition at Toronto, at the Beachburg Fall Fair in October, and at the Toronto Fruit, Flower, and Honey Show in November. In every case appreciative notices were given in the daily papers as to the value of the exhibit.

Messrs. Jackson and Thompstone under my direction carried out some potato spraying experiments on a large scale on the College farm. Their results will be found embodied in this Report on pages 51-52.

THE MUSEUM. As Curator of the College Museum, I have pleasure in reporting that there has been considerable progress during the year in the arrangement of the material. The arrival of several new cases on October allows us now to arrange the material to better advantage. The collection of wax fruits, arranged by the Horticultural Department, and prepared by Mrs. Potter, has been increased by the addition of three new cases. This exhibit is a most excellent one, and is greatly admired by our visitors. The Bacteriological Department has added to the already interesting exhibit under their charge, and during the coming year we hope to have exhibits

from the Chemical and Physical Departments arranged in the new upright cases allotted to them.

We are much indebted to Jas. Anderson, Esq., Guelph, for a small but valuable collection of birds of the Guelph district. The birds represented were caught, mounted, and arranged in the case by the donor himself.

Mr. T. D. Jarvis has very kindly arranged in a show case his collection of Jamaican specimens, obtained while on a visit to the island in the early part of the year. To Mr. Painter of the Macdonald Consolidated School we are indebted for the loan of his collection of Indian relics, and to Master Jack Schofield for the loan of two small cases of fishes and ducks.

The excellent color-drawings of our native song birds, prepared by Miss Holliday of Guelph, have been framed and hung on the walls, that they might be more accessible to students of bird life.

For the coming year several interesting Process Exhibits have been promised. Hon. W. J. Hanna will send us an exhibit to illustrate the manufacture of Binder Twine; the Ontario Sugar Co., of Berlin, an exhibit to illustrate the Manufacture of Sugar from the Sugar Beet; Messrs. Holt, Renfrew and Co., Furriers, an exhibit of the furs used in the trade; the Barber Bros., Georgetown, an exhibit to show the process of manufacture of papers from pulp; and Sykes Bros., of Glenwilliams, a woollen exhibit.

We hope also to have placed in the Museum soon the valuable exhibit of Ontario Timber and Lumber, which was sent to the Pan-American at Buffalo and the Louisiana Purchase Exposition at St. Louis.

It is the aim to build up a representative Agricultural Museum that will illustrate the rock materials from which our soils have been made; the various classes of soils; the insects; the birds and other wild native animals; the plants, both useful and injurious in agriculture; the products of the forest, the mine, and the farm; such implements as will show the evolution of agricultural machinery; and the process of manufacture of the necessities of every-day life.

But there should be an annual appropriation of, say, $500 at the disposal of the Curator for the purchase of desirable material and specimens. I beg, therefore, to call your attention to this matter at this time.

Our Needs. This Department is badly in need of a green-house for plant physiology. It is impossible to conduct practical laboratory studies in our general laboratory used, as it is, by several other classes, doing other work. For four or five years I have pressed for the erection of a combined insectary and plant greenhouse, but now, that the instruction in Entomology is done by another department, separate houses will be necessary.

Again, an appropriation will be necessary for the purchase of about a dozen microscopes, for the present supply is inadequate for the needs of the two new departments. So long as there were but one department and one head, the present supply was sufficient, but this condition no longer obtains under the new arrangements. Besides, each instructor should have a microscope for his own use, one that may be used for all grades of research work.

Again, there is a pressing demand for more models and diagrams to illustrate the lectures and laboratory work in Geology. Good botanical charts are also wanted.

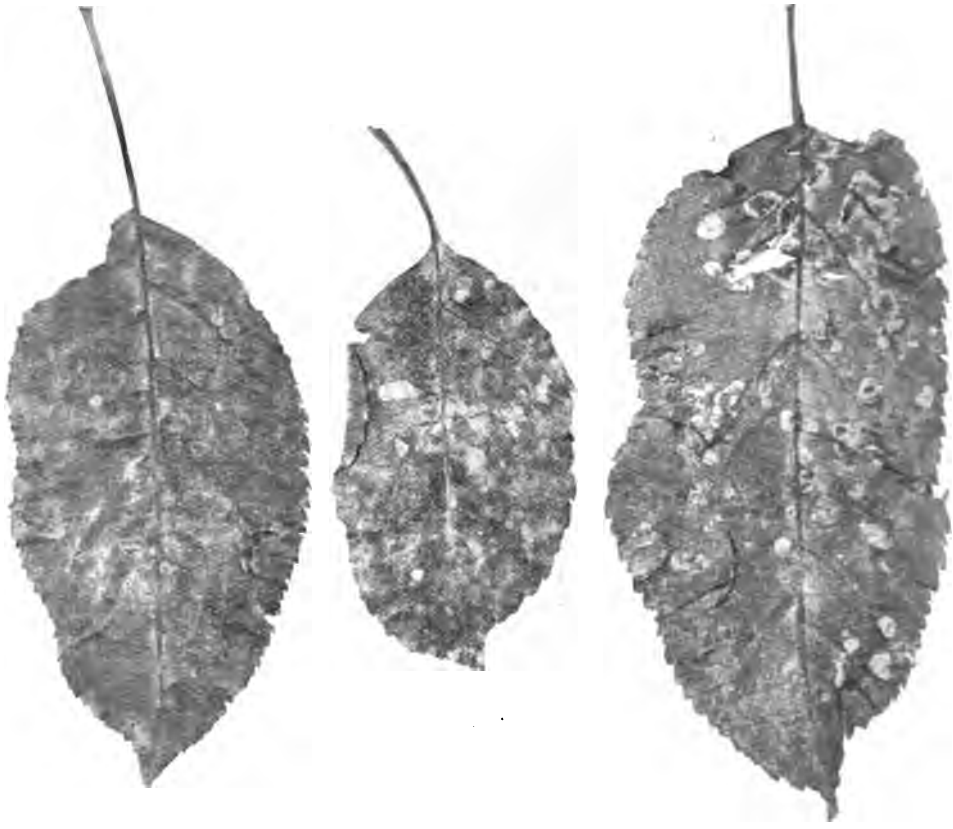


Fig. 1. Apple leaves affected with Leaf Spot (*Phyllosticta pirina.*)

Fig. 2. A Russetted Apple. (See page 54.)

EXPERIMENTS AND INVESTIGATIONS.

SPRAYING EXPERIMENTS IN THE NIAGARA DISTRICT. In early spring a deputation of Niagara fruit-growers waited on the Minister of Agriculture urging the importance of a series of carefully conducted spraying experiments under my charge against the San Jose Scale and the Grape Rots. The Minister agreed to bear the expense of such experiments, and asked me to arrange and conduct them. I requested that Mr. P. W. Hodgetts, B.S.A., of the Department co-operate with me, and this request was also granted. During my absence in July and August at St. Anne de Bellevue Mr. Hodgetts was ably assisted by Mr. T. D. Jarvis of the Biological Department.

The early sprayings were undertaken to determine the effectiveness of the lime-sulphur mixtures, Carlson's Mixture, and Pratt's Scalecide against the San Jose Scale, and the value of an application of copper sulphate solution on the dormant vines in the control of the Black Rot of Grapes. Experiments were conducted at the following places: M. Pettit's, Winona; Ambrose Pettit's, Grimsby; R Kelly's, Beamsville; J. Fretz's and S. Overholt's, Jordan; Geo. Robertson's and the Industrial Home, St. Catharines; Jas. Hutchinson's, Virgil; Porter Adams', Queenston; S. Shearer's, Niagara; and Mr. Berriman's, Stamford.

Subsequent sprayings were given the vineyards with Bordeaux and Soda Bordeaux about June 14th, July 6th and 20th, August 1st and 15th. A chart of the different experimental vineyards was carefully prepared at the outset and the plan was adhered to as nearly as possible throughout the season. The object of the chart was to determine what sprayings were absolutely essential and what sprayings were unessential for the control of the grape rots. Rows, or portions of rows, were left unsprayed as checks in every vineyard.

THE RESULTS. During September I visited the different experimental vineyards. The season was a most favorable one for the grape grower. Even the most careless grower had very little rot to contend with. For this very reason the season was an unfavorable one for experimentation, and practically no difference was noticed as to the effects of the different applications. At Winona the check vines, which were left unsprayed, had considerable mildew, but the grapes were not injured to any extent. In a season, such as that of last year, these mildewed grapes would have been totally destroyed. The color of the foliage was much brighter on the sprayed vines than on the unsprayed. At Grimsby the Black Rot was found on the vines which had been unsprayed, and, as at Winona, it was found that practically no damage had been done by the mildew, which was quite evident on the unsprayed rows and absent from the sprayed rows.

At Beamsville the check rows were the only ones that had Black Rot to any extent, and the owner of the vineyard was one of the first to recognize the fact that the spraying had kept the Black Rot away from his vines. At Jordan the row which had only the blue stone treatment in April showed considerable mildew. There was, however, one row of Moyer grapes which had been sprayed with Bordeaux five times during the season, and which showed more Black Rot than any other row. The owner states that last year the grapes on this row were completely ruined by Black Rot.

At St. Catharines the results were very similar to those observed at Grimsby and Winona, the unsprayed vines showing the most Black Rot and mildew. An interesting lesson by way of comparison may be drawn from a study of a neighboring vineyard which had never been sprayed.

Although this is a very favorable season for grapes, yet this grapery showed a great deal of Bird's Eye Rot, Mildew, and Black Rot.

At Niagara-on-the-Lake, the sprayed vines were very clean, but the unsprayed vines showed considerable Black Rot and Bird's Eye. At Stamford, there was practically little difference between the sprayed and unsprayed vines—both being very free from disease. At Queenston a splendid object lesson was observed in a vineyard of Niagaras. On the check (unsprayed) vines "petrified" grapes and Downy Mildew were in evidence, but were entirely absent from the sprayed vines. The owner states that the Delawares which were sprayed were much better and cleaner than those which had been left unsprayed.

A very interesting side experiment was carried out in a vineyard along the Niagara river road. Only a portion of this vineyard was sprayed, but the grapes on the unsprayed portion were shelling very badly, and many of them were "petrified." Downy Mildew was very abundant in the unsprayed portion, and there seems to be no doubt that the "petrified" grape is due to the attack of that disease. The sprayed part of this vineyard had but one application, in July, but even with but a single application the difference between the sprayed and unsprayed vines was very evident.

In most of the orchards considerable injury was done by the Grape-Berry Moth. Should this insect continue to trouble us for another season, it may be necessary to add some arsenic solution to the Bordeaux, especially during the June and July sprayings.

On account of the unsatisfactory condition of the season for spraying experiments the Government will be urged to conduct the same series of experiments in the same vineyards for another season at least. Grape growing is a very large industry in the Niagara region, and it is very important that the grape grower should have definite information as to the best ways of controlling diseases on the grape in the most unfavorable seasons.

THE RESULTS OF THE SCALE EXPERIMENTS. The lime-sulphur wash (uncooked) was prepared according to the following formula and directions:

35 pounds of best stone lime,
17 pounds of flowers of sulphur,
40 gallons of water.

Put the 17 pounds of sulphur into a vessel, add two gallons boiling water, a little at a time; stirring vigorously all the while until a fine paste is obtained.

Put the 35 pounds of lime in a barrel, large enough to hold 40 gallons, pour into this lime 12 gallons boiling water; now add the sulphur paste previously prepared. Very quickly cover the barrel with a heavy burlap sack, having placed an old hoe into it first; now allow it to cook for 30 minutes. Do not stir, as that reduces the heat by letting in cold air, but by the hoe raise the mass from the bottom occasionally so that it does not run together and burn before the lime is thoroughly slaked. Nothing must be done to interrupt the cooling process, as that would affect the final quality of the wash.

After the mixture has cooled 30 minutes, add 28 gallons of warm water, not necessarily boiling. Strain into the spray tank, and apply while warm, for in this condition it will flow through the spray pump nozzles more easily than when the wash gets cold. It will also remain in solution much more thoroughly when it is warm than when it cools.

It is unnecessary here to give the details of the scale experiments and the observations made in the Niagara district, for these may be found in an article prepared for the Annual Report of the Entomological Society of

Ontario for 1905. The results only will be given: It will be noted that salt has not been used in the preparation of any of these mixtures. In the preliminary experiments carried out three years ago by Mr. G. E. Fisher, he came to the conclusion that the presence of the salt added to the expense, made the wash more difficult to spray, and increased its corrosive action on the metal parts of the pump; while it failed to make the wash any more effective as a destroyer of scale, or more adhesive to the bark of the tree. Whether these conclusions will be borne out by future experiments remains to be seen, but some observations made this year show that probably the presence of the salt is beneficial, and that it would be advisable to conduct experiments this coming season to test this very point.

My observations this season would, therefore, I think, incline me to believe that the presence of salt renders the wash more adhesive, and hence more effective. I found, as a rule, that in those orchards where the mixture adhered longest and best to the bark, the scale had made but little progress.

It would appear that the *adhesiveness* of the wash is a large factor in its *effectiveness*. The tremendous reproduction of the scale that occurs in September and October can hardly be checked, or the spread prevented, unless the bark has a coating which is either distasteful or harmful to the crawling larvae. For this very reason, that the bark is made clean and enticing to the larvae during the last months of the growing season, other remedies fail to keep the scale in check, when only one application is made and that application in the spring just before the buds opened.

As to the results of the season's experiments with lime-sulphur, it may be stated in a general way that little or no difference could be observed between the effectiveness of the cooked and uncooked washes.

None of the new mixtures, such as Carlson's, Pratt's Scalecide, or the kerosene-flour emulsion, can be recommended to the fruit-growers as effective remedies for the San Jose Scale. The lime-sulphur washes gave better results in every case that came under my observation.

I am not in a position to decide definitely whether the uncooked lime-sulphur wash or the cooked wash is the better remedy. To us it would appear that the personality of the man who makes and applies the wash counts in most cases for success or failure. Careful preparation of the wash according to formula, the use of good rapid-slaking lime, and thorough application to the trees will in nine cases out of ten check the scale completely. Moreover, I am of the opinion that the addition of salt to the wash would increase its adhesive qualities, and add to its effectiveness.

Potato Spraying.

(Report by Messrs. Jackson and Thompstone).

The Biological Department took charge of spraying the Farm potato crop this year, and as directed, we conducted the experiments. The plot consisted of eight acres of Empire State potatoes panted May 15th-20th. There were 105 rows 80 rods long; 44 rows were sprayed with Bordeaux and arsenite of Soda; 48 rows with Bordeaux and Paris Green; 4 rows with Bug Death (dry); and 8 rows with Bug Death (wet); and one check row. Spraying was begun on June 23rd when the tops were about six inches high, and continued—some weekly, some semi-weekly, and others according to conditions. A four-row sprayer was used, and six or seven acres could be sprayed in five hours. The following results were obtained:

White arsenic did not prove as satisfactory as Paris Green.

Regulation strength (1 pound white arsenic, 4 pounds sal soda and 2 gallons of water) did not kill the bugs, and double strength killed the tops. Aresnite of soda did not clog the nozzles as Paris Green did, but it was much more trouble to prepare.

Regulation strength of Paris Green (½ pound to the barrel) did not annihilate the bug as one would wish, and double strength (1 pound per barrel) was used without injury to the plant.

The best result from Paris Green-Bordeaux treatment was 218 bushels per acre, whereas similar arsenite of soda treatment yielded only 200 bushels per acre, and where the tops were injured by double strength, the yield was only 157 bushels per acre, or very little better than the unsprayed check row, which went 152 bushels to the acre.

The best result was obtained from the rows that were treated with Bug Death (dry), but this was a tedious task even for ⅓ of an acre. One man cannot sift more than ⅛ of an acre while the dew is on in the morning, nor can it be sifted less than 30 pounds to the acre on small tops and 50 pounds on large tops. This brings the cost of two siftings to about six dollars an acre, or six times as much as the Paris Green treatment alone would cost for four sprayings. The time, task, and cost would seem to make Bug Death (dry) impractical for large plots.

To ascertain the practicability of Bug Death (wet), two treatments were tried on eight rows, with a four-row sprayer, and proved worthless. The agitator would not keep the heavy powder in suspension. Of the five pounds used in fifteen gallons of water and also of Bordeaux, about half was left as sediment in the bottom of the barrel. The bugs continued to increase on these rows and the tops were nearly gone, in spite of a double treatment and a thorough trial, after which Paris Green was used and great improvement noticed.

Notes on Spraying Potatoes.

A 40-gallon barrel full will spray 2 acres.

Bordeaux Mixture costs about 16 cents per acre.

Paris Green costs 9 cents and arsenite of soda 3 cents. Thus Bordeaux-Paris Green costs about 25 cents per acre.

A horse, a boy, a sprayer, and a man will spray 5 or 6 acres in half a day, making the total cost 75 to 85 cents per acre for each spray, of $3.25 per acre for the season of 4 sprays, which an insignificant increased yield of 6 bushels per acre would warrant, whereas the actual results show an increase of over 50 bushels per acre and the potatoes are of better quality and freer from rot.

Some Fungous Troubles of the Year.

Melon Blight. In Essex County market-gardening has developed to a large extent during the last two or three years, and musk-melons form one of the staple crops. The *Melon Blight* (Plasmopara cubensis), however, has become a serious menace to the crop in spite of the application of Bordeaux.

This disease appears first early in August and forms large, irregular brown spots on the leaves, which are often destroyed. As a result the fruit fails to develop properly. The disease spreads during the late summer by means of spores, which are borne on tiny branching threads on the under surface of the leaves. These spore are carried by the wind, rain and other agencies to neighboring leaves, where they germinate, the young threads soon effecting an entrance to the tissues within.

Although few experiments have been made, yet it is probable that the disease can be controlled by early and repeated sprayings of Bordeaux. Care should be taken to spray the under sides of the leaves, and to gather up the old leaves and vines and burn them.

STRAWBERRY ROOT BLACKENING. In June our attention was called to the blackening of the roots of many young strawberry plants that had been set out a few weeks previously. On examination of the College plantation several cases were also found. The writer was unable to determine the nature of the trouble. He could find no trace of insect work, nor anything of a fungous nature.

GRAPE LEAF MOSAIC. Leaves of grapes were sent us about the close of September from Portsmouth Asylum which showed a characteristic mottling of brown and green. The brown areas were irregular in shape on the upper surface of the leaves, and between the large veins. The report stated that the affected leaves fell early, but it did not mention that injury had been done to the fruit.

There was no evidence that the disease had been caused by any of the common grape fungi. It resembled rather the disease known as *Brunissure of the Vine*, which is caused by a slime-mould (Plasmodiophora vitis, Viala et Sauv.) Mr. Jarvis tells me that he saw leaves similarly affected in the Niagara district this summer.

LEAF-SPOT OF VIOLETS. A correspondent from Brampton sent me about October 20th some single violets that had their leaves spotted with the *Violet Leaf-Spot* (Phyllosticta violae). These violets were grown out-of-doors, and were brought in from the field at the end of September. A double variety that had been grown entirely under glass did not show any signs of the spot until the middle of October.

The spots are usually near the margin; somewhat circular in outline; white or whitish, often with a dark centre; edges of spots usually definite and clear-cut, and minute black specks bearing the spores on the white spots. Spores of Cercospora violae were not found on the diseased areas.

LEAF-SPOT OF APPLES. In many orchards the leaves were disfigured by many irregular brown spots, often of considerable size. Some owners of orchards blamed the Bordeaux, but these spots were as frequent in the unsprayed orchards as in the sprayed. On most of the spots the fruiting bodies of a fungus (Phyllosticta pirina) were found, but whether or not this fungus is the primary cause of the spotting is an open question. It may be found that in some way this fungus is a stage of some one of the apple tree cankers referred to in my last Report. Fig. 1. (See page 48).

FLY-SPECK FUNGUS. The minute black specks characteristic of this disease were abundant on apples in many sections of the Province. In a few instances this fungus was accompanied by a sooty blotch. Repeated examination, however, of apples affected with this fungus (Lepotothyrium pomi) revealed no trace of spores. This disease appears late in the summer and sometimes upon russetted areas.

BLACK MOULD OF ONIONS. In September the onion plantation in the College Garden showed signs of disease; soon the leaves showed large white areas which soon became black through the development of a black mould. There is no doubt that the onions did not reach their normal maturity. When examined under the microscope many soot-colored, many-celled spores, and short septate soot-colored hyphae were observed, belonging to *Macrosporium*

parasiticum Thm. This appeared to be a true parasite on the onion leaves, for there was no trace of previous blight or mildew.

Brown Rot of Plums. This disease was very prevalent and very destructive the past season. For many years it has been the most serious enemy the plum grower has had to contend with, for, notwithstanding repeated sprayings with Bordeaux, much of the fruit is lost. Observations in the Niagara district lead me to believe that the Rot was always less severe in orchards where Bordeaux spraying was faithfully practised, and where much care was given to the destruction of the old mummy plums by burning or plowing in late fall or early spring. Spraying applications should be given (1) just before the buds open; (2) just after the blossoms fall; (3) every ten days or two weeks until ripening begins, then Soda Bordeaux or Ammoniacal Copper Carbonate.

Experiments should be tried to determine the value of flowers of sulphur when applied by a dust-sprayer, for some observations point to the effectiveness of such a treatment when tried on a few trees.

Late Potato Blight. This disease made its appearance in both the garden and farm crops of potatoes. As usual it came very suddenly, and in the case of the garden the whole crop was blighted in 24 hours. The presence of the downy mildew fungus (Phytophthora infestans) causing the blight was very evident. It is evident that Bordeaux will control this disease if the sprayings are continued into September.

For further reference to both the Early and the Late Potato Blights, I refer you to my Annual Report of 1903, where figures and descriptions are given.

Injurious Action of Bordeaux in Apple Orchards.

For the first time an instance of *possible* injury to the foliage and fruit of apple trees in orchards near Trenton by Bordeaux and Paris Green was brought to our attention this autumn.

The case is so interesting that it warrants a more than passing reference, for we have all along believed Bordeaux and Paris Green, when properly prepared and applied, to be a most effective and safe fungicide and insecticide.

The orchards referred to were sprayed three times with Bordeaux and Paris Green by a competent person sent out by the Department of Agriculture, Toronto,—the applications being made before blossoming, soon after blossoming, and again in the first week in July. The foliage began to fall early in August and at the end of September nearly half the leaves had fallen. Those remaining were injured with the leaf-spot (Phyllosticta pirina). Most of the apples were badly russetted, the Ben Davis worst, the Baldwins and the Stark next, while the Wealthy and the Snow were not russetted at all, being of good color and size. Many of the Ben Davis varieties had the black specks of the Fly Speck fungus (Leptothyrium pomi). Fig. 2. (Page 48).

The other sprayed orchards in the vicinity showed but slight russetting, but the unsprayed orchards showed considerable russetting and leaf-spot (Phyllosticta pirina), and dwarfing of the fruit was not so noticeable.

The injured sprayed orchards were about eight years old, and were situated in light soil on a slight slope with a northwest exposure. Some Baldwin trees in one of the orchards had been severely injured, probably by the severe winter of two years ago, and some of the Ben Davis trees had

dead limbs, so that these trees too may have been damaged by the same severe winter. Another fact, which undoubtedly had an influence on the results, was the large amount of rainfall during June, and part of July in the Trenton section.

If this were the only case on record one would naturally attribute the injuries to climatic causes, but reports come to us from New York and Ohio this year of orchards injured in a manner similar to those at Trenton. Prof. F. C. Stewart, of Geneva Experiment Station, under date of November 21st, 1905, writes "It is unquestionably true that spraying with Bordeaux Mixture even when properly done may in some seasons result in considerable injury to both the fruit and the foliage. During the past three or four years we have had considerable of this trouble in New York, and in the past season more than ever before. This Station has charge of an orchard of ten acres near Rochester. A part of it was sprayed, and a part unsprayed, and the evidence is conclusive that the spraying russetted the fruit badly and apparently decreased the size of the fruit as well. In the station orchard at Geneva many varieties have been considerably injured by the spray. The variety Ben Davis has been shown to be specially susceptible to such injury."

Prof. A. D. Selby, of the Ohio Experiment Station, Wooster, under date of November 20th, writes: "Your letter has raised some questions of mutual interest and importance to all engaged in this line of work (spraying). First, as to the effect, sometimes unfavorable, of sprays with Bordeaux mixture upon apples. In 1899 Clarence H. Weed, then Entomologist of the Ohio station, made some experiments in spraying with Bordeaux mixture and concluded that the mixture of the strength employed could not safely be used on apple by reason of injury thereto.

"The effect of the Bordeaux mixture, with possibly the addition of arsenites, was to cause the apples to be rusted, unevenly developed and often cracked. One fact brought out by our work and study of the last two seasons bears directly upon the premature falling of the leaves where spraying with arsenites has been practised. We had excessively rainy weather during the spraying period both in 1904 and in 1905 and quite excessive leaf dropping about the close of the active spraying period. The leaf dropping occurred on both the sprayed and the unsprayed trees, but was double in amount, perhaps, on the sprayed trees. In some instances the increase of dropping on the sprayed trees was quite small. The explanation, as it seems to us on consultation—the Horticulturist and myself being both agreed as to this—lies, for the unsprayed trees, in the shade of the leaves of the interior, and through rapid growth and development of new leaves on the exterior of the tree top. The leaves accordingly cease to function and will separate from the tree. The same applies to a part of the leaves on the sprayed trees, but others were injured in our opinion by the arsenites which were dissolved in the excessive moisture through the rainy period. With the study of some of these leaves we concluded that it proceeded by way of the stomates (breathing pores). Undoubtedly our observation supports the contention, and this runs through a number of years, that unsprayed apples are very much more likely to be one-sided, disfigured and worthless, owing to the serious effect of apple scab, than are sprayed apples."

Prof. C. P. Close, of the Delaware Agricultural Exepriment Station, under date November 18th, writes; "You doubtless know that a frost on the apples when they are very small would also cause russetting. We occasionally notice a slight russetting of a few varieties which we think might have been caused by Bordeaux."

Prof. H. H. Hume, of the North Carolina Agricultural Experiment Station, under date November 17th, writes: "In my work in this State I have never known of any injury from the use of Bordeaux Mixture and Paris Green, such as you describe in your letter. I have, however, known of instances where the leaves have been injured by the use of improperly made Bordeaux mixture causing, as you know, holes through the apple leaves resembling those produced by Shot-hole fungus in peaches and plums. At the same time the fruit has been russetted and caused to grow lop-sided and irregular.

"The past season I had forwarded me from Western North Carolina specimen fruits of badly russetted apples, which had never been sprayed, and for which I was unable to assign any cause or reason."

Prof. W. M. Munson, of the Maine Agricultural Experiment Station, under date November 21st, writes: "If the Bordeaux was carefully made it should not have had any injurious effect whatever. If insufficient quantity of lime were used, it would probably cause some russetting of the skin. I have, however, never seen apples deformed as a result of spraying with Bordeaux mixture. I may say that many cases of russetted fruit have been sent to me for examination this year, and almost without exception it so happened that the trouble was due to frost soon after the fruit set."

Prof. R. H. Pettit, of the Michigan Agricultural College and Experiment Station, under date of November 22nd, writes: "I can safely say that I have never heard of a case of injury from Bordeaux mixture unless we may consider certain stains on grapes as injuries. Of course such stains can be readily removed by the use of diluted vinegar and therefore are not permanent. I have asked many responsible and experienced sprayers if they have ever run across injury of the kind, and I have not been able to find one who has ever seen any trouble from the use of Bordeaux. Prof. Hedrick used quite strong copper sulphate here in the orchards. I cannot give the exact data, but he could if you care for them. Copper sulphate can be used much stronger than I had supposed in the summer time when the foliage is on the trees. It seems to have a very beneficial effect, but of course does not stick as well as Bordeaux. It is not therefore likely that Bordeaux could have done the injury because it was not properly mixed, for lime is harmless and copper sulphate, if not used in very strong solutions, is also harmless."

Prof. G. P. Clinton, State Botanist of Connecticut, in the Experiment Station Report for 1903, writes as follows regarding winter killing brought about by the severe conditions of 1902-3-4: "In orchards, most commonly on trees four to eight years old, the injury often showed as dead areas in the bark, usually at the base of the tree, and more frequently on the northerly exposures. Sometimes these sunken areas completely girdled the tree, thereby finishing its career; again they extended a foot or two up one side, being separated by a fissure from the healthy bark. Trees injured severely in this way put out an abundance of healthy foliage early in the season and appeared in normal health until early in July, when the leaves began to drop.

Prof. G. E. Stone of the Hatch Experiment Station, Amherst, Mass., under date of November 25th, 1905, write as follows: "There was an immense amount of winter-killing two years ago, and the excessive drouth we have had in this section during the past summer has also raised havoc with a large number of orchards. We have thousands and thousands of trees, however, which have been dying for the last two years in this State, not only from winter-killing above ground but winter-killing of roots, and the apple tree is perhaps the worst sufferer in this respect. Apples have also been very small here this year, and notwithstanding that there was a small number

on many of the trees. I would naturally suppose in your region that the winter-killing would be much more severe than here, but the winter two years ago cleaned out thousands and thousands of old neglected apple trees, and even the best kept orchards were severely damaged.

"As to the matter of falling leaves, this has been more or less common also, and it is induced many years by spring frosts which rupture the epidermal cells and cause the leaves to turn yellow and fall. I have not given this topic any special consideration this year, but I know that many apple trees have lost their foliage, and I know that we had frosts in some sections of the State in the spring, to which I have been inclined to attribute the cause of much of the defoliation of apple trees here during the past summer. Two or three years ago this frost work on the leaves was very common and quite serious, so much so that anywhere from one-fourth to three-fourths of the leaves would drop off the trees in the month of August. I would sooner think the trouble with your trees was due to winter-killing of roots and winter-killing above ground, with perhaps some spring frost effects on the foliage, rather than to Bordeaux mixture."

Prof. Wendell Paddock of Colorado, in Colorado Bulletin 69, 1901, p. 9, says: "Complaints were received from correspondents at Canon City and Montrose that spraying with Bordeaux Mixture had seriously injured the fruit of certain varieties of apple trees. The injury produced is well shown in the illustration in Plate VIII, Fig. 3, which is from a photograph of a Ben Davis Apple that is so disfigured as to be unsaleable. This variety appears to be very susceptible to such injury, though a number of other kinds were injured more or less. All degrees of disfigurement occurred, from a slight russetting of the skin to the malformation shown in the figure.

"That the corrosive action of Bordeaux mixture is responsible for this condition there can be no doubt. Just what the conditions are that favor this action of the mixture have not been determined and the subject is still in an experimental stage."

Lodeman in his excellent book, *The Spraying of Plants*, pp. 127-129, gives a note of warning that the use of Bordeaux under certain conditions may be followed by injury to the leaves and fruit. When the copper sulphate is mixed with the milk of lime in the preparation of Bordeaux, there are probably formed a basic sulphate of copper and sulphate of lime. After the application is made to the trees further changes occur through the action of the carbon dioxide of the air,—the basic copper sulphate is converted into copper sulphate, copper hydrate, and copper carbonate. When there is much dew or moisture on the foliage the copper sulphate may be dissolved and injury done."

In the orchards at Trenton, the leaves did not fall for a month after the last application, which fact goes to show that if injury were done by the Bordeaux, the re-formed copper sulphate went into solution very slowly.

Lodeman states that the injury that followed the use of Bordeaux in 1894 in New York State was due to an insufficient amount of lime.

In 1899 much russetting of fruit occurred in the New York orchards (New York Bulletin 170). The cause or causes alleged were: long continued cloudy, wet weather immediately after the setting of the fruit; the application of Bordeaux during cloudy, wet weather; and the freezing of dew on the fruit while young and tender.

In 1902 in New York State apple leaves were wrinkled and distorted through the action of frosts at the time of unfolding. There was also a wide-spread spotting, yellowing and dropping of apple leaves in July (New York Bulletin 220). According to Professors Stewart and Beach this was

the result of spraying with Bordeaux mixture and insecticides. Because of the protracted cold, wet weather the foliage was unusually tender and susceptible to spray injury. The leaves first showed dead brown spots of various shapes and sizes, then turned yellow and fell. In some cases the fruit, also, became russetted and sometimes even cracked. Although at first the injury was thought to be serious, it was found later that the injury was overbalanced by the good done in the prevention of scab.

After a careful examination of many orchards, Professors Stewart and Beach reached the conclusion that "the trouble is due primarily to weather conditions, and is aggravated by spraying. Although unsprayed orchards were not entirely exempt from leaf-falling, the sprayed orchards were almost invariably the most affected. All of the severe cases were those of sprayed orchards, and, as a rule, the more thorough the spraying the more severe the attack of leaf drop."

With regard to the leaf-spot on which we found pycnidia of Phyllosticta pirina, the Geneva investigators believe that "*spraying was responsible for the spots*, and the fungus a saprophyte on the tissues killed by the spray.

From my own observations over Ontario the leaf-spot was plentiful in most orchards sprayed and unsprayed alike. I am inclined rather to the belief that the leaves were scorched and blistered by the hot sun acting on the surfaces moistened by the rains which were abundant during June and July. The leaf-spot does not develop fruit early in the season, consequently early sprayings will not prevent the spread of the fungus by spores to other leaves.

When we consider all the evidence *pro and con*, on this question, it is not clear that the injury to the Trenton orchards was due entirely to the Bordeaux, for these facts would still remain unexplained: the presence of russetted fruit in the unsprayed orchards; the paucity of russetted fruit in the other sprayed orchards of the same farm and of neighboring farms; the smallness of the crop in previous years on these injured orchards; and the absence of injuries in so many States after so many years of spraying with Bordeaux.

One thing is clear, however, that the little black specks on the fruit is not the result of spraying with Bordeaux, as some orchardists maintain. They are present in spite of the Bordeaux, and are caused by a fungus which has often been observed to develop the fly-speck appearance late in the season even upon the russetted area.

When we bear in mind that portions of these orchards were injured by the severe winter of two years ago, it is not assuming too much to believe that the root system of the whole orchard was also more or less injured by the same causes. And if the roots are injured, the leaves would fall prematurely and the fruit would be small. Moreover, the russetting of the fruit might be due largely to climatic influences beyond the control of the sprayer, such as have been suggested by the New York observers.

Respectfully submitted,

W. LOCHHEAD.

PART V.

THE PROFESSOR OF ENTOMOLOGY AND ZOOLOGY.

To the President of the Ontario Agricultural College:

SIR,—In accord with your request I present my first report for the Department of Entomology and Zoology.

ESTABLISHMENT OF THE DEPARTMENT. This Department was separated from the Department of Botany and Geology during the past summer, all four of the subjects indicated having previously been included in the one Biological Department. By making this change it was hoped to relieve a condition of congestion in the work which had prevailed, and at the same time to strengthen the work in both departments.

WORK OF ORGANIZATION. Aside from the time taken up in actual instruction of students, the time of both Mr. Jarvis and myself has been almost exclusively given to the work of refitting and systematizing the equipment and work of the Department. Notes for all the lectures to all classes have to be prepared, and the entire collections of insects are being overhauled and put in order so that classes can be attended to in the most efficient manner possible. Thanks to your own kindness, a small working fund was made available, and which has been used as economically as is consistent with good work, but we have not yet been able to make any large purchases of equipment, books, etc., which are absolutely essential in launching a newly-formed department.

COURSE OF INSTRUCTION.

The following courses are carried by this Department:

1. *Elementary Zoology.* First year, second term, 2 periods lectures, 1 period laboratory.
2. *Economic Entomology.* Second year, first term, 2 periods lectures, 1 period laboratory.
3. *General and Economic Entomology.* Third year, throughout the year, 2 period lectures, 1 afternoon laboratory.
4. *Entomology.* Fourth year, throughout the year, 6 hours laboratory. (Biological and Horticultural students).
5. *Zoology.* Fourth year, throughout the year, 1 afternoon laboratory, (Biological students).
6. *Histology.* Fourth year, throughout the year, 2 hours laboratory. (Biological students).
7. *Advanced Research and Thesis Work.* Fourth year, by arrangement. (Biological students).
8. *Nature Study.* With the Nature Study Class at Macdonald Institute, 2 hours per week. Fall term.
9. *Poultry Parasites.* With the winter class in Poultry, one period each week.

Without for the present advocating any increase or decrease in the courses as already laid down, we are attempting to so organize our facilities that these courses shall be so complete, and shall so well supplement each other, that any student going through the two-year course will have a good general knowledge of the common animals in the country, and of the injur-

ious insects in particular, while any student completing the four-year course in the Biological option will have a systematic and technical training that will fit him to do independent work as a teacher, experimenter, or investigator.

1. *Elementary Zoology.* This course begins after the Christmas vacation, and as the first year class is so large as to make division necessary, the work is twice that required with the smaller classes. In this course it is intended to take up the consideration of the common animals one meets with on the farm: earthworms, snails, spiders, insects, fishes, toads, snakes, birds, and mammals of various kinds, discussing each group of animals with special reference to the good or evil which they do, and emphasizing the needed measures to be adopted with reference to each. This will be followed by a study of actual specimens in the laboratories, the students having an opportunity to observe at first hand the actual structure of the animals and their adaption to their several modes of life.

2. *Economic Entomology.* This course began with the second-year students at the opening of College term. Although a little delayed in getting fully prepared to conduct this course with satisfaction, the course given to the class seems to have been entirely to their satisfaction, and should certainly give them a good knowledge of the most serious insect pests. After a somewhat detailed consideration of the elementary principles underlying economic entomology, the consideration of the common injurious insects of Ontario was begun, taking up (1) Insects of Staple, Grass, and Fodder Crops; (2) Insects of Garden and Truck Crops; (3) Insects of Orchards and Small Fruits; (4) Insects of House, Barn, Mills and Affecting Man and Domesticated Animals; and (5) Insects of Shade, Forest and Ornamental Trees and Plants. During the lectures specimens are used illustrating the life-histories and habits of the species discussed, and in the laboratory the student makes drawings of the different stages of these pests. Thus he is told, sees, and with his own hand illustrates the fact that a destructive cutworm is the off-spring of an innocent-looking moth; that the loud-buzzing, brown "May-bug" is the parent of the destructive "White Grub" in gardens and grass fields. The utmost emphasis is placed upon the consideration of remedies, the exact reason for every step being fully explained. As many of these second-year students go directly back to the farms, it is certainly desirable that they be given a thorough grounding in the study of injurious insects and the methods of preventing their ravages, and we believe that this course is giving them exactly the information they need along this line.

3. *General and Economic Entomology.* This course runs throughout the third year, and it is our aim to make it the strongest of the prescribed courses in this Department. For this year, through the first half of the first term, the course was similar to that given the second-year students, but instead of considering the injurious insects with reference to the plants attacked, we take up the several orders of insects in regular order, discussing structural characteristics, number of species, distribution, general habits and economy. In this course emphasis is also given to the economic phases of the subject. Special attention is given to the classification of insects to their natural families, so that the student shall be able to quickly arrive at some reasonably accurate conclusion regarding any species which may come to hand. Many specimens are exhibited during lectures, and in the laboratory the students are given ample practice in classification, and make drawings showing peculiarities of structure, as for hearing, production of sound, and the particular structures made use of in classification. This course is considerably

in advance of any that has been given in this College heretofore, but is not of an impractical nature. All the insects dealt with are such as may be found any season, and such as any well-educated man should wish to know something about.

4. *Entomology.* This course, with the fourth-year students, will, for this year, be much the same as that given to the third year in the course just discussed. This seems imperative, as the present fourth-year men have not had that course nor its equivalent. This work takes one afternoon each week, while the remaining two hours are devoted to work of a more advanced nature, under Mr. Jarvis, with microscopes, in the study of gall-mites, scale-insects, green-house pests, etc.

5. *Zoology.* For the present year we cannot hope to do much to strengthen this course. During the fall term the fourth-year Biological students have been given practice in the identification of birds from skins in the laboratory, with the purpose of familiarizing them with the points of similarity or difference in the various groups of birds. In this way about 85 species of Ontario birds have been studied. In the second term this course will be devoted to the dissection and anatomical study of fishes, toads, reptiles, birds, and mammals. After the courses of Entomology have been put on a permanent and satisfactory basis, we shall hope to give more attention to completing the collection of Ontario animals, but in a College of this nature the entomological work rightfully takes precedence over general zoology, on account of its vastly greater importance to agriculture.

6. *Histology.* In this course Mr. Jarvis is instructing the advanced biological students in the study and measurement of minute animals, and showing the appearance of animal tissues when imbedded, sectioned, and stained.

7. *Advanced, Research, and Thesis Work.* Two of the fourth-year Biological students are taking thesis work in this department. Mr. D. Weir has chosen the general subject of Insect Photography, although up to the present he has devoted his attention largely to collecting and photographing various species of insect galls. Mr. J. R. Dickson is working upon the gall-mites, (*Phytoptus*), a group of minute creatures which are of considerable economic importance, and which have not been thoroughly studied in America. The work of these students is being conducted by Mr. Jarvis, who has had some experience along these lines of work.

8. *Nature Study.* This course was arranged for with Prof. McCready. For a period varying from one to two hours each Friday, the Nature Study class is given instruction in some phase of entomology. During the term just closing it has been our policy to begin with a brief discussion of two or three standard insect pests, placing special emphasis upon the life-history, number of broods in Ontario, and remedies. This finished, some topic is taken up for the remainder of the period. One day the subject is "Grasshoppers," another "Bees, Ants and Wasps," another "Beetles," another "Structure and Growth of Insects," etc. Instructions are also given in the formation and care of insect collections. As the members of this class are for the most part teachers in the public schools of the Province, we may hope that this line of work may be of much ultimate benefit to our citizens.

9. *Poultry Parasites.* This course is conducted by Mr. Jarvis.

Entomological Society.

Sufficient interest is felt in the study of insects so that a special society to foster this study was organized. This Society was formed as the Guelph Entomological Society, with a roll of twenty-eight paid members, over half

of whom are instructors or residents in Guelph and vicinity, the remainder being students. Application was made to the Ontario Entomological Society, and the organization was accepted as its Guelph branch. The Society meets on alternate Wednesday evenings, and the interest thus far shown has been exceedingly gratifying. For the present all the papers are of a rather general nature, but as the members become more interested and advanced it is hoped that papers of more technical and strictly scientific nature can be introduced.

Collections.

The most ample collections are absolutely necessary in conducting courses in entomology. What tools are to the carpenter, what land is to the farmer, what trees are to the lumberman, insect collections are to the student of insect life. Our collections should be of three kinds: (1) Large series of all the common insect pests in all their stages, for the use of our second-year students in laboratory work; (2) Large quantities of pinned material of all orders and families for use of the third-year students in classification; and (3) a neatly mounted, fully labelled and accurately identified reference collection which should represent so far as possible the complete insect life of the Province. This last, being for permanent use, and including all species of insects, will be the work of many years. Aside from these, exhibit collections should, as soon as possible, be placed in the College Museum. Later we may hope to add to the collection of birds and other animals.

For the present we have but a scant supply of the economic species, and the material for use of the third-year class is not abundant, while we have very little in the way of properly arranged reference collections, except a nice lot of the larger moths purchased from Mr. Arthur Gibson, of Ottawa, by my predecessor, Prof. Lochhead.

A number of letters concerning injurious insects have been referred to this department for reply, all of which have been carefully answered. We are also in active and frequent correspondence with a number of our most active collectors throughout the Province in the hope of securing their co-operation in our efforts to build up our department. We have begun work upon the compilation of a list of all species of insects known in Ontario, in the hope that this information may be of use, not only to ourselves and students, but also to collectors throughout Ontario and the country at large.

While there is urgent and immediate need for certain articles of equipment, yet it is not as if instruction along these lines were only just beginning. The offices, laboratories, tables, lecture-room, etc., are nicely provided for, the principal things now needed being (1) books, (2) collections, and (3) dissecting microscopes. Shelf space for these must also be provided.

With regard to books and periodicals, there are a number of standard reference works which we should get without delay. Several back volumes of certain valuable periodicals are already out of print, and the longer we delay purchasing what remain, the more costly they will be, and the less likely it is that we can get them.

It would be ungrateful should I close this report without making mention of the faithful and unselfish service rendered by Mr. Jarvis, who has sacrificed much to serve the department to the best of his ability.

Very respectfully,

FRANKLIN SHERMAN, Jr.

PART VI.

THE PROFESSOR OF CHEMISTRY.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to sumbit herewith my fifth annual report on work done in the Department of Chemistry.

INSTRUCTION. This part of the work of the department naturally consumes the major portion of our time. For, in addition to the work given to the students of the first, second, and third years and the various optional courses of the fourth, we now give instruction in Inorganic and Organic Chemistry and Chemistry of Foods to the Junior and Senior Normal Classes in Domestic Science and Junior and Senior Classes of Professional Housekeepers. These courses consist of both lectures and laboratory work, and begin the middle of September and continue until the end of June. We also give each year a course of twelve lectures with twenty-five hours laboratory work on Dairy Chemistry to the students taking the three months' course in Dairying, and four lectures to those taking the Short Course in Poultry. As our laborarory working space is altogether insufficient for the work there is to be done, many of the classes have to be divided, thus necessitating the duplicating of work and increasing the time devoted to teaching. It may be stated further that Mr. de Coriolis, Demonstrator in Chemistry, spent one week at the Strathroy Dairy School giving instruction in Dairy Chemistry, and that an apparently ever-increasing number of students elect to work theses in the Chemical Department.

The nature of the work we are endeavoring to accomplish with all the above-mentioned classes is fairly well outlined in the College Circular and in previous reports of this Department, and, therefore, requires no extended notice here. An honest attempt is being made to make the work interesting and practical and as thorough as time will permit. It is gratifying to note that a large majority of the students are not satisfied merely with the so-called practical aspects of agriculture, but are seeking to master the principles underlying the various practical operations on the farm, that they may cultivate the soil and feed both plants and animals with a clearer conception of the why and the wherefore of the whole procedure. Such applied knowledge must make the work of the farm interesting and profitable, and at the same time produce intelligent, thoughtful citizens.

MISCELLANEOUS WORK.

After the teaching of the College classes, perhaps the most important part of our work is the giving of instruction to those unable to attend the College. This may be done by correspondence, addresses at Farmers' Institute meetings, conventions of various kinds, and by articles contributed to the different agricultural papers.

During the year I attended and delivered addresses at the annual conventions of the following associations: Western Dairymen's, Canadian Retail Grocers', Canadian Master Bakers', Fruit Growers', Vegetable Growers', Wellington Teachers', and Experimental Union. I also gave two half days of instruction to the Butter and Cheese Instructors working under Mr. Barr in the Western Section of Ontario, and spoke at a Farmers' Institute meeting at Jordan Harbor and to the ladies in the Womens' Institute

tent at Toronto Exhibition, and at several other meetings throughout the year.

It is gratifying to state that the general correspondence is increasing, for it indicates that the farmers have confidence in the College and in the work that is being done here, and that they are looking to us for information. During the last year an increasing number of samples of a great variety of substances have been sent in for examination. Wherever possible the desired information was given. I am desirous of making the work of this Department as useful as possible and, therefore, invite farmers and others interested in soils, manures, foods, dairy products, etc., etc., to correspond with us. We cannot always make the analyses requested, partly because of the amount of work entailed and partly because the samples sent may have been selected in such a way as to not accurately represent the substance of which it is a part, but we will, in all cases, give the fullest information at our disposal.

A large number of miscellaneous samples of a great variety of substances have been examined during the year; but, while the results were of value to the person who sent us the sample, I do not think it would be well to make individual mention of them here, and only a few of those of most interest at the present time will be referred to in this report. Many of the other results may find their way into future publications from this department.

Wood Ashes.

Our common wood ashes contain potash in one of the best forms, and were, prior to the introduction of potash salts from the Stassfurt mines, practically the only source of potash, other than farmyard manure, available to the farmer or vegetable grower. At that time the demand for potash on the truck farms throughout the Eastern States created such a market for ashes that large quantities were annually secured from Canada, and Canada wood ashes were much advertised throughout the whole of the New England States. It is a regrettable fact that even yet several hundred tons of ashes are exported each year to supply that market.

The pure ash is not a uniform product. That from the different varieties of wood varies in composition, and the ash of the young boughs is richer in potash than that from the full grown timber. As a rule, the ashes from the soft woods are not so rich in potash as those from the hard woods.* As gathered for market, they contain a considerable quantity of moisture, dirt, etc., which causes a variation in composition not due to the character of the wood from which they were obtained. The average analysis of commercial wood ashes shows them to contain a little less than 6 per cent. of potash, 2 per cent. of phosphoric acid, and 32 per cent. of lime. Leached wood ashes contain on the average 30 per cent. of moisture, 1.10 of potash. 1.50 of phosphoric acid, and 29 per cent. of lime. During the year five samples of ashes were analysed, giving the following results:

Percentage Composition of Wood Ashes.

Sample.	Potash. K_2O.	Phosphoric acid. P_2O_5.	Lime. CaO.
No. 1	1.27	1.37	25.8
" 2	1.30	1.52	27.1
" 3	1.33	1.17	38.0
" 4	4.44	1.12	38.4
" 5	3.37	1.55	26.6

*See College Report for year 1897, page 28-29.

The first three samples were evidently leached ashes, although sample No. 3 was being sold in good faith as an unleached ash. Sample No. 4 is probably from some soft wood, as we have generally found the ash of soft wood low in phosphoric acid.

There is no way of detecting the wide variations that may occur in the composition of ashes by sight or feel; consequently, they should always be bought subject to analysis. Potash and phosphoric acid in the best forms of fertilizers can usually be bought for from 4.5 to 5 cents per pound. If we value these constituents at 5 cents per pound, then samples 1, 2, 3, 4 and 5 are worth $2.64, $2.82, $2.50, $5.56, and $4.92, per ton respectively. Or, figuring in the same way we find that ashes up to the general average given above, *i.e.*, potash 6 per cent. and phosphoric acid 2 per cent., would be worth $8.00 per ton. It will readily be seen that if any considerable quantity of ashes are being bought, an analysis should be procured and the ashes paid for on the basis of their potash and phosphoric acid content. No value has been assigned to the lime. While this is not strictly correct, as lime is of value on most soils, the potash and phosphoric acid are the most valuable constituents.

Lime-Kiln Ashes, obtained in the burning of lime with wood are relatively poor in potash and rich in lime. They contain from 1 to 1.5 per cent. of potash, about 1 per cent. of phosphoric acid, and as much as 50 per cent. of lime.

Coal Ashes contain only traces of potash and phosphoric acid. Any good results got from their use are undoubtedly due to their effect on the physical texture of the soil.

Irish Bog Butter.

Mr. David Boyle, Superintendent of the Provincial Museum, Toronto, sent us a sample of Irish Bog Butter. He stated that it was found in the county of Kildare, Ireland, and when taken out of the peaty soil was so fresh that the dogs ate it. The sample we received was a greasy, greyish white substance, with a slightly rancid smell. Unfortunately, Mr. Boyle could not spare enough of the sample for a complete examination. We were able, however, to prove that the sample contained no salt, only a trace of nitrogenous bodies and very little moisture; in fact, practically the whole of it dissolved in ether and other fat solvents.

Reference to the literature on this interesting subject shows that a large number of samples of this bog butter have been obtained from the swamps of Ireland. It is found in twenty and even hundred pound lots at different depths, some being fourteen feet below the surface. As a rule, the original shape or form of the lumps of butter seem to be exceedingly well preserved, and one case is recorded where the marks of the fingers could be distinctly seen on the butter. On another lot, a coarse hemp cloth was found wrapped around the butter, which on exposure to the air crumbled to dust. Very little is known about how long these substances have been in the swamp, but it is generally thought that they are from 1000 to 1,000 years old and it is quite possible they were there before the swamps.

It is claimed by some that the bog butter is a substance formed from the peat itself, but the results of chemical analyses go to show that it still has some of the characteristics of butter, and the general belief of those

who have studied the subject is that it really was butter placed there for some reason many years ago. Why the swamp should be used as a place of storage is not plain. It can hardly be supposed that all the samples which have been found were lost accidently on the way to market, although, in one case, at least, the remnants of a basket were found with the butter. It has been suggested that the butter was buried in the swamp for safe keeping when the Danes invaded Ireland, or possibly, at the time of the massacres by Cromwell's men. The best and most likely theory is that long years ago experience proved that summer butter could be put down in the turf to keep for winter use, or possibly, certain desired flavors were developed in this way. Then it might happen that those who put it away either died or forgot it, and so it might be left. It is well known that moist peat or swamp soil is an excellent preservative, due probably, to the humic acids formed as the result of the decomposition of the nitrogenous organic matter, and it is quite possible that this preserving action was known to and used by the people of Ireland many centuries ago and that these lumps of butter were carefully put away in the peat before the time of the Norman conquest.

Paris Green.

Every summer several samples of Paris Green are sent to us for examination. At my request, Mr. Fulmer prepared the following article dealing with some of the main features of this useful insecticide.

Each year farmers, gardeners, and orchardists lose a very large proportion of the yield of their fields and trees owing to the inroads of insects. In the majority of cases the greatest percentage of these losses are due to neglect, carelessness, or lack, possibly, of reliable information; although in these days of abundant literature on all phases of agricultural practices the last mentioned factor should probably be left unmentioned. We can never hope to entirely checkmate this nip from the profits of our lands, but still the astounding proportions to which it has now attained can be in a large measure reduced by the expenditure of a little time and money on the purchase and application of various washes and sprays. Many of these are now on the market, or, at least, the substances for compounding them, and a line to the College will bring to anyone information regarding the reliability and proper methods of handling and combining these to secure the best results.

Perhaps the best known insecticide used throughout Ontario is Paris Green, and a few remarks concerning it will probably not be out of place. Its action as an insecticide depends upon the fact that it is a poison and as such must actually be taken into the system of the insect. In other words, it can only be used against those pests which obtain their subsistence by chewing and swallowing their food, such as the Currant Saw-fly, Cabbage worm, Tent Caterpillar, and others.

The poisonous property of Paris Green is due to its arsenic content, which substance is present as arsenious acid in combination with copper oxide, and acetic acid or "vinegar" as copper-aceto-arsenite. The theoretical proportion of these different ingredients is as follows: Copper oxide 31.29 per cent., arsenious oxide 58.65 per cent., and acetic acid 10.06 per cent. During the past summer six samples of Paris Green were sent here for analysis and the results of our examination are given in the following table:

Number.	Moisture. 111°C.	Sand.	Sod. sulphate.	Copper oxide.	Total arsenious acid As_2O_3.	Acetic acid by difference.	Soluble arsenious acid* As_2O_3
1	1.29	.11	.34	30.68	56.55	11.03	2.36
2	.99	.23	.13	31.62	56.91	10.12	2.73
3	1.25	.26	.37	30.59	56.8	10.73	2.11
4	1.26	.15	.36	30.39	56.12	11.72	2.85
5	1.29	.71	.57	30.23	56.01	11.19	2.73
6	1.41	.12	1.80	30.29	56.33	10.05	4.35

As will be seen, these samples are not chemically pure, and, as a matter of fact, none of the commercial article ever is. Small amounts of sand, sodium sulphate, and free arsenious acid are always present. The presence of these are due to the method of manufacture, and the slight impurity of the substances used in the same. However, these are sometimes wantonly added as mere "make weights" and as such are then fraudulent, since they increase the cost of purchase. The first two are harmless and it is only regarding the third which we wish to make any comment. It has perhaps been noticed by many who have used Paris Green as a spray that sometimes after the application the foliage becomes scorched or burned and perhaps eventually dies and drops from the stock or branch. This is due to the presence in the green of free arsenious acid, which, being an acid, exerts the burning or destroying property. Tender foliage, such as that of the peach, is more readily affected by this than the more hardy, such as that of the apple.

According to J. K. Haywood, of the Bureau of Chemistry, Washington, the presence of this substance in Paris Green may be due to three causes:

(1) An excess over and above that which is required to combine with the copper and acetic acid in the process of manufacture, thus leaving just that amount in the free or uncombined state.

(2) The Green may be poorly made so that the constituents are loosely held together. In the act of spraying and mixing with water, perhaps in the presence of carbon dioxide of the air or that dissolved in the water, which compound exerts a breaking-down influence, the green is partially decomposed, setting the arsenious acid again free.

(3) The Green may be divided into such fine particles that it presents so much surface to the decomposing action of the water and carbon dioxide that enough acid may be set free to cause serious damage.

Objection has been raised by some authorities as to the possibility of the breaking down of the Paris Green when we consider the fact that in its manufacture it is precipitated as an insoluble compound from a solution which contains a complex mixture of acids and alkalies. As to the fineness of the article, the finer the better from a mechanical standpoint. If the particles are coarse, they are heavy and readily settle out from water, and thus constant agitation is necessary during spraying operations.

The amount of free arsenious acid or that which may soon become free can only be estimated by a chemical examination. In many of the American States laws setting the limit as to the amount which may be present in those Paris Greens offered for sale, are in force. These limits range from four to six per cent. Any green containing more than those amounts

*Obtained by ten days' extraction method.

is condemned as unfit for use. These limits are still vague, however, on account of the different methods in existence for estimation, and thus the question is only in an experimental stage. It must be admitted, nevertheless, that its presence in more than small quantities is highly objectionable for care in manufacture will keep it practically absent. When we consider that the addition of lime, when using, is necessary in order to counteract the acid by forming the neutral arsenite, the additional expense of such procedure makes the correctness of the foregoing statement more apparent.

The status of the Paris Green market in Ontario seems to be highly satisfactory. The Inland Revenue Department at Ottawa reported in 1902-3 that the samples collected and analysed were 95.8 per cent. genuine. The figures in the table also bear out this conclusion. All the Greens there noted are of good quality; there is no marked quantity of impurities and the highest figure for soluble arsenic, 4.35 per cent., is not beyond the objectionable point. Some authorities place the minimum content allowable for total arsenic at 50 per cent., but no doubt 56 per cent. would not be too high to place that constituent since all good greens contain at least that amount.

Among the adulterants which are found in Paris Green, present merely as "make weights", barium sulphate, road dust, and calcium carbonate are the most common. Fortunately these are easily detected. Pure copper aceto-arsenite is completely soluble in ammonia, dissolving in the presence of that reagent to form a deep blue solution. Any appreciable quantity of sediment left after solution with this fluid presents good ground for the rejection of a sample of Paris Green. Ammonia can be procured at any drug store for a few cents, and in carrying out the operation a portion of the Green can be placed in some handy receptacle, preferably glass, and about ten times its quantity of the solution added, and well stirred or shaken. This evidence is not a final criterion as to the reliability of the substance, however, since free arsenious acid is also soluble in ammonia and would thus escape detection. As before stated, the presence of this ingredient can only be ascertained by a chemical process.

The demand for Paris Green in Ontario is good, since between 100 and 120 tons are used annually. As a result we find many substitutes placed upon the market and greatly lauded. Many of these are entirely worthless and contain very small amounts of any material which would kill an insect. Some of those which have appeared have been analysed here, and the results of such examinations can be found on pages 43-4-5 of the College report for 1903.

Paris Green is often combined with Bordeaux mixture in order to introduce an insecticidal value along with the fungicidal one. Bordeaux mixture is now sometimes made by the use of caustic soda instead of lime, as it is a much handier way since the time necessary for the slaking of the lime is saved, and the resulting compound, copper hydrate, is identical. However, this method introduces a source of danger when Paris Green is added to the mixture, as was experienced during the past summer in the Niagara district, where the application of this fungicide in which Paris Green had been placed destroyed foliage badly. The cause was no doubt due to the breaking down of the Paris Green by the slight excess of caustic soda which was likely present, forming free arsenious acid.

Owing to the excessive cost of Paris Green, and the difficulty of keeping it in suspension in the liquid while spraying, various other compounds of arsenic have been brought into use. Some of these are arsenite of soda, arsenic of lime, and arsenate of lead. These can be made at home at a very slight cost, and there is no reason why they should not come into more general use since they are every bit as effective and are of known composition.

Milk and Butter Preservatives.

From time to time reference is made that preservatives injurious to health have been found in the milk supply of different towns and cities in Ontario. A number of samples of milk have been sent to us for examination, and several inquiries have been received for methods of identification of preserving materials. Among the samples of milk examined, two were found to contain formalin and one boron compounds.

Early in the summer we commenced a systematic examination of the milk and cream used in the city of Guelph. In this work we were greatly assisted by the City Medical Health Officer, Dr. Robinson, who kindly supplied us with samples. A bottle of milk was got from each of the delivery wagons of all the milk dealers of Guelph once in each of the months of May, June, and July. Samples of cream were collected less frequently. It was our intention to continue collecting and examining samples throughout the remaining months of the summer, but pressure of other work prevented. It is, however, gratifying to be able to state that in all the samples of milk or cream examined no preservative of any kind was detected.

During the summer a number of samples of butter preservatives used in creameries were sent to us for analysis. Most of these proved to be boron compounds diluted more or less with salt and sodium bi-carbonate. In one or two instances there appeared to have been an excessive quantity of the soda used in making up the preservative. While the use of a small amount of soda in a preservative may be beneficial, a large quantity not only unnecessarily dilutes the real preserving material, but it also imparts to the butter a bitter, disagreeable flavor. Because of the general interest in the question of preservatives and the amount of them used in creameries making butter for export, I decided to collect samples for analysis in order that we might gain some more definite information regarding the materials used in making them. Accordingly a letter was sent to every creamery in the Province of which we could get the address, asking them to send us a sample of the preservative they were using. Twenty-nine samples were received. These were carefully examined for all the more common preservatives, and only salt, sodium bi-carbonate and boron compound, principally borax, were detected. No attempt was made to determine the amount of the latter substances; but the percentage quantities of common salt and sodium bi-carbonate were carefully determined and are given in the following table:

Per Cent. of Salt and Soda in Butter Preservatives.

Number of sample.	Salt.	Sodium bi-carbonate.	Number of sample.	Salt.	Sodium Bi-carbonate.
1	21.17	.....	16	23.05	.....
2	28.3	5.94	17	8.42	12.4
3	27.85	4.71	18	.41	6.93
4	27.6	6.0	19	22.35	.....
5	26.2	.....	20	.47	22.84
6	17.66	.....	21	.23	.....
7	20.36	.....	22	24.1	.....
8	1.28	.....	23	5.73	7.22
9	10.06	.....	24	.234	3.34
10	15.56	.....	25	5.26	6.0
11	23.45	.....	26	33.2	2.1
12	24.45	.....	27	.....	23.04
13	20.8	.....	28	.....	8.3
14	21.7	.....	29	1.85	6.61
15	22.8	.....			

The price of these substances is from 9 to 12.5 cents per pound.

The samples collected represent fairly well the nature of the preservatives now in use in the creameries throughout the Province. It is evident that both common salt and sodium bi-carbonate, either singly or together, are used along with the boron compounds. In some cases, over one-quarter of the whole of the preservative is made up of salt, and, as salt in these mixtures cannot possibly be more efficacious than the ordinary salt of the dairy, it is apparent that the butter maker is paying a high price for this common substance. Sodium bi-carbonate may serve a useful purpose in neutralizing any free acids that may form in the butter, and to that extent, may serve a good purpose. However, after two years of careful expermental work in the Dairy department, Prof. Dean feels confident that neither the salt or soda are essential for a good butter preservative and that the ground borax alone will give equally as good results.

Separation of Nitrogenous Bodies in Cheese.

At the request of the Association of Agricultural Chemists, I acted as Referee on the Separation of Nitrogenous Bodies in Cheese. This Association is, as the name would imply, an association of chemists dealing with agricultural problems. It has done much to develop, improve, and unify the methods of analyses of agricultural products. The custom is each year to appoint a number of "Referees" on different lines of work. These Referees are supposed to study the subject assigned with the object of elaborating a method of analysis, if none is known, or to secure the co-operation of other chemists in testing the accuracy of existing methods. The following is the report which I presented at the meeting of the Association in Washington in November of this year:

Your referee decided to test the method elaborated by Van Slyke and Hart for the separation of the nitrogenous bodies in cheese. This method is based on the results of work done at the Geneva Experiment Station and was given in Dr. Van Slyke's report as referee on Separation of Nitrogenous Bodies before this Association in 1902.

The samples of cheese sent out were taken from a cheese eleven months old, and of good quality. To insure the samples being uniform, the cheese was cut into fine particles, thoroughly mixed and all the sample bottles filled immediately. The following letter of instructions and outline of method to be followed in the analytical work was sent with the samples:

May 5th, 1905.

Dear Sir,—In accordance with your expressed willingness to co-operate in the work of testing Van Slyke's and Hart's method for the Separation of Nitrogenous bodies in milk and cheese, I am sending you a prepared sample of cheese for this work. Because of the uncertainty of the action of the various preserving substances upon the different compounds which we wish to separate, no preservative has been put in the cheese. I would, therefore, ask you to keep the sample in cold storage until you are ready to use it, and, if at all possible, to commence the analysis about the twenty-fifth of this month. The cheese from which the samples were taken was within a few days of eleven months old, and was of No. 1 quality.

The method of analysis outlined on the accompanying sheets was taken from Dr. Van Slyke's report as Referee on Separation of Nitrogenous Bodies, given in the Report of the Proceedings of the Nineteenth Annual Convention of the Association of Official Agricultural Chemists held at Washington, D. C., October, 1902. This report forms Bulletin No. 73 of the Bureau of Chemistry, Washington.

The method of sampling, given on the sheets, cannot of course be followed in this case. All that need be done is to thoroughly mix the contents of the bottle before weighing from it.

In reporting results, will you please mention at what date you made the analysis. I would much prefer that it be made at the time mentioned, but if made later, please report the date on which it was made.

Trusting that you will be able to make a full report, I remain,

Yours very truly,

(Sgd.) R. HARCOURT,

Referee on Separation of Nitrogenous Compounds in Milk and Cheese.

Method Followed in Analysing the Cheese.

1. *Obtaining Sample of Cheese.* A sample of cheese is obtained for analysis by means of a cheese-trier, which enables one to secure a round plug of cheese about half an inch in diameter and four to six inches long. Four or five plugs are drawn, one within a short distance of the centre of the cheese, one about an inch from the outer circumference, and the others at points equidistant between the two previous ones taken. Samples thus taken represent practically all different conditions existing in the cheese. After each plug of cheese is removed, about an inch of the end having the rind is cut off, and the rest is placed in a well-stoppered, large-mouthed sample bottle. The end with the rind is dipped once or twice in melted paraffin and then carefully replaced in the cheese, being pushed in a little below the surface. After all the plugs have been taken and the ends properly replaced in the cheese, some of the melted paraffin is poured over the surface to fill up and surround the depressions made by replacing the ends of the plugs. This treatment generally insures the exclusion of molds and prevents abnormal loss of moisture in the portions of the cheese near the holes by the removal of the cheese plugs. This is a matter of much importance, when one intends to keep the same cheese for one or two years for systematic examination.

When all the plugs of cheese needed have been taken, the analysis should not be long delayed. The cheese in the bottle is cut into small pieces with a spatula and stirred within the bottle, in order to mix the whole into as homogenous a mass as possible.

2. Determination of Total Nitrogen in Cheese. Weigh out 1 or 2 grams of the cheese, prepared as described above, for the determination of total nitrogen, and treat it according to the Kjeldahl-Gunning method, modified as follows: when the solution has become partially digested, add a piece of copper sulphate about as large as an ordinary pea. Unless this is done, it will take a long time to convert the organic nitrogen completely into ammonia.

3. Extraction of Water-soluble Products. In a porcelain mortar, thoroughly mix 25 grams of cheese sample, prepared as indicated above, with about an equal bulk of clean quartz sand. This mixture is transferred to a 450 c.c. Erlenmeyer flask, to which add about 100 c.c. of distilled water at a temperature of 50°C. The flask is then placed on a water bath or in some place where it can be kept at a temperature of 50 to 55°C., and is allowed to stand for half an hour, being vigorously shaken from time to time. The liquid portion is then decanted through a filter of absorbent cotton into a 500 c.c. flask. The residue is again treated with 100 c.c. of water, heated, agitated, and the liquid decanted as before. This process is repeated until the filtrate, after being cooled to room temperature, amounts to 500 c.c. exclusive of the fat, which usually is present at the top of the liquid.

The cotton filter mentioned is made of two layers of absorbent cotton prepared as follows: In a glass funnel, place some absorbent cotton to the

depth of about 1 inch, moisten this with water, in order to compact it, and then above this place another layer of cotton of the same thickness. Upon this pour the portions of cheese extract. This kind of filter allows rapid filtration without the aid of a pump, and is as effective in every way as paper, which requires half a day or more for complete filtration of 500 c.c. of extract. Several samples of cheese can be extracted at the same time. The upper layer of cotton holds all solid particles and can be returned to the flask for extraction with salt solution.

4. Determination of Total Water-Soluble Nitrogen. For the determination of the amount of total water-soluble nitrogen, take 50 c.c. of the water extract, prepared above, equivalent to 2.5 grams of cheese, and treat it according to the Kjeldahl method for determining nitrogen.

5. Determination of Nitrogen in the Form of Paranuclein (Pseudonuclein.) To 100 c.c. of water extract, equivalent to 5 grams of cheese, add 5 c.c. of a 1 per cent. solution of hydrochloric acid, and warm the mixture on the water bath at 50 to 55°C. until complete separation takes place, as shown by a clear supernatant liquid. The precipitate is filtered, washed with water, and then, with the filter paper, treated by the Kjeldahl method to determine the amount of nitrogen. The nitrogen equals nitrogen present in the form of paranuclein (pseudonuclein).

6. Determination of Nitrogen in the Form of Proteids Coagulated by Heat in Neutral Solution. The filtrate from the preceding determination (5) is made neutral with dilute caustic potash, using phenolphthalein as an indicator. It is then heated at the temperature of boiling water, until any coagulum that forms settles completely, leaving a clear supernatant liquid. The precipitate is washed with water and its nitrogen determined by the Kjeldahl method. In our experience such a precipitate rarely occurs, except in the case of cheese ripened near freezing point. The nature of this body we have not yet investigated.

7. Determination of Nitrogen in the Form of Caseoses (Albumoses). The filtrate from the preceding determination (6) is treated with 1 c.c. of 50 per cent. sulphuric acid, saturated with chemically pure zinc sulphate and then warmed to about 70°C., until the caseoses separate completely and settle. The mixture is allowed to cool and is then filtered. If filtered hot, there will occur a further separation of caseoses in the filtrate on cooling. The precipitate is washed with a saturated solution of zinc sulphate made slightly acid with sulphuric acid. The nitrogen in the precipitate is determined by the Kjeldahl method.

8. Determination of Nitrogen in the Form of Amido-acid Compounds. The amido-acid compounds are determined in the filtrate from the precipitation of peptones (9).

9. Determination of Nitrogen in the Form of Peptones. (1) By tannin and sodium chlorid. Place 100 c.c. of the water extract of cheese in a 250 c.c. graduated flask, add 1 gram of sodium chloride and a solution containing 12 per cent. of tannin until one drop added to the clear supernatant liquid gives no further precipitate. Then dilute to the 250 c.c. mark, shake, filter through a dry filter and determine the amount of nitrogen in 50 c.c. of the filtrate by the Kjeldahl method; this gives the amount of nitrogen in the form of amido-acid and ammonia compounds. The amount of nitrogen in the form of peptones is determined by difference—that is, by subtracting from the amount of total nitrogen in the water extract and combined sum of the amounts of nitrogen found in 5, 6, 7, 8 and 10.

10. Determination of Nitrogen in the Form of Ammonia. Distil with magnesium oxide 100 c.c. of the filtrate from the tannin-salt precipitation, passing the distillate into a standardized acid, and titrating in the usual way.

*11. Determination of Nitrogen in the Form of Unsaturated Paracasein Lactate.** The residue insoluble in water is treated with several portions of a 5 per cent. solution of sodium chloride, the process being carried out as in preparing the water extract (3). The nitrogen in an aliquot part of the 500 c.c. of this salt extract is determined by the Kjeldahl method.

Eleven chemists requested samples, eight of whom were able to complete the work and sent in reports. Dr. B. B. Turner analysed two samples, and E. G. de Coriolis, one of my assistants, also analysed two samples. The results obtained from the eleven analyses are embodied in the following table:

Results of Co-operative Analysis of Cheese.

	Total nitrogen.	Water soluble nitrogen.	Salt soluble nitrogen.	Paranuclein.	Coagulated by heat.	Caseous.	Peptones.	Amido Acids.	Ammonia.
Analyzed end of May:									
E. G. deCoriolis, Agricultural College, Guelph, Ontario	4.56	1.428	2.391	.056	.....	.322	.084	.966	*a*
	4.56	1.428	2.352	.064	.....	.333	.065	.966	
E. B. Holland, Hatch Expt. Station, Amherst, Mass.	4.61	1.62	1.90	.11	.....	.45	.05	.92	.09
	.....	1.66	2.02	.15	.....	.41	.07	.94	.09
C. B. Ellis, Expt. Station, Ames, Iowa	4.40	1.68	1.81	.097	.....	.022	.01	1.09	.443
J. P. Street, Expt. Sta., New Brunswick, N.J.	4.60	1.55	1.35	.14	.02	.15	.01	.97	.26
	4.62	1.56	1.35	.15	.01	.12	.....	.....	.27
C. W. Jones, Expt. Station, Fayetteville, Ark	4.44	3.18	1.05	.18	.....	.....	.....	1.05	.49
F. S. Shiver, Agricultural College, Clemson College, S.C.	4.87	1.99	1.70	.056	.014	.366	.094	1.21	.25
Analyzed end of July:									
E. G. deCoriolis, Agricultural College, Guelph, Ont.	4.59	1.422	1.98	.031	.....	.395	.032	.984	*a*
	4.54	1.441	1.99	.031	.....	.398	.024	.984	
Dr. B. B. Turner. Expt. Station, Storrs, Conn. Sample No 1.	4.46	1.76	0.95	.03	.....	.23	.23	1.13	.16
Dr. B. B. Turner. Sample No. 2.	4.55	1.77	0.53	.05	.....	.....	.12*b*	1.215	.155
A. W. Dox, Expt. Station, Storrs, Conn.	4.52	1.76	0.61	.15	.....	.23	.07	1.15	.17
Analyzed end of September:									
A. H. Knisley, Agricultural College, Corvallis, Oregon.	4.37	2.03	0.47	.028	.006	.24	.028	1.481	.195
	.....	1.94	0.47	.022	.008	.22	.....	.....	.209
	.....	1.96	.....	.020	.006	.23	.....	.....	.209
Analyzed end of October:									
Floyd W. Robison, State Analyst, Lansing, Michigan †	4.323	1.988	0.274	trace	.014	.425	trace	1.428	.126

COMMENTS OF ANALYSTS. C. W. Jones: "The sample was kept on ice until the 22nd of May when the analysis was begun. The work was not completed until the 12th of June and it is possible that there were some bacterial

* According to conclusions reached in Bulletin 261, Geneva, New York, Van Slyke and Hart now call the compound extracted with a five per cent. salt solution paracasein, not unsaturated paracasein lactate.

† Arrived after the Report was prepared.

a For some reason, the ammonia determinations were unsatisfactory.

b Assuming same amount of caseosus as in sample No. 1 (Dr. B. B. Turner).

changes as the solutions were kept in a warm room. However, I did not observe any growth of bacteria until after the analysis was completed. In making the water soluble and the salt soluble extractions a small amount of white curdy matter collected with the fat and was discarded with it. The cotton filters did not work quickly, taking sometimes over half a day to make filtrations. In determining the paranuclein the solution was treated according to directions and heated at 50-55°C. for four hours and filtered. As the filtrate was not clear it was again heated at the same temperature for four hours and filtered. Even then the filtrate was still somewhat cloudy."

B. B. Turner: "I give below the results of the analysis of two samples of cheese sent to Mr. Bosworth and myself. Mr. Bosworth having left this institution, his successor, Mr. A. W. Dox, M.S., analysed one, and I, independently, analysed both. The difference between the analysis of the two samples may be in part due to the length of time they were in the laboratory. Both were kept in cold storage (about 40° F.) until the work was commenced July 14th. They remained in the hot laboratory several days, with the result that probably the second sample ripened more than the first. I must also point out that I found the extraction with 500 c.c. of water, as called for (usually in four portions) was by no means complete. A further extraction with 500 c.c. of water increased the soluble nitrogen in one case by 0.154 per cent. and in another by 0.217 per cent."

F. S. Shiver. "The work was done at the time you suggested. Considerable difference was experienced in making both the aqueous and salt extracts. The determination of paranuclein and caseoses were not very satisfactory."

E. B. Holland. "The analysis was begun on the 22nd of May. In the estimation of nitrogen in the form of paranuclein a clear supernatant liquid could not be obtained. By keeping the solution at 50°c., for several hours and allowing it to stand over night, it filtered clear.

C. E. Ellis. "We could not commence the work until May 27th, and had to carry it on as best we could with other work that had to be done."

John Philip Street. "The analysis was made between the 9th and 22nd of May."

A. L. Knisely. "During the summer the cheese was kept in a store room, the temperature of which usually ranged from 55 to 65°c. The sample of cheese was opened and the analysis started on September 25th. A determination of total nitrogen in the cheese at the top of the bottle gave 4.84 per cent., while that at the bottom gave only 4.21 per cent. I made this determination because I noticed that the fat had partially melted and settled to the bottom of the sample of cheese. The mixed sample gave 4.37 per cent. of nitrogen."

"I found on filtering the samples through cotton, as suggested, that the filtrate was turbid, due, I presume, to minute particles held in suspension. Upon filtering this through an S. & S. filter No. 588, the filtrate became very clear."

COMMENTS OF REFEREE. As no means, other than keeping the cheese at a low temperature, was used to check the ripening process, it was felt that the time at which the analyses was made would have considerable influence on the results. To get figures bearing on this point, Mr. E. G. de Coriolis analysed the cheese at the time specified in the letter, and again two months later. Referring to Mr. de Coriolis's results, as given in the previous table, it is evident that, judging by the amount of water soluble nitrogen recovered in the two analyses, very little advance in the ripening process took place during the two months. About the first of October another extraction was made.

when it was found that the water soluble nitrogen had reached 1.840 per cent., the amido-acids 1.033 per cent., and the ammonia .185 per cent. The cheese had been kept from the time it was bottled until analysed in cold storage at 40° F.

It will be seen that six samples were analysed during the latter part of May, four in July, and one in September. The latter analysis was made at about the same time as the last extraction by Mr. de Coriolis, just referred to. Mr. Knisely's sample was kept, however, at 15 to 25° higher temperature than the one we analysed. The samples analysed in July were all kept at the same temperature. As was to be expected, the amount of nitrogenous bodies soluble in water increased with the length of time the cheese was kept before the analysis was made, but there is not the close relationship between the different determinations in the various groups that was desired. The length of time the extracts were kept in the laboratory before the analytical work was completed would, doubtless, increase the quantity of the end products.

Dr. B. B. Turner reports incomplete extraction of the water soluble nitrogen by the method presented. Work done under my own direction confirm this. A further extraction with 500 c.c. of water gave the following additional quantities of nitrogen:

Dr. Turner, No. 1 extraction 0.154 per cent nitrogen.
Dr. Turner, No. 2 extraction 0.217 per cent. nitrogen.
Mr. de Coriolis , No. 1 extraction 0.143 per cent nitrogen.
Mr. de Coriolis No. 2 extraction 0.151 per cent. nitrogen.

No extractions with additional quantities of the salt solution were made, but it is evident that for some reason uniform results were not secured, and it is quits possible that it was due to incomplete extraction.

Another point we tested was with regard to the completeness of the separation of the water soluble extract by the absorbent cotton filter. To check this point a portion of the filtrate obtained in the usual way was filtered through a thick pad of asbestos on a Hirsch's filter and nitrogen determined before and after the second filtration. Three extractions were made for the purpose of studying this point, the results of which are as follows:

I.	Filtered through	cotton	alone	1.422	per cent. nitrogen
	"	"	"	1.441	" "
	"	"	and asbestos	1.410	" "
	"	"	"	1.410	" "
II.	"	"	alone	1.480	" "
	"	"	"	1.490	" "
	"	"	and asbestos.....	1.360	" "
	"	"	"	1.365	" "
III.	"	"	alone	1.460	" "
	"	"	"	1.470	" "
	"	"	and asbestos.....	1.375	" "
	"	"	"	1.365	" "

In the first extraction the absorbent cotton appears to have made a fairly complete separation of the soluble nitrogen; but in the other two cases there is about one-tenth per cent. less nitrogen in the portion filtered through the asbestos. Further, filtering through the asbestos pad removes the fat globules and leaves a perfectly clear filtrate which is much easier carried through the after work.

The cause of the comparatively wide variation in the quantity of the end products was doubtless largely due to the length of time the solutions

were kept in the warm laboratory before the analytical work was completed. The influence of this factor on the results was not studied, as it was felt that the limited time which could be devoted to the matter would be better employed in studying the question of extraction and filtration.

In conclusion, it may be stated that the separation of organic bodies, such as we have to deal with here, is not a simple matter; it is a separation that requires practice and skill in manipulation. Taking into consideration the difficulties in the way of having the samples in uniform condition when the analyses were made and the nature of the separations, the results are encouraging.

RECOMMENDATIONS. Your referee would recommend that the study of this method of separating the nitrogenous bodies of cheese be continued.

2. That the amount of water used in making the extraction of water soluble nitrogen be increased from 500 c.c. to 1,000 c.c.

3. That after passing the extract through absorbent cotton, it be drawn through a thick pad of asbestos on a Hirsch, or other suitable filter, by means of a suction pump.

INVESTIGATION WORK.

COMPARATIVE VALUES OF DIFFERENT GRADES OF WHEAT OF CROPS OF 1903 AND 1904.

The exact milling value of each grade of wheat is a question which is arousing a great deal of interest in the Canadian North West at the present time. The growers feel that the spread in the price paid for the different grades is wider than it should be, and that the appearance of the grain is taken into consideration more than the actual milling value.

With the object of gaining more definite information regarding the justice of the grading done on individual lots of wheat as delivered by the farmer, the North West Territorial Department of Agriculture collected and forwarded to us a number of samples of wheat of the different grades of the crop of 1903 and 1904. A record was kept of the previous cultivation of the ground on which each of the samples was grown. Each sample consisted of approximately eight bushels of wheat. In both year's work, the samples were intended to represent the various grades from No. 1 Hard to No. 4 Northern, in duplicate. Unfortunately, however, when the various lots of wheat were submitted to the Chief Grain Inspector, Winnipeg, for official grading, the grades were changed as shown in table I.

All the wheat was received in good condition and was from six to eight months old when milled. The milling was done in a short process mill in Guelph. Every means known to the miller was taken to prevent the mixing of the products of the various lots in the milling process and to insure the whole of the products being recovered. The percentage yield of flour given in the following table represents the total yield of flour obtained, but ten per cent. of low grade was taken from the portion saved for chemical analysis and for the baking tests. These lots of flour were kept in a dry airy room for nearly three months before the analytical and baking work was done. Unfortunately no record was kept of the weight of 100 grains or of the measured bushel of the various lots of the crop of 1903. The official grading of the samples of both years, the weight of 100 kernels, and weight per measured bushel of the sample for the crop of 1904, and the percentage yield of flour obtained from the wheat of 1903 and 1904 are given in the following table:—

Table I:—Showing Grades and Percentage Yield of Flour.

Grade.		Weight of 100 kernels.	Weight per measured bus.	Percentage of flour.	
1903.	1904.	1904.	1904.	1903.	1904.
		grams.	lbs.		
1 Hard	1 Hard	3.2527	64.0	70.8	71.9
1 "	1 "	3.2854	64.0	69.8	72.0
1 Northern	1 Northern	3.2521	65.0	70.0	71.8
1 "	1 "	3.3793	65.5	69.9	72.0
1 "	1 "	3.1531	62.5	70.7	68.3
	1 "	3.0785	61.5		69.7
2 Northern				68.3	
3 "	3 Northern	2.9180	62.5	68.3	70.0
3 "				68.1	
3 "				68.2	
4 "	4 Northern	3.1548	62.5	68.0	65.1
	4 "	2.9194	60.0		66.1

The third sample of the No. 1 Northern of the crop of 1903 was what was called "stook frozen" or "riffled" wheat. This wheat was covered with snow while in the stooks. The melting snow apparently softened the wheat and wrinkled it, thus causing it to be graded lower than it otherwise would have been. The two samples of No. 4 Northern of the crop of 1904 were composed almost entirely of Red Fife and would doubtless have graded No. 1 Hard or No. 1 Northern if not frosted. The other samples of the same crop were graded down either because of slight frost or because of the presence of soft grains. One sample was graded as low as No. 5 Northern and has been left out of this report. Millers to whom the samples were shown stated that all the Northern grades were better wheat than they could buy in corresponding grades in Ontario.

In order that the yield of flour obtained by grinding in the large mill might be checked, we sent samples of each lot of wheat of the crop of 1904 to the Columbus Laboratories, Chicago, where they were ground in a small mill especially adapted to determining the yield of flour from comparatively small lots of wheat. The results obtained are embodied in the following table:—

Table II:—Showing Weight per Measured Bushel and Yield of Flour.

Grade.	Weight per measured bushel.		Yield of flour from wheat.		Bushels (60 lbs.) to barrel of flour.	
	Uncleaned. lbs.	Cleaned. lbs.	100 lbs. uncleaned.	1 bushel cleaned.	Uncleaned. bus. lbs.	Cleaned. bus. lbs.
1 H	64	65	74.2	44.5	4 28	4 24
1 H	64	65	76	45.6	4 22	4 18
1 N	65	65	74	44.4	4 24.5	4 24.5
1 N	65.5	66	77.6	46.6	4 14	4 12
1 N	62.5	64.5	76.3	45.8	4 25	4 17
1 N	61.5	63	74.9	44.9	4 28	4 22
3 N	62.5	63	74.3	44.6	4 25.5	4 23.5
No. 4	62.5	63	73.3	44.0	4 29.5	4 27
No. 4	60	61	74.5	44.7	4 27	4 23
No. 5	60	61	72	43.2	4 36	4 32

The figures given in both this and the previous table represent the total yield of flour as no attempt was made to separate the flour into different grades. It will be noticed that the percentage yield of flour given in Table II is higher than that shown in Table I, but that the variations in yield in one set of figures bear a somewhat similar relationship to those of the other.

It is particularly worthy of notice that while there is a decrease in yield of flour from the lowest grades, there is not that difference which might be expected considering the wide range in grading of the wheat. The two samples of No. 4 Northern gave flour slightly darker in color than the others, doubtless due to the fact that it is hard to grind frosted wheat without incorporating some of the wrinkled bran layers. The miller who did the grinding of the large lots stated that the color and yield of the flour from the frosted wheat could have been improved by steaming the wheat before grinding.

No complete chemical analysis was made of either the wheat or the flour, for it was thought that there would not be sufficient difference in the percentage amount of any of the constituents other than proteids to make the analysis of value. The chemical examination was, therefore, confined to the moisture, proteids and acidity of the flour:—

Table III:—Showing Percentage of Moisture, Acidity, Proteids, and Gluten.

Grade.		Moisture.	Acidity.	Total proteids. (N x 5.7)		Protein soluble in 70% alcohol. (N x 5.7)		Percent. of protein soluble in alcohol.		Gluten. 1903.		Gluten. 1904.	
1903.	1904.	1904.	1904.	1903.	1904.	1903.	1904.	1903.	1904.	Wet.	Dry.	Wet.	Dry.
1 H..	1 H..	12.48	.28	10.9	12.2	5.77	5.84	52.8	48.1	33.2	13.3	40.8	16.3
1 H..	1 H..	12.98	.12	10.8	9.3	6.32	5.15	58.3	55.4	35.0	13.8	28.7	11.1
1 N..	1 N..	13.07	.10	11.1	11.6	5.37	6.82	48.2	58.9	32.1	12.7	37.3	14.6
1 N..	1 N..	11.99	.10	10.9	10.8	5.95	6.02	55.6	54.8	31.7	11.2	35.7	13.2
1 N..	1 N..	12.52	.10	10.1	10.9	5.73	5.94	54.4	54.4	31.7	12.1	36.3	13.7
.....	1 N..	12.99	.10	.....	10.8	.....	5.93	.....	54.8	.....	.....	34.4	13.0
2 N..	.....	.....	.....	10.7	.....	6.08	.....	57.1	.....	33.8	12.8	.....	.....
3 N..	3 N..	13.17	.08	10.7	11.4	6.20	5.64	58.2	49.3	30.5	12.2	37.1	14.7
3 N..	.....	.....	.....	10.0	.....	5.91	.....	58.2	.....	27.1	10.9	.....	.....
3 N..	.....	.....	.....	10.1	.....	6.03	.....	58.8	.....	31.2	12.1	.....	.....
4 N..	4 N..	13.46	.12	11.1	11.5	6.34	6.81	57.0	59.0	33.8	13.4	36.6	13.9
.....	4 N..	15.83	.28	.....	11.74	.....	5.61	.....	56.3	.....	.....	35.4	13.6

The moisture and acidity were not determined in the flour of the crop of 1903. In the case of the 1904 crop, the moisture determinations were made at the time the other analytical work was done. It will be noticed that the second sample of No. 4 Northern contained a very high percentage of moisture, and, consequently, a high acidity. This flour was quite lumpy two months after it was made. It is quite possible that the wheat was damp when graded and that this fact influenced the Grain Inspector in placing it in a low grade. On the other hand, one sample of No. 1 Hard also contained a high percentage of acidity, and was lumpy, although the percentage of moisture was not high when the determination was made. Unfortunately no determinations of moisture or acidity were made either in the wheat or flour at the time of grinding.

The percentage amounts of protein in the flour from the various grades of wheat of the 1903 crop are remarkably uniform, the extremes being 9.98 and 11.13. In the 1904 crop the extremes were 9.29 and 12.15. Recently attempts have been made to value wheat for flour purposes by the amount of protein present.* It is evident that on this basis of comparison the extremes in quality occur in the two samples of No. 1 Hard of the crop of 1904. According to Prof. Snyder the protein content of a flour is only a general index of bread-making value, and that, provided the proteids do not fall below a certain minimum amount, the composition of the proteid material, is of primary importance.† Osborne and Voorhees, who have made a special study of the subject, state that gliadin and glutenin are the two principal wheat proteids and that these two substances form the gluten of the flour.‡ Many attempts have been made to determine the ratio gliadin should bear to glutenin to give the best results for bread-making purposes. The work done in this direction indicates that the gliadin-glutenin ratio varies considerably in wheat grown under similar conditions from year to year and that these differences have been associated with only minor variations in the size of the loaf or general bread-making value of the flour.§ Snyder states that "the results available at the present time indicate that the percentage amount of gliadin (or proteids soluble in 70 per cent. alcohol solution) in a flour is of more importance than the gliadin-glutenin ratio."

In view of the foregoing statements regarding the value of the percentage amount of protein and gliadin in forming an idea of the value of flour for bread-making purposes, a study of the data presented in Table III reveals the fact that, while there are variations in the amount of protein and gliadin in the various samples of flour, there is no decrease in the quantity which would indicate any falling off in the strength of the flour made from the lower grades of wheat. It is also noticeable that the gluten determinations point to the same conclusion.

For the purpose of obtaining fuller information regarding the nature of the protein content of these different flours, they were analysed according to the method proposed by J. S. Chamberlain.¶ The results are as follows:

Table IV:—Showing Per Cent, of Total Nitrogen and Per Cent. of Nitrogen in Form of Gliadin and Glutenin.

Grade.	Total nitrogen.	Salt soluble.	Alcohol soluble.	Alcohol insoluble.	Salt soluble of alcohol insoluble.	Glutenin.	Gliadin.	Per cent. of Glutenin.	Per cent. of Gliadin.
1 H	2.130	.403	1.024	1.106	.133	.973	.754	56.8	43.2
1 H	1.630	.376	.903	.727	.112	.615	.639	49.0	51.0
1 N	2.025	.399	1.197	.828	.091	.737	.889	45.4	54.6
1 N	1.900	.385	1.057	.843	.102	.741	.774	49.0	51.0
1 N	1.925	.563	1.040	.885	.112	.773	.589	56.8	43.2
1 N	1.900	.483	1.041	.859	.134	.725	.692	51.1	48.9
3 N	2.005	.385	.991	1.014	.133	.881	.739	54.4	45.6
4 N	2.025	.459	1.194	.831	.133	.698	.868	44.6	55.4
4 N	2.060	.329	1.159	.901	.137	.764	.967	44.2	55.8

*A. D. Hall, Journal Board of Agriculture, London, pp. 321-333.
†Minn. Agr. Expt. Station, Bulletin 85.
‡Journal of American Chemical Society, Vol. 15, p. 471.
§Journal of American Chemical Society, Vol. 27, No. 9.
¶Proceedings of the 20th Annual Convention of the Association of Official Agricultural Chemists.

While this proposed method may not make a true separation of the gliadin and glutenin nitrogen, it does give a chance to see something of the probable gliadin-glutenin ratio. These results do not indicate that the flour from the lower grades of wheat is inferior to that from the wheat which graded very much higher. According to this method of comparison, wheat graded No. 4 Northern would be considered better than that of any of the preceding samples.

To further test the strength of the different flours, they were submitted to actual baking tests. The baking was done by a thoroughly competent man who used all his skill to bring out the best results from each flour. The plan adopted was as follows: Six pounds of flour was weighted into a mixing pan and sufficient water, containing the salt and yeast, added to make a dough of medium firmness. Half a pound of flour was weighted into a separate dish to be used as required in making and handling the dough. That portion of the flour not required was weighed back, and from the total weight of flour used the yield of bread was calculated. The doughs were kept throughout at a uniform temperature, and the baking done in a large bake oven. In scoring the bread, the best loaf was credited with 100 points, and the others graded to that. Three bakings were made of each flour. The average yield of bread from each flour and the average score of quality for both years will be found in Table V. The color of the bread was taken into consideration in allotting marks for quality:—

Table V:—Showing Yield of Bread from 100 Pounds of Flour and the Quality of the Bread.

Grade.		Yield of Bread per 100 lbs. of Flour.		Quality.	
1903.	1904.	1903.	1904.	1903.	1904.
1 Hard	1 Hard	142.5	154.5	92.0	93.1
1 "	1 "	146.4	151.5	95.0	94.0
1 Northern	1 Northern	146.7	153.4	95 0	94.1
1 "	1 "	144.8	153.9	92.0	96.2
1 "	1 "	140.6	155.2	95.0	96.1
.....	1 "	.....	154.8	.....	98.0
2 Northern	.....	149.2	.....	90.0	.....
3 "	3 Northern	150.3	154.0	100.0	92.2
3 "	.....	146.7	.....	95.0	.....
3 "	.....	154.0	.....	100.0	.....
4 "	4 Northern	153.3	156.8	80.0	90 2
.....	4 "	.....	154.3	.....	90.2

The bread from the 1904 wheat crop was weighed immediately on being taken from the oven, while that from the 1903 crop was weighed twenty-four hours after coming from the oven. This will account to some extent for the smaller yield of bread from the flour of that year.

In the 1904 samples the quickest working dough was that from the first sample of No. 4 Northern. It also made the largest loaf, while that from the first sample of No. 1 Hard was the smallest. This, it will be noticed, corresponds with the strength of the flour as indicated by the gliadin content.

However, strength in flour is not the only point considered by miller and baker. To satisfy his customers the baker must produce a white loaf of bread, and, to do this, he must have white flour. As has been stated, the flour from the wheat graded No. 4 Northern was not equal in this respect to that from the higher grades. No figures were obtained that would bring out the differences in color, excepting that it was considered in allotting marks for quality in the bread. In fact, it was the chief cause for the lower marks given to the bread from the lower grades of wheat.

In general, the work here reported indicates that the milling, chemical and baking tests fail to bring out any very wide difference in the products of the individual lots of wheat studied. In yield of flour and in color of the bread the products of the lower grades are inferior, but in strength, as shown by the chemical analysis and in yield of bread, there appears to be little or no difference.

When we take into consideration the fact that the spread in price between No. 1 Hard and No. 4 Northern may amount to twenty-five or even forty cents per bushel, it would appear as though, in this case, the lower grades would not receive the price to which they were entitled, and, consequently, the farmer producing them would not receive justice. On the other hand, it is only fair to state that, according to our system of grading, many other samples graded down for other causes than being frosted may be much inferior in quality and thus reduce the standard of these lower grades. The price, however, is regulated by the quality of the grade as a whole and it may thus happen that individual lots are not paid for in their just merits.

Ontario Wheats.

Within the last fifteen years, over two hundred varieties of wheats have been grown on the College Experimental plots. Among such a large number of varieties there was a very wide range in the strength of straw, yield of grain, and in the apparent quality of the grain. So far no systematic attempt has been made to study the quality of the flour these different varieties of wheat are capable of producing. Some years ago a small beginning was made at determining their relative milling value, but, because of lack of appliances and pressure of other work, it was not continued. We are still without the necessary machinery to grind and make practical tests of the milling value of small lots of the flour; but it was thought that some very interesting data might be gathered by determining the percentage of total proteids and the amount of alcohol soluble proteids. This has been done with twenty varieties of winter wheats and six varieties of spring wheats. The results are as follows:

Analysis of Some Ontario Wheats.

Spring Varieties.	Total Proteids.	Alcohol soluble Proteids.	Alcohol soluble of total Proteids.
	%	%	%
Medeah	12.04	4.51	37.45
Red Fife	11.57	4.51	38.98
Pringle's Champion	11.46	4.43	38.65
White Russian	11.06	4.11	37.16
Wild Goose	11.79	4.11	34.86
Saxonka	11.84	4.68	39.52

Analysis of Some Ontario Wheats.—Continued.

Winter Varieties.	Total Proteids.	Alcohol soluble Proteids.	Alcohol soluble of total Proteids.
	%	%	%
Dawson's Golden Chaff	12.05	4.47	37.09
American Wonder	11.43	4.39	38.40
Imperial Amber	13.31	5.24	39.36
Turkey Red	11.88	4.51	37.96
No. 6 White	10.99	4.47	40.67
Rudy	12.96	4.91	37.88
Early Red Clawson	11.38	4.67	41.03
Geneva	13.78	5.66	41.08
McPherson	12.81	4.96	38.72
Early Genessee Giant	12.54	4.83	38.51
Bulgarian	13.01	4.76	36.58
Abundance	11.43	4.63	40.50
Superlative	11.44	4.79	41.87
Kentucky Giant	13.03	4.99	38.29
Russian Amber	11.90	4.63	38.90
Treadwell	12.73	4.67	36.68
Tasmania Red	13.74	5.35	38.93
Tuscan Island	13.28	5.07	38.32
Egyptian Amber	12.57	5.03	40.01
No. 5 Red	10.99	4.49	40.85

As the constituents which form gluten comprise the greater part of the proteids, it is evident that a knowledge of the total amount of proteids in a wheat is of considerable value in judging of its merits for milling purposes. In fact, one eminent authority* states that in so far as the chemical examination is concerned, this is the best and the simplest method of valuing the wheat. In our study of the various grades of wheat of the North West crop of 1903†, we found the proteid content of the higher grades was approximately 12 per cent.; consequently, if we were to value these wheats on this basis only, many of the varieties would be equal to the best No. 1 Hard, and that many of the winter varieties were superior to all the spring grown wheats on the list. Again, if we compare these wheats on the basis of the per cent. of alcohol soluble proteids, or gliadin, or on the basis of the percentage of total proteids soluble in alcohol, we find that many of the winter varieties are superior to the spring varieties. Taking the two first columns into consideration, it is evident that, on the basis of the figures here given, Geneva would stand first with Tasmania Red a close second, while Dawson's Golden Chaff or Early Red Clawson would be equal to Turkey Red or Red Fife. However, some other points must be taken into consideration in arriving at definite conclusions regarding the relative value of these wheats. In all cases actual baking tests must form the final basis of comparison and these we cannot make with our present equipment. The above results do, however, give a comparison of the probable strength of the various wheats.

Swamp Soils.

During the last three years we have made quite an extensive chemical examination of swamp soils. It was not, however, felt to be advisable to prepare a bulletin on the matter without first carrying on some practical

*A. D. Hall, Journal Board of Agriculture, London, pp. 321-333.
†College Report, 1904, page 55.

experiments to demonstrate that certain methods of treatment would overcome the natural deficiencies of these soils. Some such experiments have been conducted this past season, which have given good results. It is my intention to prepare a bulletin on this subject at once and embody all the results obtained. In the meantime, at my request, Mr. de Coriolis has prepared the following article dealing with some of the main features of this class of soils:

"In the College Annual Report for the year 1903 there may be found a short article dealing with the question of swamp soils. At the time, as may be noticed, investigation into the nature and characteristics of these soils had just begun, and since then considerable information has been gathered through analytical and experimental work. It is not the intention in this article to take up the question at all extensively—this being left for a further publication—but merely to outline the work that has been done, and the general conclusions arrived at.

"One of the first points to be considered is the origin and formation of swamp soils. As the name indicates, they are formed in places where, through lack of drainage, water has accumulated, forming a swamp, in which a certain class of vegetation has started, and large amounts of organic matter in a partially decayed condition have been stored. This may have gone on for a large number of years, and even centuries, the amount of organic matter stored depending upon the age of the swamp. Such swamps occur almost anywhere in the Province of Ontario, every square mile or so of land having some portion of its area under water. With the growth of intensive farming and the increase in value of land, it has become necessary to clear up these hitherto unused tracks of land for purposes of cultivation. In this way a large number of farmers are to-day reclaiming their swamp soils. This number is increasing every year to such an extent that investigation into their nature and characteristics has been rendered necessary, in order to be able to answer the many questions received by the department on this subject. Besides the ordinary so-called swamp soils, there is also another class of soils which have been formed in more or less the same way, and which for all practical purposes may be dealt with as belonging to the same class; these are the muck soils left by the clearing of forests. As the first, they are formed by the accumulation of organic matter through a number of years or centuries, the differenece being in the nature of the vegetable growth from which the organic matter was derived. The final result is practically the same, however, namely, land covered by a layer, variable in thickness, of organic matter in a more or less advanced stage of decomposition.

"What, therefore, may be expected to be the composition of such soils? Evidently a large quantity of compounds of carbon may be looked for, and especially those in which carbon is in combination with nitrogen. Analysis proves this expectation to be true, and one of the characteristic features of swamp soils is the comparatively large amount of the valuable element, nitrogen—in the combined form— which they contain. Out of forty odd samples analysed here, one contained as high as 2.59 per cent. of nitrogen, while most of them ranged between 1.5 and 2.0 per cent. An ordinary loamy soil in a good state of cultivation seldom contains more than .3 per cent. of nitrogen. Of course, these figures represent the total amount of nitrogen, both organic and inorganic, contained in the soil. The form of combination in which this element exists in swamp soils is, to a certain extent, quite different from that of ordinary farm soils, and the question of the availability of this substance to plants is another important factor to be

considered. This question will be taken up later. While discussing the nitrogen content of soils it might be advisable to bring in the question of humus. To a great number of people humus means the organic matter of soils, and it also carries with it the idea of large amount of nitrogen. As a fact, all the organic matter of soils is not humus, nor is humus all the organic matter that a soil contains. To wit, the following analyses: Sample No. 17, organic matter, 66.57 per cent., humus, 21.78 per cent.; Sample No. 22, organic matter, 73.03 per cent., humus, 21.06 per cent.; Sample No. 5, organic matter, 28.64 per cent., humus, 13.94 per cent., and so on. This shows that only a portion, and not even a definite nor constant one, of the total organic matter of soils is humus. An explanation of this term, from a chemical standpoint, will, perhaps, help in understanding the above facts. Humus is a collective term employed to designate a group of substances found in soils, which substances are brought into solution when the soil is treated for hours with a 4 per cent. solution of ammonia. The composition of these substances (humic acid, humin, ulmun, ulmic acid, etc.), has been studied, and formulae have been assigned to them, but these may be considered more or less speculative, and, as a fact, are too indefinite to be depended upon. One important point to be noticed is that only a few of these substances contain the element nitrogen in combination with carbon, oxygen, and hydrogen, while most of them contain only the last three named elements. This, therefore, proves the fallacy of associating the idea of a large percentage of nitrogen with a large content of humus in soils. These different substances, known as humus, are the products of the decomposition of organic matter in the soil, products by no means final, as further decomposition will break them up again into simpler substances. There is, however, a certain connection between the ideas of humus and nitrogen. In the different transformations that are undergone by the compounds of nitrogen in soils, the soluble and volatile substance ammonia is very often formed, and it may easily pass out of the soil by washing. If, however, humus is present, it will readily combine with the free ammonia to form compounds less soluble in water, and, therefore, will help to retain and preserve nitrogen in the soil.

"As to the amount of inorganic matter contained in swamp soils, it is altogether a very variable quantity, depending upon how much sand and clay have got mixed with the surface accumulation of decayed vegetable matter. Although not a very important point in itself, it is worthy of consideration when discussing the amount of mineral matter which the swamp soil contains.

"This brings us next to the consideration of potash and phosphoric acid in these soils. These two substances, which, with nitrogen, form three important factors in studying the fertility of soils, are of mineral origin. They cannot, therefore, be expected in large quantities in soils where organic matter predominates. Analysis, however, reveals their presence in fair quantities, although occasionally a soil will show quite a deficiency in potash.

"The following figures may be taken as representing the average percentage of potash and phosphoric acid in swamp soils:

	No. 1	No. 2.	No. 3.	No. 4.	No. 5.
Potash	.349	.374	.531	.188	.483
Phosphoric acid	.378	.543	.299	.297	.255

"As may be seen by these figures, there is a sufficient amount of the two mineral constituents to provide for many crops. But it should be stated that, with the exception of No. 4, these soils are practically virgin, not having been under cultivation for any appreciable time. Both potash and phosphoric acid are low in No. 4, especially potash. This soil has been under cultivation for quite a number of years, and has never produced good crops. The difference in these figures are worthy of attention. As has just been stated, potash and phosphoric acid are primarily of mineral origin, and the maintenance of these substances in soils can only take place through the agency of minerals. In a clay of loamy soil minerals exist which, by gradual disintegration through the various weathering actions going on in the soil, keep up the supply necessary to the plants. The same does not, however, take place in swamp soils. Although these may contain fair amounts of potash and phosphoric acid when they are in the virgin state, the supply soon gets exhausted, because, owing to the very nature of the soil, the minerals that are the natural sources of these constituents to plants do not exist in them. Consequently when a swamp soil is reclaimed for cultivation we may expect that in a comparatively short time there will be very little potash and phosphoric acid left, and this is clearly illustrated by comparing the figures from soil No. 4 with those of the other soils. But the falling off in mineral matter as cultivation goes on is still more accentuated by the increase in organic matter. Cultivation brings into an available state the large stores of nitrogen present in the swamp soils, with the consequence that the balance between the nitrogen, on the one hand, and the mineral constituents, on the other, gets more and more upset. Such conditions soon tell upon the crops, and the result is a rank, weak growth of straw, which easily lodges, and poor, unfilled heads of immature grain. It is a proven fact that potash is essential to the growing of a strong standing straw, and that grain cannot mature without a good supply of phosphoric acid. Nitrogen, on the other hand, stimulates rank growth, so that with a small supply of mineral matter, and a large supply of nitrogen, proper growth and maturity cannot take place.

"Experiments have been conducted for the purpose of testing the effect on the growth of crops of adding potash and phosphoric acid to swamp soils. Plots have been measured off side by side, some treated with various amounts of potash and phosphoric acid separately, others with various amounts of the two combined, and still others left untreated. In all cases the effects were quite distinct, the potash particularly giving good results, even to doubling the yield from the unfertilized plot. One farmer who was doing co-operative work with the department in this experiment stated that he could see the difference in the plots a quarter of a mile away, the fertilized plot unmistakably showing to a better advantage with strong, healthy straw, and good, matured grains. This, therefore, may be said conclusively regarding swamp soils, that they have abundance of nitrogen, but that they need the addition of mineral matter to produce good crops.

"The problem of the proper treatment of these soils does not, however, stop here. Increasing the supply of potash and phosphoric acid is not going to transform them into the best productive land. There is another important factor which must be considered before all is said on the subject. Together with a lack of the two constituents before mentioned, we also have a deficiency in lime. Although this substance is not one of the most necessary to the growth of plants, its effects in the controlling of other conditions is too important to be neglected. The large amount of organic substances in swamp soils, when decomposed, causes a production of organic acids,

which are injurious to plants. Unless these acids find a base to combine with, they will cause sourness of the land, and check growth. Lime is the base with which these acids combine readily to form salts, which have no effects upon plants. The presence of a ready amount of lime in these soils is, therefore, important, and the addition of small quantities of lime will often give good results."

Sugar Beet Industry.

Under instructions from the Minister of Agriculture, this department conducted extensive experiments during the summers of 1900, 1901 and 1902 to ascertain whether sugar beets could be grown profitably in this Province. In 1900 these experiments were placed in the neighborhoods of Welland, Newmarket and Aylmer; in 1901, around Alvinston, Belleville, Berlin, Cayuga, Clinton, Dunnville, Lindsay, London, Mount Forest, Port Perry, Peterborough, Simcoe, Waterford, Walkerton, and Whitby; and in 1902, near Brantford, Brussels, Guelph, Markham, Orangeville and St. Catharines. In each district there were from 25 to 50 experimenters, and each experimental plot consisted of one-quarter acre. The yield per acre of beets of a very high quality could be grown in Ontario. A full report of this work may be found in Bulletin No. 113, Ontario Agricultural College, or in the Reports of Sugar Beet Experiments in Ontario, 1901 and 1902, issued by the Department of Agriculture, Toronto.

Prior to and during the time of this experimental work, there was considerable agitation for the establishment of the sugar beet industry in Ontario. In April, 1901, the Provincial Legislative Assembly set aside a sum of money for the purpose of encouraging the growth of sugar beets, and the establishment of factories within the Province for the manufacture of refined sugar. By the provisions of the Act the manufacturer was to receive a bonus of one-half cent per pound for all first-class marketable sugar produced during the first and second years' operations of the factory, and at the rate of one-quarter cent per pound for the product of the third year, and nothing for any year thereafter. The Dominion Government also assisted by allowing machinery for the sugar factories to be imported free of duty. Under these favorable conditions Ontario and Michigan capitalists saw their way clear to invest money in the new enterprise and by the fall of 1902 four companies had erected factories and were prepared to slice beets. These companies were, The Dresden Sugar Co., Dresden; The Wallaceburg Sugar Co., Wallaceburg; The Ontario Sugar Co., Berlin; and the Wiarton Beet Sugar Co., Wiarton. The factories of the first three named companies were capable of working 600 tons of beets per day, while the Wiarton factory was of 400 tons capacity. The first year there was about fifteen million pounds of sugar produced. The amount made at each factory was as follows:

Ontario Sugar Co.	6,063,926 lbs.
Wallaceburg Sugar Co.	3,606,604 "
Dresden Sugar Co.	3,763,987 "
Wiarton Beet Sugar Co.	1,565,000 "

For various reasons the first year many farmers and others signed contracts for a greater acreage than there was available labor to look after. This, together with the fact that in many cases the beets were grown on land unprepared for the purpose, will account for many of the unsatisfactory results of that season.

In 1903 nearly as many pounds of sugar were made as in the previous campaign, each of the factories contributing the following amounts:

Ontario Sugar Co.	7,059,695 lbs.
Wallaceburg Sugar Co.	4,230,422 "
Dresden Sugar Co.	2,094,999 "
Wiarton Beet Sugar Co.	981,000 "

During the summer of 1904 the Dresden factory was removed to the State of Wisconsin and, because of financial difficulties, the Wiarton Beet Sugar Co. suspended operations, consequently, there were only two factories operating in the fall of 1904. Their make was as follows:

Ontario Sugar Co.	7,260,637 lbs.
Wallaceburg Sugar Co.	7,574,704 "

The present campaign, now nearly completed, has been a very satisfactory one for both the companies. The Ontario Sugar Co. report that the number of beet growers for their factory has gradually increased from 800 the first year to over 1,900 this year. Their total acreage for this campaign was slightly over 4,500 by actual measurement, which was about 300 acres more than their contracts called for. The average yield per acre of the beets delivered at this factory in 1904 was 9.1 tons. This year when the beets were practically all in the company stated that their average yield would not be less than 10.7 tons per acre, and that their make of sugar will probably exceed 10,000,000 lbs.

The Wallaceburg Sugar Co. state that they have over 1,300 growers and an estimated acreage of a little more than 6,200 acres. The wet weather in the early part of the season seriously affected the stand of plants on the low lying land in the Wallaceburg section, and, consequently, the yield per acre is not as large as was hoped for. However, writing within 10 or 12 days of the end of the campaign, the company state "Our cut will be in the neighborhood of 52,000 tons and our output of sugar about 12,000,000 lbs." When I visited this factory the latter part of October, the beets pouring into the sheds by railroad, river scows, and wagons were testing about 14 per cent. of sugar. Last year the average percentage of sugar in the beets delivered at this factory during the whole season was a little over 15. At the Berlin factory, the average percentage of sugar was a little under 15 last year and a little over that amount this year. When the Government decided to give a bonus on sugar it was stipulated that after the first year beets grown according to contract were to be paid for at the rate of 33 1-3 cents per ton for every one per cent. of sugar which such beets contain. Therefore, beets containing 15 per cent. of sugar are worth $5.00 per ton, and, taking this year's average of both sugar content and yield per acre of the beets delivered at the Berlin factory we find that the crop was worth about $53.50 per acre. It is needless to say some growers received more than twice this amount per acre for their crop, and that there are always some careless growers who will fall very much below this average.

Farmers have been quick to learn that a small acreage well cared for was much more profitable than a larger acreage poorly cultivated. Reference to the figures already quoted shows that the Ontario Sugar Co. had nearly 1,900 growers this year and that their total acreage was about 4,500, an average of a little less than 2.5 acres per grower. At the Wallaceburg factory, over 80 per cent. of the growers grew 5 acres or less. Naturally, this must mean that the beets for the factories were gathered from very wide areas. The 1,900 growers for the Ontario Sugar Co. were scattered over the following 18 counties: Bruce, Grey, Huron, Perth, Middlesex, Oxford,

Waterloo, Brant, Haldimand, Lincoln, Wentworth, Wellington, Halton, Peel, York, Simcoe, Ontario, and Durham. Nearly 1,600 carloads of beets were received at the factory from 140 shipping points over this area and upwards of 18,400 tons were delivered by wagons. The beets for the Wallaceburg factory were grown principally in the counties of Kent, Lambton, Essex, Elgin, Middlesex, and Norfolk. Comparatively little is now heard from the growers about the labor question. They have learned to grow an acreage which they can handle with the help they have on the farm and find it a good money making crop. It is also evident that the farmers in the district surrounding the factories are not the only ones benefited.

Regarding the disposal of the sugar beet pulp. The common practice is to allow the grower to have pulp to the extent of 50 per cent. of the weight of the beets delivered. At Berlin very little of the pulp was taken for stock feeding purposes the first year. The second year a very large amount, practically the whole of it, was fed. Last year all the pulp was taken away. Those who did not wish to use their share found ready purchasers among the other growers at 50 cents per ton. This year the demand from growers and others altogether exceeds the supply. All kinds of live stock seem to do well on it, and many old feeders freely state that they prefer it to turnips. Unfortunately the farmers in the Wallaceburg district do not appreciate the value of the pulp, and practically the whole of this valuable food is allowed to go to waste.

Another point worthy of mention in connection with the growing of sugar beets is that the cultivation of the beets leaves the ground in excellent condition for succeeding crops. The thorough cultivation given the soil holds all weeds in check in the early part of the season, and the big development of leaves entirely covers the ground until time of harvesting in the late fall, thus effectually preventing the growth of weeds or the ripening of seed. Altogether, I think it has been clearly demonstrated that even under the present condition of the labor market, and with the present prices of beets, the sugar beet crop is a profitable one for the farmer. Furthermore, I believe that with the knowledge that may be gained from year to year regarding the preparation of the land and the cultivation of the beets, it can be made even more profitable, and that the high grade of cultivation required to grow the best beets will have a decided beneficial influence on agriculture in general.

In addition to the beets grown under contract for the Ontario factories, a large number of tons are each year exported to be worked up in Michigan factories. According to Mr. D. A. Gordon, M.P., there will be about 20,000 tons of sugar beets shipped into United States this year. It seems that before the establishment of the home factories many farmers in the border counties grew beets for some of the Michigan companies. Whether these farmers are bound by long contracts, or are doing it through choice, the fact remains that a large amount of this raw material is still going out of the country.

The two above-named companies, operating at Wallaceburg and Berlin, have the only sugar factories manufacturing sugar from sugar beets in Ontario this season. The Wiarton factory has been sold to the Keystone Sugar Company, who intend moving it to Whitby this coming season, and hope to be in a position to operate it next fall. The Keystone Sugar Co. has been lately organized with an authorized capital of $400,000, and has purchased the Whitby Harbor Company's property. This location has been chosen because it is in a good farming district, and for its excellent shipping facilities. Their intention is to manufacture sugar from beets, to refine im-

ported raw sugar, and to work up the by-products into alcohol, vinegar, stock foods, fertilizers, etc.*

Test of Different Varieties of Sugar Beets.

For five years we have determined the percentage of sugar in all the varieties of sugar beets grown on the experimental plots at the College. Some of these varieties are of the large growing kinds commonly used for feeding cattle; others are of the type grown for sugar factory purposes. The seed of the latter varieties was procured from the best known seed dealers. The beets were grown on the level in rows 21 inches apart, and thinned so as to leave the plants 8 inches apart in the row. The object of making the chemical analysis was to ascertain the difference in the sugar content of the various varieties of sugar beets grown for cattle feed, and to compare some of the newer German varieties with the Kleinwanzlebener, the variety now commonly grown for sugar factory purposes in this Province.

Percentage of Sugar and Purity of Juice of Different Varieties of Sugar Beets.

Name.	Average weight of beets.	Per cent. of tare.	1905.			Average of five years.	
			Solids.	Sugar.	Purity.	Sugar.	Purity.
	ozs.						
New Danish Improved	25.9	13.1	13.8	11.1	80.5	11.1	81.0
Red Top	24.1	13.5	14.8	11.6	78.5	11.2	80.9
Royal Giant	22.5	4.6	12.8	10.3	80.5	10.2	81.3
Giant Rose Feeding	22.0	14.0	13.8	12.5	90.8	13.0	87.8
Giant White Feeding	27.7	5.8	10.0	6.8	67.7	8.1	72.4
White Silesian	21.0	14.7	16.2	13.2	81.6	13.7	82.5
Red Skinned	21.1	13.2	13.4	11.1	82.9	11.9	83.3
Green Top White	26.2	15.3	15.6	12.7	81.6	13.1	83.0
Lane's Improved	22.7	7.9	14.6	12.0	82.4	12.5	83.2
Champion	19.6	9.1	18.1	15.9	87.7	15.7	85.9
Kleinwanzlebener	17.3	15.1	18.8	16.2	86.4	16.6	87.3
French Yellow	17.6	14.2	14.0	11.0	78.7	12.0	81.2
Pitschekes Elite	18.1	9.9	17.2	15.3	89.0	15.9	89.0
Improved Imperial	19.7	13.2	19.9	16.8	84.2	16.8	86.8
						Average of four years.	
Mangel Sugar Beet	20.3	19.2	18.8	16.3	87.0	16.7	86.6
Tankard Cream	28.2	12.0	10.8	8.1	75.1	8.6	75.9
Jaensch's Victrix	18.0	10.0	18.1	14.9	82.3	16.0	85.5
Rubensamen (Rimpan)	16.2	10.8	19.5	16.9	86.7	17.3	88.1
White French						12.3	82.9
Carter's Nursery						13.4	83.4
Queen of the Danes						11.7	82.0
Jersey						12.9	86.6
Imperial Grey Top						15.6	86.7
Vilmorin's French Sugar						15.6	86.7
						Average of three years.	
Rennie's Giant Sugar	26.2	7.2	12.2	9.5	77.9	10.3	79.0
Hybrid Sugar Beet Mangel	32.2	9.3	11.9	9.5	79.5	10.5	79.9
Imperial Giant Half Sugar	22.8	7.6	13.3	10.3	77.6	10.6	78.5
Ideal						7.6	70.9
Diechman No. 1						16.8	86.2
" " 2						17.1	87.5
" " 3						16.7	86.4
Braune	16.3	11.6	17.5	16.6	94.9		

*The only other beet sugar factory in Canada is located at Raymond, in Southern Alberta. It was operated for the first time in 1905. A recent letter to the Department from a correspondent at Lethbridge, Alberta, contains the following note:—"4 January, 1906. The Raymond factory, situated about 18 miles from here, sliced 18,000 tons of beets this season, yielding 4,622,900 lbs. of sugar, or something over 256 lbs. of sugar per ton of beets."

The beets were slightly larger than last year, and the percentage of sugar in the juice and the purity of the juice were a little lower than the average of the five years. Of the large growing varieties the Giant White Feeding and the Tankard Cream gave the largest beets and the smallest amount of sugar, which would indicate that these varieties were of a more watery nature than such varieties as White Silesian, Green Top White, New Danish Improved, etc., and, consequently, of less feeding value. Among the varieties comparable with the Kleinwanzlebener, it is evident that the Improved Imperial, Rubensamen, and Mangel Sugar Beet are the equal in both sugar and purity of this well-known variety. The results of this five years' study would indicate that these varieties would give as good results in the factory as the Kleinwanzlebener. The yields in tons per acre are given in the report of the Experimental department, which forms Part XIII. of this report.

Quality of Sugar Beets as Affected by the Distance Between the Rows.

This experiment has been carried on for four years in succession. The beets were grown by the Experimental Department on soil of uniform condition in rows 12, 14, 16, 18, 20, 22, 24, 26, and 28 inches apart, and, in all cases, thinned so as to leave a plant every 8 inches along the row. A duplicate set of the plots were sown each year, and two set of samples were selected from each plot. Thus each year's results are the average of four sets of samples for each of the different distances apart of the rows. The object of the experiment was to determine what effect growing beets in rows various distances apart has on the yield and percentage of sugar and purity of the juice.

Percentage of Sugar and Purity of Juice of Beets Grown in Rows Different Distances Apart.

Space between rows in inches.	1905. Average weight of tared beets.	1905. Analysis of Juice. Solids.	Sugar.	Purity.	Average results of Four Years' Analyses. Average weight of tared beets.	Solids.	Sugar.	Purity.
12	10.9	21.1	17.5	82.9	10.3	20.0	17.1	85.4
14	12.6	21.0	18.4	87.3	11.6	19.9	17.5	88.0
16	16.3	19.8	16.8	85.0	14.1	19.5	16.8	86.9
18	15.3	19.4	17.0	88.0	13.5	19.2	16.9	88.0
20	16.9	20.9	17.8	85.3	14.7	19.9	17.4	87.3
22	16.4	19.9	16.9	84.9	15.4	19.3	16.7	86.9
24	20.8	20.3	17.7	87.0	17 8	19.6	17.1	87.4
26	22.5	19.3	18.0	92.8	18.7	19.0	17.2	90.1
28	22.5	19.8	17.1	86.0	19.0	19.2	16.7	86.3

Throughout the whole of the experiment, when beets were collected for analysis, samples were taken from all the plots the same day in order that uniformity of weather conditions might be preserved. Both this year's experiment and the average of the four years' work, shows there is a regular increase in the weight of the tared beet as the distance between the rows is increased. There is, however, no corresponding falling off in quality. The differences in the percentages of sugar and purity are so slight that it may

be said that when there is a full stand of beets the distance between the rows has no influence on the quality. Reference to the table giving yield of beets from the different plots, which may be found in Prof. Zavitz's report, shows that the yields decreased as the distance between the rows was increased. It is evident that the closer the rows are grown together the larger will be the yield, and, consequently, the gross receipts from the field. However, the extra expense involved in cultivating beets in rows the minimum distance apart may offset the increased yield. With the implements now at the disposal of the sugar beet grower, it is possible to conveniently cultivate between rows 18 or 20 inches apart, and this is the spacing usually recommended by those interested in the production of beets for sugar factory purposes. If the proper cultivators are not to be used the rows may be placed farther apart, and, provided the full stand of beets is secured, the quality may be as good, but the yield will be less.

Fertilizers on Sugar Beets.

With the object of ascertaining the effect of fertilizers on the sugar beet crop, I placed seven experiments with farmers growing sugar beets for the Berlin factory. In each experiment there were two one-acre plots. One was fertilized with a small amount of nitrate of soda and fairly large quantities of sulphate of potash and superphosphate. In every case the experimenters report a quicker start, enabling them to thin about three days sooner, but that, later in the season, there was very little apparent difference. However, the reports received up to date show from one-half to one per cent. increase in percentage of sugar, and a larger yield of beets on the fertilized plots. As the full returns have not been received a complete report cannot be made this year. In connection with this work I wish to thank Dr. Shuttleworth, Agriculturist for the Ontario Sugar Co., for the trouble he has taken in arranging to have the beets from these plots weighed and tested separately when delivered at the factory. I hope to continue the work, and trust that full report of two years' work may be made next year.

UNCOMPLETED WORK.

Lodged Grain.

On a considerable number of farms throughout Ontario the soil appears to be getting too rich in nitrogen, or, the constituents of plant food are getting out of a proper balance, and it seems to be impossible to grow oats without the greater part of the crop lodging. This causes increased labor in the harvesting and the production of a poor crop of light grain. For some years past the oats on the College farm have lodged badly, and this season an attempt was made to counteract this tendency by adding abundance of the ash constituents. These fertilizers were applied to the lower parts of the fields where the grain was most likely to lodge; but, unfortunately, owing to the wet season, these places were partially drowned out and thus spoiled the experiment. It is the intention to follow up this subject to see if a proper balance cannot be brought about between the various constituents to produce a normal growth.

On some of the larger plots of oats grown by the Experimental Department, the straw lodged badly. Samples of the grain and straw from the lodged and standing portions of the crop of Joanette and Siberian Oats and of the soil from the two parts of each of the plots were taken for analyses. The following table gives the composition of the four samples of soil:

Composition of the Soil on which the Standing and Lodged Grain grew.

Constituent.	Joanette soil standing.	Joanette soil lodged.	Siberian soil standing.	Siberian soil lodged.
Moisture	1.45	2.04	1.25	1.97
Organic and Volatile	6.87	8.2	8.7	8.17
Insoluble Residue	76.6	77.7	70.7	76.4
Iron and Aluminum oxides (Fe_2O_2, Al_2O_3)	9.13	8.67	8.27	8.70
Lime (CaO)	2.56	.901	3.99	1.95
Magnesia (MgO)	.87	.31	1.01	.44
Phosphoric Acid (P_2O_5)	.430	.455	.425	.397
Potash (K_2O)	.485	.512	.487	.506
Nitrogen	.097	.258	.125	.23
Humus	1.69	2.13	2.64	3.06

It is evident that the portion of both the Joanette and Siberian plots on which the grain lodged, contained the least lime and the most nitrogen. The percentage of potash and phosphoric acid are about the same on both parts of the plots. As nitrogen tends to force leaf and stem growth, the presence of so much more nitrogen in one part of the plot doubtless explains the cause of the grain lodging. The full data regarding the total yield of straw and grain and the distribution of the ash constituents and nitrogen in the grain and straw have not been gathered yet; but we hope to complete this work and repeat it another year in order that we may have some definite data regarding the loss in yield of grain and the distribution of the various fertilizing constituents when grain lodges.

Breakfast Foods.

In recent years a great variety of breakfast foods have been placed on the market. These may be divided into two classes: First, the ordinary wheat products and the granulated and rolled oats; and, second, the prepared or so-called predigested breakfast foods of the "Force," "Orange Meat" and "Norka" types. These latter foods have been very much advertised and many sensational claims made for them. We have commenced a study of these food substances to ascertain their chemical composition and the amount the human system will absorb from the various types of these foods as determined by actual digestion experiments. We are also determining the effect of short and long periods of cooking on the digestibility of the first class of foods. The practical work of the digestion experiments has been completed and some of the analyses made, and it is hoped that the work will be ready for publication some time during the coming year.

Respectfully submitted,

R. HARCOURT.

THE LECTURER IN CHEMISTRY.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith my Fourth Annual Report.

The nature and scope of the work in Elementary Chemistry are indicated in the College Circular, and have been referred to in previous reports, and, therefore, require no extended notice here.

Permit me, however, to mention one branch of the work to which I have devoted considerable attention during the past session, namely, the subject of Animal Nutrition. It is a well recognized fact in many of the American Institutions similar to our own that this line of work is of paramount importance to the practical agriculturist. Many experiments have been conducted by practical feeders for the purpose of estimating the relative costs of production, but invariably we find that the weight of an animal is no true index of the gains which he has made. This fact has been emphasized very forcibly by Armsby's experiments, in which he has demonstrated that the live weight of an animal may vary within the limits of 25 to 50 pounds in a single day. Such facts render it necessary that the course given in Animal Nutrition be planned for the purpose of giving our students some scientific knowledge of the *principles* which underlie the feeding of live stock. I have tried to do this. The question of the desirability of having a balanced ration is carefully discussed in the class-room. The value of condimental foods and stock foods is taken up in detail, and the lectures are supplemented by a series of experiments carefully planned for the laboratory.

The work with the advanced Dairy Class is also an important part of the teaching. I am pleased to be able to report that this work has been much appreciated by our advanced students.

The conduct of the student body in the class-room has been excellent, and I am pleased to say that the eager interest of our students in their studies has been a great source of satisfaction to me.

INVESTIGATIONS UNDERTAKEN.

The most important line of investigation to which I am devoting my attention is the question of the digestibility and relative food values of the different forms of cattle foods. Our equipment for carrying on this line of work is inadquate, but we hope that the results obtained may demonstrate the necessity of a moral liberal grant for this line of investigation.

The second line of investigation upon which I am engaged is the analysis of the ash of our farm crops,—cereals, legumes, and tubers. The object of this work is twofold: first, to compare the different methods which have been suggested; and second, to study the distribution of the ash in the leaves, stems, and grains of our farm crops.

THE EFFECT OF DIFFERENT SOILS UPON THE COMPOSITION OF CROPS.

In selecting this subject for investigation, it was my purpose to choose one that would have a practical bearing on the study of agriculture. The subject selected is a comparison of the composition of two crops; one of

which was grown in pots filled with surface soil, the other grown under normal conditions upon a field plot. The mineral constituents alone are taken into consideration in the analysis. In looking up some references, one notices that very few experiments have been conducted to ascertain the amount of mineral matter that is taken up by the plant roots from the sub-soil. Do plants obtain all their supply of mineral matter from the sub-soil? In making a comparison of the results obtained, these questions may be partially answered. It would be to step aside from the right method, however, to draw any definite conclusions from the results of a single investigation. Nevertheless, the results obtained may be of value as affording a starting point for a number of experiments designed to determine the amounts of mineral matter which plants contain that have been grown under certain conditions and after sufficient corroboration the investigator may speak with authority.

The amount of mineral matter used by various crops is not of minor importance as we shall notice in our study of the oat plant. Phosphoric acid and potash are considered two of the most important constituents of plant growth. What proportion of these ingredients do we find in the grain, and what proportion is contained in the straw? In selling grain what amount of fertilizing constituents are we removing from the soil, and how much will have to be returned to the farm in order that its fertility may not diminish? These important questions always confront the farmer and they can be answered correctly only when the exact composition of the crop is known. Thus, the analysis made is important, not only from the standpoint of comparison, but also in that it reveals with some degree of accuracy the amount of mineral matter that is required by a crop during growth.

Many of the questions relating to the composition of crops have been worked out after years of careful research. There are, however, many problems that remain to be solved. When we inquire as to what extent the composition of the crop is affected by the soil upon which it is grown, but very unsatisfactory data can be procured in answer to our inquiry. This should not astonish us, however, when we consider the vast field of science that has yet to be explored, the comparatively small area that has been as yet covered. Experiment stations in this Province are but beginning their work. The oldest private experiment station in Great Britain, founded by Sir John B. Lawes, records its first work in the year 1834. In Germany a Government station was established about 1850. In the United States these stations are still in their infancy, but during the last few years the work has been developing rapidly until at the present time we find that many investigations are being conducted.

In regard to the question mentioned in the preceding paragraph we find from the results of analyses already tabulated that there is considerable variation in the composition of farm crops. Soils contain varying amounts of the ingredients used by plants. In one soil the food may be in a soluble form and can thus be readily assimilated by the plant, while in another soil this food is in such a condition that it cannot be utilized. The season may also have some effect upon the mineral composition of the plant. Lawes and Gilbert found in their experiments that in the case of potash, there was a higher proportion of that substance in the better seasons, while with phosphoric acid lower amounts were found in the better seasons. There are many influences that may cause a variation in the composition of the gain, therefore we see the necessity for careful work in order that proper conclusions may be reached.

*In an article entitled "The ash constituents of plants; their estimation and their importance to Agricultural Chemistry and Agriculture," Dr. B. Tollens brings out some very important points in regard to variation in the amount and composition of ash. Among the factors which influence the variation in the composition of vegetable materials the following are noted: 1. The stage of growth. 2. The soil. 3. The fertilizers. 4. The available moisture. 5. The thickness of stand.

By the use of reliable data the author proves that all the above factors affect appreciably the composition of the ash. Plants analysed at different periods of growth show a marked variation in their mineral constituents. In soils of different compositions, quite different amounts of the various ingredients are at the disposal of plants. It is shown that plants grown in lime soils contain much more lime than those grown in soils originating from sand stone. In regard to the effect of fertilizers upon the composition of the plant, an experiment conducted by Lawes and Gilbert proves conclusively that the addition of potassic manures increases the amount of potash in the plant, Thin seeding and an abundant supply of moisture increases materially the ash content of plants.

Dr. Tollens also discusses the relation of the ash of plants to the fertilizing ingredients of the soil. Some investigators claim that the mineral composition of plants is a fair criterion of the composition of the soil. The propriety of judging a soil by the results of ash analyses of plants grown therein is, however, not settled.

In the investigation undertaken by me, the crop used for analysis was oats. The first sample used was one of several lots grown in cans in the open under natural conditions with the exception of the water supply. Water was poured over the surface of the soil in the cans at regular intervals throughout the growing season. The cans in which this sample of grain was grown were one foot in diameter and three feet deep, containing 2.3 cubic feet of soil. A pan nine inches deep was placed beneath the cans, and filled from time to time with water in order to keep the crop supplied with moisture. The soil used was taken from the surface nine inches of the Experimental Plots. It was placed in the cans in such a manner as to conform as nearly as possible to the soil in the field. The rain was allowed to fall upon the crop as under ordinary conditions. The seed was sown on May 7th and the crop was harvested on August 9th, the season of growth covering in all a period of ninety-three days. The seeds and stems were gathered separately, air-dried, and placed in jars ready for analysis.

The second sample was one of several lots grown upon the Experimental plots, under natural conditions, the soil being the same as that used in the pot experiment. The crop was grown in the season of 1902. The seed was sown on May 7th and the grain was harvested on August 7th, the total season covering a period of ninety-one days. The seeds and stems were gathered separately, air-dried, and placed in jars similar to the pot grown sample. The total yield of straw was 1.95 tons per acre. The total yield of grain was 55.50 bushels per acre.

The total ash of each sample was determined by the new method recently introduced by Dr. Shuttleworth. This method differs from the official method of the A. A. A. C. in that the ash is burned at a high temperature within a closed platinum dish, air from a gasometer being admitted through a small tube to the inside. Thus any volatile substances are prevented from passing off into the air during the process of incineration. A comparison of

* (U. S. Expt. St. Record, 1901.)

these methods has shown that a higher percentage of ash is obtained by following the improved method. In burning the straw and grain by the improved method, a higher percentage of phosphoric acid and potash is obtained. These two substances are quite volatile and therefore when the ash is burned by the old method a considerable portion passes off into the air.

In discussing this investigation, the results have been placed in a number of small tables in order to facilitate frequent reference. The percentage of each constituent obtained from the field sample is compared directly with the percentage obtained from the pot-grown grain. Where possible Warington's results have also been inserted for comparison. In the course of the discussion some facts will be noted in connection with the proportion of the important constituents found in the straw as compared with the amount found in the grain.

Percentage of Ash.

	Field Grown.	Pot Grown.	Warington.
In grain	3.4	4.3	3.1
In straw	6.9	7.5	5.9

Consulting the above table, we notice that the amount of ash in the pot-grown samples is somewhat higher than the amount determined in the grain and straw from the field plots. What reason can be given to account for this difference? It has already been stated that the plants grown in the pots received, throughout the entire season, a continuous supply of water. On the other hand, the precipitation upon the field plots was comparatively low during the month of May, but was fairly high during June and July. In the second place the soil in the cans was exposed much more to the heat of the sun than the sub-soil of the field plots, and therefore more of the mineral constituents would be converted into an available form ready for immediate use. The roots of the plants which were grown upon the field plots would no doubt penetrate a considerable distance in the sub-soil. Here the supply of mineral salts is being made slowly available, and the plant has not that full and continuous supply as is probably the case with plants grown in cans. The pot grown plants would no doubt develop a more fibrous root system, and thus be able to gather from all parts of the soil the available salts present.

Taking these facts into consideration we should naturally expect to find the pot-grown plants more luxuriant than those growing in the field. One writer (Storer) states that vigorous, luxuriant plants usually contain a larger percentage of ash ingredients than those of scantier growth. Reasoning, then, from this point of view, we cannot account for the higher percentage of ash in the pot-grown samples. Comparing these results with those obtained by Warington we notice that in each case there is a higher percentage of ash. In each of the three groups given above there is a perceptible difference in the amount of ash found in the grain as compared with that in the straw.

Percentage of Silica, SiO_2.

	Field Grown.	Pot Grown.	Warington.
In ash of grain	8.66	10.8	39.0
In ash of straw	17.2	20.5	46.0

In this table we notice that the pot-grown samples contain a much higher percentage of silica than the field-grown samples. The pot-grown oats contain a slightly higher percentage of silica in the grain than in the straw, while in the field-grown oats there is double the amount of silica in the straw to that found in the grain. The results obtained in the two lots are somewhat lower than the amount obtained by Warington. *One authority states that there is no suggestion either of limit or regularity, as to the amount of silica that plants may take in. Ashes have sometimes been found to contain more than seventy per cent. of silica, while in other instances only traces of this substance could be found. There are numerous plants which appear to have no real use for the large quantities of silica which are commonly found in them. Experiments made by Wolff by way of water culture and continued through several years, go to show that silica helps the formation of grain. In the case of oats at least a larger number of perfect grains were formed in the presence of silica than in its absence. Other experiments by Wolff seemed to show that when silica is present a smaller amount of phosphoric acid may be sufficient for the proper development of oat plants than is required when silica is about. In this experiment the percentage of phosphoric acid is sohewhat larger in the field grown oats where the minimum amount of silica occurs, thus pointing to a conclusion similar to that reached by Wolff.

	Percentage of Fe_2O_3 and Al_2O_3.			*Percentage of P_2O_5.*		
	Field grown.	Pot grown.	Warington.	Field grown.	Pot grown.	Warington.
In ash of grain	1.7	2.3	.....	31.3	29.1	25.5
In ash of straw	1.4	1.9	.....	5.1	4.6	4.5

The percentage of iron and aluminium oxides in the field oats is slightly higher, both in grain and straw, than in the pot-grown oats. This would seem to indicate that the slight increase in the two samples taken from the field has been derived from the sub-soil. We note that in each of these cases the percentage of aluminium and iron oxides is slightly higher in the grain than in the straw.

Turning now to the phosphoric acid determination, we observe that the grain from the field plot contains a much higher percentage than the grain from the pots. The straw from the field plots contains a lower percentage of

* Storer's Agriculture.

phosphoric acid than the straw from the pots. Comparing analysis of the two samples of straw with Warington's determination we notice that the percentage is lower in both samples. These results show that a larger percentage of phosphoric acid was obtained from the oats that were grown under normal conditions than from the oats grown upon the surface (nine inches) of soil. This would seem to indicate that an appreciable quantity of this constituent has been obtained from the lower soil. It is interesting to note that in each lot there is a much larger proportion of phosphoric acid in the grain than in the straw.

As regards the oat plant, Arendt, in his experiments found that phosphoric acid passed continually from the lower parts of the plant into the upper parts, especially after the time of flowering. The upper leaves gave up at least five-sixths of all the phosphoric acid they had accumulated and sent it into the ears. Thus it is apparent from these experiments of Arendt's that the phosphoric acid in ripe grain has been moved from the leaves and stems after having come to rest, as it were, in those organs. The same investigator goes on to show that phosphoric acid passes continually in large quantities towards those organs in which albuminoids were forming. A very large percentage of the phosphoric acid taken from the soil by a crop of oats is found within the grain.

Percentage of CaO.

	Field Grown.	Pot Grown.	Warington.
In ash of grain	3.9	4.3	3.6
In ash of straw	8.8	5.8	7.0

In the analysis of the ash from both samples of grain practically four per cent. of calcium oxide was found. In the two samples of straw there is a larger percentage of lime in the plot grown oats. Thus the oats that were grown under normal field conditions contained almost double the amount of calcium found in the plants which were grown upon surface soil. The sub-soil has in this case affected quite perceptibility the amount of calcium present. The percentage of calcium at maturity is much higher in the straw than in the grain.

	Percentage of MgO.			*Percentage of SO_3.*		
	Field grown.	Pot grown.	Waring-ton.	Field grown.	Pot grown.	Waring-ton
In ash of grain	13.4	11.9	7.0	3.4	4.1	6
In ash of straw	4.5	3.5	3.6	7.8	26.1	26 4

In this table, commencing with magnesia, we find the highest percentage of this substance in the field-grown oats. The percentages given by Warington are somewhat lower than the total percent. of magnesia in the field sample.

The highest total percentage is found in the grain that was grown under normal conditions. Relatively speaking, the percentage of magnesia is greater in the grain than in the straw. Experiments go to show that the magnesia passes from the lower stem to the upper part of the plant, and increases constantly in the grain. Quoting Arendt again, we notice that according to his experiments the grain of the oat plant contains more magnesia than lime, but while magnesia continues to move into the grain until it is ripe, the lime in the grain reaches its maximum quantity before ripeness, and passes out of the grain. Arendt also found that the leaves were much richer in lime than in magnesia. In the pot-grown samples, and in Warington's determination, the proportion of magnesia is much higher in the grain than in the straw. In the field-grown oats, about equal quantities are found in the straw and grain.

The pot-grown oats contain the highest percentage of SO_3 both in the grain and straw. In each analysis, the straw contains the largest quantity of this constituent.

	Percentage of Potash, K_2O.			*Percentage of Soda, Na_2O.*		
	Field grown.	Pot grown.	Warington.	Field grown.	Pot grown.	Warington.
In ash of grain	20.3	27.8	18.0	.....	.....	1.5
In ash of straw	25.6	38.2	27.0	.....	.....	3.2

The percentage of potash in the pot-grown oats is very much higher than the amount determined in the field oats. Why should there not be as much potash in the oats grown under normal conditions as in the oats grown upon the surface soil? The soil in the cans was exposed much more to the heat of the sun than the soil in the field, and, therefore, more of the plant food in the cans would be changed into an available form. The roots of the field plants would no doubt penetrate the sub-soil. Here the earth is not exposed to the action of the sun to as great an extent as the upper strata, and thus the supply of available plant food would be, comparatively speaking, limited, and the roots would not be able to supply a sufficient quantity to the growing plant. This question has already been discussed quite fully in the paragraph dealing with the percentage of ash in these two samples.

In the field-grown oats and in Warington's determination, the percentage of potash in the straw is much higher than the percentag · in the grain. One writer, in discussing the movements of potash in the oat plant, says that, generally speaking, potash appears to be rather evenly distributed throughout the plant, but it has been noticed that it seems to pass slowly out of the grain into the straw at the time of ripening. At all events, this backward movement is true of the oat plant, in which more potash is found in the stem than elsewhere. The maximum quantity of potash was in the lower part of the ripe stem, and above this point the proptortion of it diminished as the plants matured. These conclusions were reached after several determinations had been made.

In summing up the results of this investigation, three or four of the most important points may be noted, briefly:

1. The largest percentage of mineral constituents (ash) was found in the oats grown upon the surface soil. Two reasons are given for this increase:—(*a*) The supply of moisture was perhaps more uniform with the pot-grown plants; and, (*b*) the soil in the cans was freely exposed to the heat of the sun, and more plant food was thereby made available.

2. There was a higner percentage of silica in the pot-grown oats than in the field-grown grain. According to some experiments that have been conducted to ascertain the function of silica, it does not appear to be essential for growth and proper development. Large quantities, however, are used by some plants.

3. Phosphoric acid, one of the most important constituents of plants, is found in larger quantities in the field samples. Calcium and magnesium may also be noted in the same connection. The sub-soil may have influenced this increase.

4. The pot-grown plants contain the largest proportion of potash. The percentage of potash is much higher in the straw than in the grain, while with phosphoric acid the opposite is the case.

Digestion Experiments.

At many of our agricultural meetings it has been confidently asserted "that green corn or fodder corn, as it is sometimes called, is more nutritious than ensilage." Further, many farmers throughout Ontario appear to believe that it does not pay to go to the expense of putting their corn in a silo. The question, therefore, arises, "Have we any experimental data to prove or disprove these statements?" In looking over the records of different experiment stations, we find that while the chemical composition of green corn and ensilage has been reported by many authors, yet very few experiments are recorded giving results as to their relative digestibility. Warington, one of the English authorities, says that where green fodders (grasses and clover) are stored in a silo a loss both of water and dry matter takes place. He claims also that a considerable portion of the albuminoids are changed to amides, and that the albuminoids that remain unchanged are rendered much less digestible.

The composition of any feeding stuff is of interest to all intelligent feeders of farm animals, for, so long as the live stock industry in the Province is of paramount importance, so long must the question of forage be next in significance. Furthermore, since the nutritive value of a food depends not only upon its composition, but also upon the digestibility of its component parts, it will be seen that some knowledge of the relative digestibility of fodders is highly desirable.

It was with the object of furnishing such knowledge that the investigation herein described was undertaken. I may say that in conducting the experiments for the purpose of ascertaining the relative amounts of the different constituents of green corn, field cured corn, and ensilage digested by two steers, that no record was kept of the energy which had to be expended in bringing these fodders into a soluble state. It must be remembered, therefore, that the story as told by digestion experiments is incomplete. And more especially so since quite recent experiments, conducted by Armsby, have shown that the amount of energy expended in chewing and preparing food material for solution in the body is much different with different foods. It must be also remembered that such factors as crude fibre in a ration have much influence on this point.

A food, therefore, is of value to an animal, not in proportion to the great amount of nutrients found therein, but to the energy available after deducting from the digested portion the amount which has been expended in making that food an integral part of the animal body. It must also be admitted that a digestion experiment, in which the difference between the total amounts of nutrients in the food and in the dried fæces is taken as a measure of the value of that food, is not wholly reliable, because of the expense to the animal of the digestion and absorption of that food is not shown. There may be, however, other factors to modify the above, and it was to observe the effect as well as to note the general influence of ensilage that the experiments recorded herein were undertaken.

In the fall and winter of 1903 two grade steers were selected from the College herd, through the courtesy of Professor Day, and fed on green corn for a period of seven days. The corn used in the digestion tests herein recorded was all taken from one section of the field, and was as uniform in quality as could be desired. It was just past the dough stage, and was somewhat frosted. About five hundred pounds of corn were required for each test, and this amount was obtained by selecting sample sheaves from different places in the section cut. The corn to be fed in the green state was hauled to the barn and was fed within two weeks of the date of cutting. The part to be cured in the field was placed in shocks, and the corn to be cured in the silo was cut finely in the usual manner, and exactly five hundred pounds were put in a suitable box. To prevent the corn in the silo from mixing with that in the box, the open surface was covered with two thicknesses of factory cotton. This box was placed in the centre and about half way to the top of a silo about thirty feet deep.

An interesting point was discovered when the ensilage from the box was fed some four months later. As green corn, the contents of the box weighed five hundred pounds, and when the box was opened the contents weighed five hundred and twelve pounds. This gain of twelve pounds must have been due to liquid from the corn above soaking into the box.

The following table of composition shows that the change in constituents, such as protein, fat, crude fibre, etc., is unimportant.

Fodders.	Water.	Crude Protein.	Albuminoids.	Amides.	Crude fat.	Ash.	Crude fibre.	Nitrogen-free extract.
In fresh condition.	%	%	%	%	%	%	%	%
Green corn	77.16	1.77	1.39	0.38	0.43	1.32	7.15	12.17
Field cured corn	59.18	3.14	2.65	0.49	0.82	1.96	12.27	22.63
Ensilage	76.68	1.87	1.37	0.50	1.02	1.34	6.81	11.84
Calculated to water-free substance.								
Green corn		7.77	6.11	1.66	1.87	5.79	31.29	53.27
Field cured corn		7.69	6.49	1.20	2.01	4.80	30.06	55.44
Ensilage		8.02	5.81	2.21	4.37	7.65	29.20	50.76

In comparing our figures with those of other analyses made in the United States, we find that there is no very marked difference. There is this difference, however, that most of the authorities consulted give the composition of green corn, ensilage, and field-cured corn in general, but such analyses do not represent the composition of the same fodder under all conditions. It is also claimed by some that there is a greater change of the proteids into amides during the process of curing in the silo than would appear in the above table.

Perhaps the most notable change in any of the constituents in the results of analyses submitted is seen in the column headed crude fat. The increase of the crude fat in ensilage over the amount in green corn is no doubt due to the extraction of certain of the vegetable acids by the ether. We further note that green corn and ensilage contain a higher percentage of moisture than corn cured in the field. At first it would, therefore, appear that the field-cured corn contains the greater amount of food material. But it must be remembered that the quality of the dry matter of any feeding-stuff is of paramount importance, and upon examining the table of composition more closely, we find that the percentage of crude fibre in the field-cured corn is considerably higher than the percentage of crude fibre in either the green corn or ensilage.

We now give the results of the digestion experiment with brief comments thereon:

	Dry matter.	Crude Protein.	Crude fat.	Nitrogen-free extract.	Crude fibre.
Green Corn, Steer No. 1.					
Amount fed, pounds	45.236	4.705	1.075	23.746	11.986
Amount in excrement	11.053	1.209	0.125	5.419	3.012
Amount digested	34.183	3.496	0.950	18.327	8.974
Digestion co-efficients	75.56	74.32	88.37	77.13	74.87
Green Corn, Steer No. 2.					
Amount fed	45.236	4.705	1.075	23.746	11.986
Amount in excrement	12.782	1.369	0.140	6.305	2.852
Amount digested	32.454	3.336	0.835	17.411	9.134
Digestion co-efficients	73.65	72.62	77.67	75.03	75.70
Field Cured Corn, Steer No. 1.					
Amount fed	48.984	3.768	0.984	27.156	14.724
Amount in excrement	13.108	1.008	0.156	6.465	4.532
Amount digested	35.876	2.760	0.828	20.691	10.192
Digestion co-efficients	71.20	73.25	84.15	76.19	69.22
Field Cured Corn, Steer No. 2.					
Amount fed	51.841	3.988	1.041	28.740	15.583
Amount in excrement	13.511	1.065	0.132	7.568	4.021
Amount digested	38.330	2.923	0.909	21.172	11.562
Digestion co-efficients	73.94	73.30	87.31	73.66	74.19
Ensilage, Steer No. 1.					
Amount fed	52.470	4.208	2.295	26.640	15.323
Amount in excrement	16.135	1.328	0.459	7.005	3.687
Amount digested	36.335	2.880	1.836	19.635	11.636
Digestion co-efficients	69.24	68.44	80.00	73.71	75.93
Ensilage, Steer No. 2.					
Amount fed	53.869	4.320	2.356	27.350	15.731
Amount in excrement	15.659	1.554	0.354	8.202	3.921
Amount digested	38.210	2.766	2.002	19.148	11.410
Digestion co-efficients	70.93	64.03	84.97	70.01	72.53
Average Digestion Co-efficients.					
Green corn	74.60	73.47	83.02	76.08	75.28
Field cured corn	72.57	73.27	85 73	74.92	71.70
Ensilage	70.08	66 24	82 48	71.86	74.23

The average digestion co-efficients would appear to show that there is very little difference in the digestibility of the total dry matter of corn whether cured in the field or in the silo. The crude protein is digested in the following order: Green corn first, field-cured corn second, and silage lastly.

In this work it has been assumed that the amides were wholly digested.

While it is not well to place too much stress upon the results of a single set of experiments, still in the point under discussion there is very little evidence to contradict them excepting popular prejudices. Furthermore, the writer wishes to draw attention to the fact that in no case are the results obtained by him conflicting—all tend in the same direction—although differences do occur in the percentage of the different constituents digested by each steer.

To show more clearly the actual significance of the results obtained, let us calculate the number of pounds of dry matter which animals are able to digest from an acre of corn when cured in the silo as compared with the number of pounds of digestible matter in an acre of corn cured in the shock.

The average yield of an acre of good corn is twenty tons of green fodder. Therefore, according to our results, of the 9,328 pounds of dry matter contained in an acre of corn, 6,958 pounds are digestible when fed in the green state; 6,769 pounds are digestible when the corn is cured in the field, and 6,537 pounds are digestible when the corn has been properly cured in the silo. This must be a very important consideration if true, and we have reason to believe it correct. Furthermore, when corn is saved in the silo, it is succulent and palatable, and the animals eat it much more readily than field-cured corn.

The foregoing results lead to the following conclusions:

I. The loss sustained when corn is cured in the field and in the silo is about equal.

II. There is a decrease in the digestibility of corn fodder in curing it.

III. There is little difference in the digestibility of field-cured corn and ensilage.

The foregoing conclusions lead to the belief that silage is the best form in which the farmer can save his fodder corn; because, first, it is succulent and palatable, and the animals eat it much more readily than field-cured corn; second, the cost of putting corn into the silo is but slightly greater than that of curing it in the field; third, silage is always in a convenient form to feed; and, finally, the loss in the silo is not likely to be as great as the loss in the field, where the wind blows a certain amount of it away. A further loss is sustained in that part of the fodder frozen to the ground, and any bundles that fall are almost, if not entirely, rendered useless as food.

Miscellaneous.

In the spring of the present year we prepared one gallon of standard alkaline solution for each of the instructors of the Western Dairymen's Association.

Recently I have made a chemical examination of several samples of canned fruits, to determine whether or not preservatives had been used in the process of manufacture.

Another matter under investigation is the amount of carbonic acid which chickens can stand without injury. Our work along this line has only begun, consequently no definite conclusions can be arrived at. We hope, however, to have sufficient data to justify us in publishing this work before the end of the year.

Respectfully submitted,

December, 1905. W. P. GAMBLE.

PART VII.

THE PROFESSOR OF VETERINARY SCIENCE.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith my annual report for 1904-1905:

CLASS ROOM.

The class-room work was much the same as in former years.

FIRST YEAR. To this class I gave, during the fall term, a course of lectures on veterinary anatomy. As is usual in such courses, I selected the horse as a type, and where important differences exist between his anatomy and that of the ox I drew the attention of the class to the same. This course included a brief but somewhat comprehensive consideration of the skeleton; joints and muscles; the digestive, respiratory, urinary and generative organs; the circulatory and absorbent systems; the eye, skin and foot, and the nervous system. When possible we verified description by the examination of the skeleton or a living animal.

During the afternoon lectures we discussed the construction of horse stables as regards site, material, drainage, ventilation, arrangement and kinds of stalls, mangers, floors, feed-boxes, etc., etc.; the general care of horses as regards feeding, watering, grooming, working, exercising, etc.; the general care of harness, saddlery, vehicles, etc. This was followed by a course in judging horses, in which we discussed the desirable characteristics of the different breeds and classes, and compared the merits of different animals of the same breed or class. For this purpose we used the horses belonging to the institution, those in my own stable, and borrowed some.

During the winter term I gave a course of lectures on "Veterinary Materia Medica," in which I spoke of the properties, actions, uses, and doses of the various drugs used for the prevention and cure of the ordinary diseases to which farm stock is subject. We also discussed the different methods of administering medicines, with the advantages and disadvantages of each.

SECOND YEAR. The class-room work for this year during the fall term consisted in a consideration of the causes, symptoms and treatment of the ordinary diseases of and accidents to farm stock, with frequent reference to the proper methods of feeding, watering and general care of stock in order to prevent disease. During this course I usually have a living animal in the class-room and explain the changes in general appearance caused by disease or injury. We also have many specimens of diseased bone, by means of which I am able to show the class the changes that take place during disease.

During the winter term I gave a course of lectures on "Veterinary Obstetrics," treating of the phenomena of conception, development of the fœtus and parturition; the usual causes of sterility and the methods by which some of them can be removed; the diseases of both sexes due to the act of reproduction; the general hygienic treatment of pregnant animals; the causes of difficult parturition, with the means for their removal; the causes, symptoms and treatment of diseases of both dam and offspring incident to and following parturition, and gave special attention to the care of the young. As far as possible I illustrated these lectures by charts, diagrams, etc.

During the afternoons I gave a course of lectures and demonstrations on the practical methods of handling horses and colts; securing animals for minor operations, as dissecting out tumors, lancing abscesses, dressing and stitching wounds, castrating, firing spavins, ringbones, etc.; applying blis-

ters, and bandages, extracting and dressing teeth, scarifying lampas, etc. I illustrated the methods of applying bandages, stitching wounds, administering medicines, passing the probang in the ox, puncturing the ox in case of excessive bloating, castrating, etc.

I also gave this class a course in "horse judging," using for the purpose the horses at our command and taking the class to the premises of some of our local dealers and breeders.

THIRD AND FOURTH YEARS. With these years I continued the course in "horse judging," getting the subjects in the same way as for the first and second years.

SPECIAL DAIRY CLASS. I gave to this class a short course of lectures on the causes, symptoms and treatment (both preventive and curative) of the ordinary diseases of dairy cattle.

SHORT COURSE IN STOCK JUDGING. During this course, which was held in January, I gave a course of practical scoring and judging in the different classes and breeds of horses. In this I was ably assisted by Drs. H. G. Reed, of Georgetown, and John Standish, of Walkerton. In all classes except the agricultural (which class is well represented at the institution), I borrowed the animals, and I wish to take this opportunity of publicly thanking those gentlemen who not only allowed us to have their horses and severely and often unjustly criticize them, but who either brought them to the class-room or sent attendants with them, viz., Messrs. Sorby, Atchieson, McCannell, Bowman, Hurley, McKenzie, Tovell, Stewart, Smith and others. The facilities for this course are all that can be desired except for showing action. It is not possible for a horse to do itself justice in this respect in so small a ring, neither is it possible for an observer to form a correct opinion of what he could do under more favorable circumstances. In order to correctly judge a horse's action it is necessary to have a straightaway track of 100 yards or more, and when the weather is cold and the ground covered with snow or frozen lumps, as it usually is in January, we cannot take the horses outside to show action with any degree of satisfaction.

DISEASES AND INJURIES TO STOCK.

Besides the class-room work, I gave professional attention to all the stock.

HORSES. We had several cases of the ordinary diseases and ailments in horses, viz., colic, indigestion, influenza, laryngitis, lymphangitis, calks, wounds, scratches, eczema, sore necks and shoulders, etc., all of which recovered.

CATTLE. In cattle we had cases of impaction of the rumen, fardel-bound, retention of the placenta, mammitis, sore teats, foul in feet, uterine discharge, difficult parturition, etc., all of which recovered. We had a fatal case of inflammation of the uterus in a Shorthorn cow, a fatal case of fardel-bound (impaction of the third stomach) in a young Shorthorn bull, a fatal case of obstruction due to the presence of hair-balls in the fourth stomach in a Hereford calf, and a fatal case of calculi in the kidneys, ureter, bladder and urethra of a young Polled Angus bull.

SHEEP. We had little trouble with sheep, the only fatal case being one of inflammation of the womb in a Leicester ewe whom I had delivered of a pair of gangrenous fœtuses.

SWINE. We had little trouble with the swine and no fatalities except in newly-born ones.

Respectfully submitted,

Guelph, November, 1905. J. H. REED.

PART VIII.

THE PROFESSOR OF DAIRY HUSBANDRY.

To the President of the Ontario Agricultural College:

SIR,—I beg leave to submit my fifteenth Annual Report of the Dairy Department of the College. Owing to the early call for the report we have been obliged to leave out the results of the greater part of the experimental cheese work done during the months of October and November, as most of the cheese are not ripened sufficiently to judge of their quality. We have also been obliged to make up the yearly record of our cows from December 1st, 1904, to November 30th, 1905, instead of for the calendar year, 1905. This will be to the advantage of some cows and to the disadvantage of others.

During the past summer, I was given two months' leave of absence to visit centres of dairying in Europe, a report of which I have already submitted to you. I take this opportunity of thanking yourself, and the Hon. Minister of Agriculture, for your courtesy in allowing me to gather information which will be helpful to me in my work.

The work during the year has not differed materially from that carried on in previous years. During the fall term a course of lectures and practical work was given to the first and second year students, and also to the specialists in dairying of the fourth year. The winter term was taken up with special courses in dairying, of which three were held during the year. These were attended by seventy-eight students. The work at the dairy department of the College was along lines similar to that of other years. The following ex-students of the Dairy School have applied for diplomas in cheese and butter-making:

C. W. Holdaway	Blacksburg, Va., U. S. A	Butter-making.
A. A. Freund	Hilbert, R.F.D. 5, Wis., U.S.A.	Cheese-making.
R. P. Dennison	Kingsey, Que.	Butter-making.
P. Fockler	Dutton, Ont.	Butter-making.
G. P. Greensides	Tyrell, Ont.	Cheese-making.
D. E. McKenzie	Kinmount, Ont.	Butter-making.
L. R. Sutherland	Rossburn, Man.	Butter-making.
L. Southworth	Cannington, Ont.	Butter-making.
A. E. Davies	Lindsay, Ont.	Butter-making.

The chief improvements of the year were,—the installation of ventilation in the Dairy Stable, and the laying of a cement walk in front of the Dairy Buildings.

As in former years, we have taken charge of the "Official Testing" in Canada for the Canadian & American Holstein Associations. This work involves a good deal of labor and time, especially in securing proper persons to conduct the test. In winter we are usually able to get competent men or women to do the work, but in summer it is very difficult to obtain such. If the work were more regular it would doubtless pay to have one or more persons permanently engaged to do "official testing". If all the breeders of pure-bred dairy cattle would unite in this work and would push the "official testing" of their cows, it would be a great benefit to the dairy industry. We think, however, it would be advisable to have these tests continue for a whole year, instead of for short periods as at present, under the supervision of a qualified person or persons.

Cow Testing Associations, such as are operated in Denmark, would also be a great benefit to the ordinary dairy farmer, who is not breeding pure-bred stock, but who is anxious to improve his herd in dairy qualities. This is a line of work worthy the attention of all interested in the improvement of dairy cows.

I order to get information of value to the dairy farmers of the Province, I beg leave to suggest, that, if possible, the actual cash returns from a few dairy and beef farms be secured during the coming year. If representative farms where the different breeds of dairy and beef cattle are kept, could be obtained, it would be all the more valuable as a means of comparing the relative profits from keeping Ayrshires, Jerseys, Holsteins, Shorthorns, etc., as well as a means of comparing returns from beef and dairy farming, or from mixed farming, in which beef or dairying predominates. If a portion of the College Farm were set apart as a dairy farm it would be conducive to the study of dairy farm economics more closely than can be done under existing conditions.

We shall soon require improved cheese, farm dairy, and town and city milk trade equipment at the Dairy Department of the College. The two former branches are now located in the original dairy building, which was erected some thirty years ago and is now falling into decay in many places.

EXPERIMENTS IN BUTTER MAKING.

Cream with Culture added and Churned Directly vs. Similar Cream Ripened after adding Culture.

No. of Experiments. Five experiments were conducted during the month of July comparing the churning of pasteurized sweet cream directly after adding 20 to 25 per cent. culture, with similar cream ripened in the usual way after adding 20 to 25 per cent. culture.

Acidity. The sweet cream, so called, when placed in the churn contained an average of .23 per cent. of acid as determined in the ordinary way by an acidimeter using phenolphthalein as an indicator. The lots ripened, contained an average of .52 per cent. acid and ranged from .5 to .55.

Per Cent. Fat in Cream. The percentage of fat in the cream of both lots varied from 25 to 34 and averaged 29.3.

Churning Temperature. The churning temperature of the sweet cream varied from 48 to 53 degrees F. and averaged 49.6 degrees; that of the ripe cream varied from 48 to 51 degrees and averaged 49.4 degrees.

Time for Churning. The time required for churning the sweet cream varied from 13 to 23 minutes and averaged 19.4; that of the ripe cream ranged from 16 to 36 and averaged 24 minutes.

Fat in Buttermilk. The percentage of fat lost in the buttermilk ranged from .5 to .85 and averaged .62. (For one churning the fat tested 2.1 per cent. owing to high temperature. This is not included in the previous average.) The buttermilk from the ripened cream tested an average of .16 per cent. fat.

Yield of Butter. The pounds of butter from all the lots churned sweet, were 406.5; from the ripened cream 421.5—a difference in favor of the ripened cream of 15 pounds, or 3.7 per cent.

Quality of the Butter. As previously stated the experiments were made in July (13th to 20th). One 28 lb. box of each was marked with a number and placed in cold storage at the College, in a temperature of 28

to 30 degrees F. On Aug. 25th, all the samples were scored at the Dairy. Afterwards four lots of each (eight boxes) were sent to Montreal where they were scored, Sept. 12th, by Messrs. Woodard (official referee) and Le Clair. The sweet cream lots scored an average of 41.8 points out of 45 for flavor, while the ripened cream lots scored an average 39 points. Averaging the scores given at Montreal and at the Dairy we find them to be:

	Flavor. (Max. 45)	Grain. (Max. 25)	Color. (Max. 15)	Total. (Max. 100)
Sweet cream	41.1	24.7	14.5	95
Ripened cream	39.3	24.5	14.3	93.2

The Montreal judges remarked on some of the ripened cream lots that they were "tallowy", "fishy" and "stale".

The results of experiments conducted last year and also this year indicate that sweet cream with 20 to 25 per cent. culture, produces a butter of better keeping quality than that made from similar cream ripened, but that the yield of butter is not quite so great. As we better understand how to make butter from sweet, pasteurized cream it is altogether likely that this drawback will be overcome. The chief cause of loss in these experiments was from having too high a churning temperature and this resulted from the necessary delays in mixing the cream, taking weights, etc., incidental to experimental work.

Churning Sweet Cream Without Culture vs. Churning Cream Containing 10, 20 and 30 per cent. Culture.

Object of Experiment. The object of this experiment was to determine the relative values of churning cream sweet without any culture, as compared with churning cream containing 10, 20 and 30 per cent. culture. The cream from each day's separation was all mixed in a vat. About one-quarter was taken out and churned sweet without any culture. To one-fourth of the remainder 10 per cent. of culture was added and it was churned at once. To each of the remaining two-fourths 20 and 30 per cent. culture, respectively, were added before churning. All the lots were churned in a "Simplex" combined churn. The tests were made during July and August.

Weights of Cream Used. The weight of the lots churned sweet and with 10 and 20 per cent. culture ranged from 140 to 155 lbs. and averaged 148.7 lbs. The lots with 30 per cent. culture ranged in weight from 123 to 150 lbs., and averaged 140.2 lbs.

Percentage of Fat in Cream Churned. The percentage of fat in the cream ranged from 34.5 to 38 and averaged 36.1.

Churning Temperatures. The temperatures for churning the sweet cream ranged from 45 to 49 degrees and averaged 47.2 degrees. The lots with 10 per cent. culture ranged from 48 to 53 degrees and averaged 50 degrees. The 20 per cent. lots ranged from 49 to 55 degrees and averaged 50.7 degrees. The 30 per cent. lots ranged from 50 to 56 degrees and averaged 52 degrees for churning.

Time for Churning. The sweet cream, 10, 20 and 30 per cent. culture lots averaged respectively 14, 14.7, 15.7 and 17 minutes in churning.

Loss of Fat in Buttermilk. The percentage of fat in the buttermilk averaged .92, .56, .45, and .42 respectively for the four lots—sweet cream, 10, 20, and 30 per cent. culture.

Quality of the Butter. All of the lots were scored at the dairy on Aug. 25th and one lot again on Oct. 9th. There was practically no difference in the quality of the butter in this lot on Oct. 9th. Three of the lots, twelve boxes, were sent to Montreal. They were scored in Montreal on Sept. 12th by Messrs. Woodard, Le Clair, Brice, Nivin, Dalrymple, and Monette. These twelve boxes were afterwards forwarded to London, Eng., to be judged there, but the first report was not satisfactory. A later report gave a number of these as being "perfect in flavor and condition".

The following table gives the average scores of the six judges in Montreal together with the average of those given at the Dairy:

Kind of Butter.	Flavor. (Max. 45)	Grain. (Max. 25)	Color. (Max. 15)	Total. (Max. 100)
Sweet cream without culture	41.1	24.3	14.1	94.7
Sweet cream with 10% culture	41.5	24.2	14.1	94.3
Sweet cream with 20% culture	41.2	24.2	13.9	94.7
Sweet cream with 30% culture	41.5	24.2	14.0	95.4

1. The sweet cream lots churned in less time and at a lower temperature than did the lots having 10, 20 and 30 per cent. culture, but the loss of fat in the buttermilk decreased with the addition of culture to the sweet cream. This extra loss might possibly have been prevented by churning the sweet cream at a lower temperature. The rise in temperature was due to delays in mixing, weighing, etc., incidental to experimental work.

2. There was very little difference in the quality of the butter from the four methods of churning, what difference there was being in favor of the lots to which 30 per cent. culture was added. It is doubtful, however, if this slight extra quality would pay for the extra labor involved in preparing and adding cultures to the cream. Further work is needed on these points. The reports on the samples after reaching the English markets were not satisfactory.

Pasteurization of Milk vs. Cream for Butter-making.

Plan of Experiments. This work is a continuation of that done last year. The plan of the experiment was to mix a vat containing about 3,000 lbs. of milk thoroughly, then separate one-half at the usual temperature of 85 to 95 degrees F. The cream was afterwards pasteurized at a temperature of 180 to 185 degrees F. The other half of the milk was pasteurized and separated at a temperature of 180 to 185 degrees. Each time the experiment was made, the order of pasteurization was reversed, *i.e.*, if the milk were separated and the cream pasteurized first, one time, the milk would be pasteurized before separating next time, in order to eliminate the effects of standing while separation of the cream took place. All lots were cooled, about 15 per cent. of culture was added, and the cream ripened in the usual way before churning.

Churning Results. The weight of cream in each lot varied from 159 to 172 pounds and averaged 165½ pounds. The percentage of fat in the pasteurized cream varied from 28 to 33.5 and averaged 30.8. The per-

centage of fat in the cream from pasteurized milk, ranged from 29 to 35.5 and averaged 31.2. The time required for churning was practically the same for both lots—26.2 and 26.5 minutes. The temperature at churning was about 50 degrees F. for both. The acidity of the cream lots from pasteurized milk, averaged .55 per cent. at churning and for the pasteurized cream lots the average was .52. There was very little difference in the losses of fat in skim-milk and buttermilk, the averages being respectively .01 and .185 for the pasteurized whole milk lots and .02 and .21 for the lots where separation of the cream was made at 85 to 95 degrees and the cream afterwards pasteurized.

QUALITY OF THE BUTTER. Three lots of the pasteurized cream butter and three of the pasteurized milk lots were sent to Montreal for scoring. The average of the scores given at the Dairy and at Montreal were as follows:

Kind of Butter.	Flavor. (Max. 45)	Grain. (Max. 25)	Color. (Max. 15)	Total. (Max. 100
Pasteurized cream	42.3	24.3	14.5	96.2
Pasteurized milk	42.1	24.2	14.3	95.7

As indicated by the scorings, there was very little difference in the quality of the butter. Last year the butter made from the pasteurized milk was slightly better, especially after keeping for sometime. This year there was little or no difference.

As it is more convenient to pasteurize the cream and skim-milk separately, than to pasteurize the whole milk before separating, and further as there is little or no difference in the quality of the butter, we would recommend pasteurization of the cream and skim-milk after separating, for our whole milk creameries.

TEMPERATURES FOR THE PASTEURIZATION OF RIPE CREAM. We have always strongly recommended the pasteurization of cream when sweet, but never very strongly the pasteurization of ripe or sour cream. The objections to the pasteurization of ripened cream are the danger of coagulation or curdling during the heating process and the loss of fat in handling such cream. We believe that the pasteurization of cream would assist our cream-collecting creameries to improve the quality of their butter, but would urge the importance of having the cream as sweet as possible at the time of heating.

However, some creameries are unable to get delivery of the cream sweet, and if they practise pasteurization at all it must be with cream more or less sour. There is also a difference of opinion as to the best temperature for heating such cream. The experiments conducted during the past season had for their object the securing of some data on the points involved in the pasteurization of ripe cream at four different temperatures, viz., 130, 140, 160, and 180 degrees F.

PLAN OF EXPERIMENTS. Unpasteurized cream from a power separator was run into a cream vat where it was cooled to about 70 degrees, and ten per cent. of butter culture (starter) was added. When the cream contained from .47 to .6 per cent. acid, determined by the ordinary acidmeter, using phenolphthalein as an indicator, it was divided into four lots. One-fourth was pasteurized at a temperature of 130 degrees F.; one-fourth at 160 de-

grees; and the remainder at 180 degrees F. The order of pasteurization was changed at each experiment, i.e., if 130 degrees were used first one time, 180 degrees would be first next, in order to eliminate any effects there might be as a result of standing. The order of churning the four lots was also changed. All lots were churned the day after pasteurizing in a small "Simplex" churn. It was noticed in every case that the cream had less acidity when churned the day after pasteurization than it had the previous day before pasteurizing. On one occasion the lot pasteurized at 130 degrees coagulated during the heating, and gave considerable difficulty in getting it over the cooler after heating. Two tests were made in June, and four in August. The two June lots and two of the August lots were sent to Montreal for scoring. The other two August lots were kept in the cold storage at the College for some time to note any difference which might develop in quality under cold storage conditions.

RESULTS OF THE CHURNING. The weight of cream pasteurized at each of the four temperatures was 802 lbs., or a total of 3,208 lbs. The percentage of fat in the cream ranged from 29 to 35 and averaged 32. The remaining points in the churnings are most conveniently stated in a table.

Temperature for pasteurization.	Av. acidity of cream at churning.	Av. fat in buttermilk.	Av. temperature for churning.	Av. time for churning.	Av. lbs. butter per churning.	Overrun.
	%	%	Degrees.	Minutes.		%
130 degrees F..	.46	.46	49.5	21.8	51.12	19.5
140 degrees F..	.46	.65	49.8	21.6	51.29	19.9
160 degrees F..	.43	.46	49.6	21.2	51.30	20.0
180 degrees F..	.44	.41	50.1	18.3	51.91	21.4

QUALITY OF BUTTER. The lots made June 2nd and 3rd, and those made August 22nd and 23rd, were sent to Montreal for scoring, having been previously judged at the Dairy. The two lots made August 24th and 25th were judged at the Dairy on October 9th, after being in cold storage at a temperature of about 30 degrees F. for about 45 days. The average scores for flavor of these two experiments where the cream was pasteurized at 130 degrees, 140, 160, and 180 degrees were respectively 39.5, 39.5, 40.5, and 41, out of a possible 45. They were all given the same score on other points.

The average of the Dairy and Montreal scores of the other four experiments are conveniently recorded in a table as follows:

Temperature for pasteurization.	Average Flavor. (Max. 45)	Average Grain. (Max. 25)	Average Color. (Max. 15)	Average Total. (Max. 100)
130 degrees F	39.5	24.1	14.7	93.3
140 degrees F	37.5	23.6	14.4	90.5
160 degrees F	38.1	23.6	14.5	91.5
180 degrees F	39.6	23.7	14.4	92.7

1. There was little or no difference in the acidity of the lots of cream at the time of churning, after being heated to the four different temperatures.

2. The greatest loss of fat in the buttermilk was from the lots heated to 140 degrees F.

3. There was little difference in the time required to churn.

4. The highest yield of butter was from the lots pasteurized at 180 degrees F., the overrun being nearly two per cent. greater than from heating to 130 degrees F.

5. There was apparently not much difference in the quality of the butter from the four temperatures.

6. So far as our work has gone we are inclined to recommend 180 to 185 degrees F. for the pasteurization of ripe cream. It is better, however, to pasteurize the cream when sweet.

Butter Preservatives.

The work of further testing preservatives in butter was continued during 1905. The results of work done last year were published in Bulletin No. 145. The preservatives tested during 1905 were borax, boracic acid, mixtures of borax and boracic acid, mixtures of borax, boracic acid and common salt, mixtures of a commercial preservative and common salt, and three commercial preservatives. Sodium chloride or common salt was also used. Two lots of eight or nine boxes in each lot and containing one-quarter or one-half per cent. of each kind of preservative in the different boxes were made for each of the three months of July, August, and September. There was also one box containing common salt at the rate of three-quarters of an ounce per pound of butter in each experiment. The July lots were placed in an ice cold storage at a temperature of about 40 degrees F. The other lots of butter were placed in mechanical cold storage at a temperature of about 30 degrees F. All the July and August lots were scored at the Dairy on August 25th. Soon afterwards they were shipped to Montreal, where they were scored on September 12th by Messrs. Woodard, Leclair, Brice, Nivin, Dalrymple, and Monette. They were forwarded to London, England, about the end of September, but the reports on the samples were not satisfactory. It is difficult to get large firms to take the trouble to examine individual lots and make a satisfactory report.

Plan of Experiments. The butter in each case was churned from ripened cream in a large churn. Sufficient to make a 28-lb. box was removed to a smaller churn, and the preservative was added and the butter worked in the usual way. Each box was numbered so that whoever judged the butter could not know what kind of preservative was used. The papers for lining the boxes were soaked in a strong solution of salt, to which formalin was added.

Two experiments were made, September 7th and 8th, the results of which are not included in the summary of scorings. In addition to the preservatives fully reported upon, there were two lots made by using a preservative sent in by one of our creamerymen which was reported as giving a bitter taste to the butter. Up to the time of writing we have not noticed this bitter flavor in the butter so treated. All the lots containing preservatives were practically the same in flavor on October 28th. One box, salted, was mottled, and was scored down one point on flavor. One box, made by packing fresh butter without salt or any other preservative, was equally good with the others, fifty days after being made. All were held at a temperature of about 30 degrees F. None of the samples had developed mould up to that time, i.e., fifty days after making.

QUALITY OF THE BUTTER. There was not so much difference between the quality of the butter where common salt (Sodium chloride) only was used, and where the boron preservatives were added, as was the case last year. The following table gives the average scores for the various preservatives, mixtures of salt and preservatives, and also for common salt as given at the Dairy and by the Montreal experts..

Kind of preservative used.	Average flavor (Max. 45).	Average grain (Max. 25).	Average color (Max. 15).	Average Total (Max. 100).	Remarks by Montreal judges.
No. 1. Borax, ¼%	41.3	23.7	13.8	94.5	"Mouldy"; "mottled."
" ½%	42.0	23.8	13.8	94.5	"Mouldy"; "injured by preservatives."
Average	41.7	23.75	13.8	94.5	"One box not mouldy."
No. 2. Boracic acid, ¼%	41.1	23.6	14.5	95.1	"Mouldy."
" " ½%	41.5	23.9	14.5	95.3	"Mouldy."
Average	41.3	23.75	14.5	95.2	
Borax, Bor. acid, ¼%	40.3	23.8	14.3	93.4	"Mouldy."
" " ½%	41.5	23.5	14.0	94.4	"Mouldy."
Average	40.9	23.65	14.15	93.9	
Borax, B. acid and salt, ¼%	40.5	23.8	14.3	93.0	"Mouldy."
" " " ½%	41.0	23.8	13.7	93.6	"Mouldy"; "gritty."
Average	40.7	23.8	14.0	93.3	
No. 6. Commercial P., ¼%	41.6	23.7	14.3	94.8	"Mouldy."
" P., ½%	42.0	23.6	14.2	94.7	"Mouldy"; "preservative taste."
Average	41.8	23.6	14.2	94.8	
No. 10. Com. P., ¼%	41.0	23.8	14.0	93.0	"Mouldy"; "mottled"; "slight taste of preservative."
" P., ½%	41.3	23.8	14.1	94.1	
Average	41.1	23.8	14.1	93.5	
No. 11. Com. P., ¼%	42.0	23.9	13.8	94.3	"Mouldy"; "preservative flavor"; two boxes no mould.
" P., ½%	41.8	23.8	14.1	94.5	
Average	41.9	23.8	13.9	94.4	
Common salt, ¾ oz	40.7	23.9	13.7	93.0	"Mottled"; "one box slightly mouldy," "no mould"; "old";
¾ oz. salt + ¼% borax	41.7	24.0	13.0	94.0	"Mottled"; "spoiled by salt."
" + ¼% No. 10 Com. P.	41.0	24.1	13.3	94.0	"No mould."

Our conclusions are similar to those given in Bulletin No. 145, chief of which may be briefly summarized as follows:

1. Powdered borax gave practically the same results in keeping the butter as did the commercial preservatives. Two of the commercial preservatives, Nos. 6 and 11, gave average scores for flavor of 41.8 and 41.9, respectively. The average of the borax treated lots was 41.7. As borax can be purchased at about one-half the price asked for the commercial article, where a preservative other than salt is used, powdered borax would appear to be the one most satisfactory.

2. One-quarter of one per cent. borax or commercial preservative is sufficient under ordinary conditions. The addition of one-half per cent. tends to produce a "preservative taste" in the butter.

3. Some of the samples treated with preservatives developed mould in our refrigerator at the end of about two months. The salted lots did not, as a rule, mould. After being made about three months the lots were examined in Montreal when all but the salted lots, one borax treated box and two boxes containing commercial preservative No. 11 in the butter were reported as "mouldy." We must conclude that butter containing boron preservatives, without or with small quantities of salt, are very liable to develop mould. Where three-quarters of an ounce of salt per pound of butter, in addition to preservative, was used, the samples do not appear to have moulded. How to prevent the growth of mould on saltless butter is a very important question.

4. We are not prepared to recommend, at present, preservatives other than common salt (Sodium chloride) for butter to be used for home consumption. It is, doubtless, an advantage to use one-quarter of one per cent. boron preservative in saltless butter for export.

Increasing the Percentage of Moisture in Butter.

In order to increase the overrun or yield of butter at creameries it has been suggested that Canadian buttermakers should make butter containing more moisture. This is a dangerous method of increasing the yield of butter, as butter merchants in England say such butter is not wanted in English markets. The reasons for disliking it are, they say, that it loses flavor more quickly, and will not "stand up" when placed on the counter. All are emphatic in warning against "water-logged" butter. It is to be regretted that some are advising Canadian buttermakers to leave more moisture in their butter.

One of the methods suggested for increasing the moisture of butter is to have a stream of water playing on the butter, or have water in the churn, while it is being worked.

In order to see how much extra water might be incorporated by adopting this plan, five tests were made during May and June of this year. The churnings were made in a large "Success" churn, then small lots averaging 35 to 50 lbs. of unwashed butter were placed in a small "Simplex" churn. One lot was washed, worked, and salted in the usual way. Another lot was washed by having the rollers of the worker in motion while a stream of cold water played upon the butter.

The average percentage of moisture in the normal samples of butter was 12.925. The range was from 12 to 13.6 per cent. The samples treated by washing while the worker was in motion averaged 12.664 per cent. moisture. The range was from 11.4 to 13.6 per cent. Instead of increasing the water content, this method produced butter somewhat drier, on the average. Only in two cases was there an increase in the water content as the result of washing and working at the same time. There was very little difference in the quality of the butter. Four lots were sent to Montreal, where they were scored by Messrs. Woodard and Leclair, and all were given practically the same score. The same may be said of the scoring given to the lots at the Dairy of the College.

Under the conditions given there was no increase in the moisture content or yield of finished butter as the result of allowing water to run on the butter while the rollers for working were in motion on the "Simplex" churn. In any case it is doubtful if it would be wise to increase the percentage of moisture in butter beyond 13 or 14 per cent., as the maximum legal limit is 16 per cent., and there is danger of exceeding this, where the buttermaker tries to "water-log" his butter.

Comparison of Two Combined Churns.

Churns which both churn and work the butter are now being generally introduced into our creameries. They save labor, floor space, pulleys, belting, etc., and make just as good a quality of butter as the box, or barrel, churn, and Mason, or any other separate worker. About the only weak points are the difficulty in keeping them clean, and the tendency for cream and butter to stick on the inside of the churn. These combined churns may be divided into two classes, those which have the worker attachment stationary in the churn and those which have the rollers for working so they may be removed from the churn when not in use. The two churns, "Victor" and "Success," tested by us during March and April, were representatives of these two classes. The claim is made for one of these churns that it will produce more butter from cream than will any other churn manufactured.

Eight of the nine trials were made with ripe cream. One lot of sweet cream was churned April 17th. Altogether there was churned 3,905½ lbs. cream in each churn. The quantity of cream churned in each one varied from 301½ lbs. to 713 lbs., and averaged 433.9 lbs. The percentage of fat in the cream varied from 27.5 to 35.5, and averaged 32.4. The temperature for churning ranged from 50 to 53 degrees F., and averaged 51 degrees F. The percentage of fat in the buttermilk from the "Victor" churn ranged from .17 to .27, and averaged .21; from the "Success" the range was .15 to .27, and averaged .2. The time required for churning with the Victor ranged from 17 to 40 minutes, and averaged 26 minutes; for the "Success" the range was 15 to 45 minutes, and averaged 27 minutes. The yield of butter averaged 171.16 lbs. per churning from the "Victor," and 170.83 from the "Success."

We consider the "Success" a more convenient churn, while the results were practically the same from both churns.

EXPERIMENTS IN CHEESEMAKING.

Rennet vs. Pepsin for Coagulating Milk in Cheesemaking.

These are a continuation of the experiments conducted last year. Armour's Pepsin was used for comparison with Hansen's liquid extract of rennet as a coagulating agent. Three grams of pepsin were dissolved in eight ounces of water for coagulating each 300 lbs. milk used. The rennet was used at the rate of one ounce per 300 lbs. milk. Fifteen experiments were made during the season. Eight of the lots ripened in ice storage were manufactured from 4,800 lbs. milk, testing an average of 3.6 per cent. fat. The whey from the pepsin lots tested an average of .23 per cent. fat, and that from the rennet lots .22. The average acidity of both lots was .192 per cent. at dipping; at milling the pepsin lots averaged .724, and the rennet lots .781; at salting the respective acidity was .996 and 1.03 for the pepsin and rennet lots.

The yield of green cheese from 2,400 lbs. milk, coagulated with pepsin, was 238.84 lbs., and the weight at the end of one month was 231.33 lbs., an average shrinkage in the ice storage of 3.16 per cent. From the same weight of milk coagulated with rennet the weights of green and ripe cheese were respectively 239.06 and 231.68, an average shrinkage of 3.0 per cent. in one month. The marketable cheese per 1,000 lbs. milk from the pepsin was 96.3 lbs., from rennet 96.5 lbs.

Seven lots made from 4,200 lbs. milk, testing an average of 3.74 per cent. fat, were ripened in our ordinary ripening (curing) room, where the temperature was 65° to 70° F. The percentage of fat in the whey averaged .22 for both the pepsin and rennet lots. The acidity at the time of dipping, milling and salting were similar to those for the lots ripened in cold storage. From the pepsin lots were made 211.33 lbs. green cheese, and 201.95 lbs. of cheese weighed at the end of one month. The average shrinkage was 4.4 per cent. From the rennet lots the yields were 211.62 and 202.57 lbs., respectively, for green and ripened cheese. The shrinkage was 4.2 per cent. The marketable cheese, per 1,000 lbs. milk, was 96.1 lbs. from coagulation by pepsin, and 96.4 lbs. from rennet.

QUALITY OF THE CHEESE. The main points with reference to the quality of the cheese are shown in the table which follows:

Kind of cheese.	Place of ripening.	Scorer.	Average scores of the cheese. Flavor 40.	Closeness 15.	Color 15.	Texture 20.	Total 100.
Pepsin	Ice storage	Dairy	35.8	13.7	14.5	18.0	92.9
Rennet	"	"	37.2	13.8	14.5	18.5	94.2
Pepsin	"	Mr. Barr	38.5	14.5	14.5	18.0	95.5
Rennet	"	"	38.5	14.2	14.5	18.5	95.7
Pepsin	"	Average	37.1	14.1	14.5	18.0	94.1
Rennet	"	"	37.8	14.0	14.5	18.5	94.7
Pepsin	Ordinary room	Dairy	35.2	13.2	13.2	17.0	88.6
Rennet	"	"	35.5	13.4	13.6	17.6	89.9
Pepsin	"	Mr. Barr	35.3	13.6	14.0	17.1	90.0
Rennet	"	"	36.0	13.6	14.0	17.2	90.9
Pepsin	"	Average	35.2	13.4	13.6	17.05	89.3
Rennet	"	"	35.7	13.5	13.8	17.4	90.4
Pepsin	Ice and ordinary room.	Aver. of all.	36.1	13.7	14.05	17.5	91.7
Rennet	"	"	36.7	13.7	14.1	17.9	92.5

1. The yield of marketable cheese was slightly greater from using rennet as compared with pepsin for coagulating milk. The average results were 96.2 lbs. cheese per 1,000 lbs. milk from using pepsin, and 96.45 lbs. from rennet. The shrinkage was also a little more from the pepsin cheese, averaging 3.75 per cent., as compared with 3.6 per cent. from rennet.

2. The quality of the cheese averaged a little better from using rennet. Last year the pepsin cheese were somewhat better. However, the difference both years is not very much, and would not be noticed on the ordinary market.

3. As the result of two years' work comparing pepsin with rennet as an agent for coagulating milk we are not prepared to recommend pepsin as a substitute for standard rennet. The pepsin is more difficult to prepare for addition to the vat, and if more is dissolved than is required for the day's use, it appears to lose strength and quality if kept for any length of time after it is dissolved.

EXTRA RENNET FOR CHEESE RIPENED IN COLD STORAGE.

This is a continuation of the work done during the past two years in determining the effects of double the ordinary amount of rennet used in coagulating milk for cheesemaking. About one-half the cheese were ripened

in mechanical cold storage, and the remainder were ripened in an ice storage. Both rooms were at a temperature of about 40° F. The eight lots ripened in mechanical cold storage were made from 4,800 lbs. milk testing an average of 3.7 per cent. fat. The average acidity at the time of adding the rennet was .197. The whey tested an average of .22 per cent. fat. The yield of the cheese from 2,400 lbs. milk, where 6 2/3 ounces of rennet were used per 1,000 lbs. milk, was 237.82 lbs., green, and 230.26 lbs. weighed at the end of one month. The shrinkage was 3.17 per cent. in the month. The yield from a similar amount of milk, to which rennet was added at the rate of 3 1/3 ounces per 1,000 lbs. milk, was 237 lbs. green cheese, and 229.45 lbs. weighed at the end of one month. The shrinkage was 3.19 per cent.

In the ice storage the yield of cheese, using 6 2/3 ounces rennet per 1,000 lbs. milk, from 1,800 lbs. of 3.7 per cent. milk, was 178.75 lbs. green, and 173.82 lbs. weighed at the end of one month. The shrinkage was 2.75 per cent. From 3 1/3 ounces of rennet per 1,000 lbs. milk the yield was 178.36, and 173.51 lbs., respectively, of green and ripe cheese. The shrinkage was 2.71 per cent. in one month.

QUALITY OF CHEESE. The chief points regarding the quality of the cheese made by using 6 2/3 and 3 1/3 ounces of rennet per 1,000 lbs. milk are shown in the table:

Amount of rennet used per 1000 lbs. milk.	Method of ripening.	Scorer.	Average of Scores. Flavor. 40.	Close-ness. 15.	Even color. 15.	Texture. 20.	Total. 100.
6⅔ ounces	Mech. storage @ 40° F.	Dairy	36.6	13.5	14.3	18.1	92.8
3⅓ "	" " "	"	36.4	13.8	14.3	18.2	92.7
6⅔ "	Ice storage @ 40° F.	"	35.0	14.4	14.7	18.2	92.3
3⅓ "	" " "	"	36.2	14.3	14.7	18.7	92.5
6⅔ "	Mech. storage @ 40° F.	Mr. Barr	37.3	14.0	14.5	18.2	94.0
3⅓ "	" " "	"	37.4	13.9	14.3	18.1	93.7
6⅔ "	Ice storage @ 40° F.	"	37.6	13.7	14.5	18.3	94.3
3⅓ "	" " "	"	38.0	14.0	14.5	18.3	95.0
6⅔ "	Average of all scores		36.6	13.87	14.5	18.15	93.35
3⅓ "	" " "		37.0	14.00	14.45	18.30	93.45

1. There was little difference in the yield of cheese whether 6 2/3 or 3 1/3 ounces of rennet per 1,000 lbs. milk were used. The total yield of marketable cheese from 4,200 lbs. milk was 404.08 lbs. by using 6 2/3 ounces of rennet, and 402.96 lbs. by using 3 1/3 ounces—a difference of 1,12 lbs. in favor of the larger quantity of rennet.

2. There was very little difference in the shrinkage or quality of the cheese from the two methods. Where more rapid ripening is desired an extra quantity of rennet may be used if the cheese are ripened at about 40° F.

MILLING CURDS CROSSWISE AND LENGTHWISE.

There is a difference of opinion among practical cheesemakers as to whether curds should be milled crosswise, or lengthwise of the block of curd. Three experiments were made in April and six during June, August and September. Altogether 7,381 lbs. milk were used, containing an average

of 3.75 per cent. fat. The average percentage of fat in the whey at dipping was .23. There was practically no difference in the quality of the cheese.

The curds milled crosswise produced 354.94 lbs. green cheese and 341.81 lbs. weighed one month later. They lost 3.7 per cent. in weight during this time.

The curds milled lengthwise yielded 354.82 lbs. green cheese and 340.05 lbs. weighed one month later, having lost 4.1 per cent.

There would appear to be little or no difference whether curds be milled crosswise or lengthwise. The only difference noted in these trials was that the lots milled lengthwise appeared to lose more in weight, the difference being about one-half per cent. in favor of those milled crosswise.

Moisture in Curd and Cheese.

This is the third year for these experiments. The chief objects have been, to secure some data regarding the amounts of moisture contained in curd at the stages known as "dipping" and "milling," and also in the green cheese; to see what effects an extra amount of moisture in the curd would have on the yield and quality of cheese; and further to find, if possible, a rapid method of approximately determining the moisture in curds at dipping. Regarding the latter point, we may say, that we think we have discovered a short method of knowing approximately the amount of moisture in a curd at "dipping," or when the whey is removed, but we wish to continue the experiments through at least another season before reporting the results of our work. The moisture in these experiments was determined by drying from 2 to 4 grams of the curd or cheese in a drying oven.

A quantity of milk varying from 600 to 1,400 lbs. was thoroughly mixed in a vat. It was then equally divided into two parts, the milk was ripened, rennet was added, curds were cut, heated and dipped as usual, except that one of them was stirred very little after dipping while the other was given sufficient stirring to produce, what in the judgment of the cheesemaker, was a normal curd so far as moisture is concerned. The total quantity of milk used for these experiments was 12,600 lbs., averaging 3.7 per cent. fat. This milk was delivered at our Dairy by patrons as is done in any ordinary factory. The average per cent. of fat in the whey was .22 for both lots. The cheese was ripened in cold storage at a temperature of about 40° F.—part in mechanical, part in ice.

Results. The main points of the experiment are conveniently outlined in tables. No. 1 deals with moisture and acidity; No. 2 with the quality of the cheese.

No. 1.

	"A" cheese containing excessive moisture. Average.	"B" cheese containing normal moisture. Average.
Moisture in curds at dipping	51.926	46.923
" " " " milling	40.303	38.620
" " green cheese	35.318	54.011
Percentage acid at dipping	0.188	0.189
" " " milling	0.700	0.670
" " " salting	1.027	0.970

No. 2.

Method of Ripening.	"A" cheese—excessive moisture.			"B" cheese—normal moisture.	
	Scorer.	Average flavor. (Max. 40).	Average total. (Max. 100).	Average flavor. (Max. 40).	Average Total. (Max. 100).
Mechanical cold storage 40° F.....	Dairy.....	36.2	92.5	36.1	92.4
	Mr. Woodard ...	36.0	93.5	36.0	94.5
	Average	36.1	93.0	36.05	93.4
Ice storage, 40° F.....	Dairy.....	36.4	92.6	36.3	92.8
	Mr. Woodard ...	37.5	96.0	37.0	94.0
	Average	36.9	94 3	36.7	93.4

The "A" cheese lost in weight during one month in ice-storage 2.7 per cent.; the "B" cheese lost 2.1 per cent. in the same length of time. In mechanical storage the "A's" lost 3.0 per cent. and the "B's" 2.3 per cent. in one month.

The yield of ripened cheese, weighed one month after being made, was 94.2 lbs., per 1,000 lbs., milk from the "A" lots containing an excess of moisture. The "B" lots containing normal moisture yielded 93.2 lbs., per 1,000 lbs. milk.

1. The average curds at factories probably contain about 45 per cent. moisture at dipping and 34 per cent in the green cheese. These experiments indicate that this amount may be increased without injuring the quality of the cheese, *if they are ripened in cold-storage at a temperature of about 40° F.* Previous experiments indicate that increasing the moisture in curds is not advisable where ripening is conducted in an ordinary room at temperatures of 70° or above, as such cheese are apt to become "acidy" and develop bad flavors.

2. The increased yield of "cured" cheese may be from one-half to one pound per 1,000 lbs., milk.

3. A rapid and approximately accurate method of determining the moisture in curds is very much needed by our cheesemakers, because moisture bears such an intimate relation to development of acidity and the latter to the quality of the cheese made.

Different Temperatures for Cooking Curds.

Heating curds to from 98° to 100° F. is the recognized standard temperature for "cooking," in the manufacture of Canadian Cheddar cheese. Some Canadian makers are adopting the plan of "cooking" to a higher temperature. Some practise raising the temperature about two degrees just before "dipping," or removal of the whey.

In order to get some data on the effects of "cooking" curds at temperatures ranging from 101° to 110° F., and averaging 105° F., eighteen experiments were made during the season. For this work 10,800 lbs., milk were used which tested an average of 3. 8 per cent. fat. The milk for each experiment was first well mixed, then it was divided into two equal parts. One vat was operated as an ordinary or control vat, and the other was heated to from one to ten degrees higher than the normal vat. One-half the cheese were cured or ripened in an ordinary room and one-half were ripened in an ice cold-storage. The normal vats averaged .194, .738 and 1.019 per cent. acid respectively at "dipping," "milling," and "salting." The vats

cooked to the higher temperatures, similar stages, averaged .192, .647 and .897 respectively. There was no difference in the fat lost in the whey. The percentages were respectively.22 and.23 for the lots ripened in the ordinary room and in ice-storage.

YIELD AND QUALITY OF THE CHEESE. The chief points regarding yield and quality of the cheese may be summarized in the following table:

Average temp. for heating curds.	Method of ripening.	Lbs. Cheese.		Scorer.	Average Scores.				
		Green.	Ripe.		Flavor. 40.	Closeness. 15.	Even color. 15.	Texture. 20.	Total. 100.
105° F....	Ordinary room	268.94	258.13	Dairy...	34.5	12.9	13.8	17.1	88.3
				Mr. Barr	36.0	13.8	14.3	17.6	91.5
99.6° F...	"	271.02	259.69	Dairy...	34.5	13.2	13.8	17.1	88.6
				Mr. Barr	36.1	14.1	14.0	17.3	91.3
105° F....	Ice storage....	272.88	266.13	Dairy...	36.5	14.0	14.4	18.0	93 0
				Mr. Barr	38.2	13.7	14.3	18.5	94.9
100° F....	"	274.42	267.30	Dairy...	36.5	14.0	14.4	18.4	93.4
				Mr. Barr	37.8	13.7	14.4	17.8	93.8
105° F....	Average of all scores.....				36.2	13.6	14.1	17.7	91.9
100° F....	" " " "				36.2	13.7	14.1	17.6	91.7

1. Cooking to temperatures above 100° F. tended to check the development of acid, as the lots so heated averaged lower percentages of acid at three important stages of the process; viz., "dipping," "milling," and "salting."

2. Cooking to a higher temperature than usual caused a decreased yield of cheese and so far as these experiments go, did not make any improvement in the quality of the cheese as indicated by the average scores. However, Mr. Barr tended to score those cheese from curds cooked to the higher temperatures, rather higher than he did those heated to a normal temperature of about 100° F.

ACIDITY OF CURDS AT SALTING.

Since the introduction of the use of the acidimeter in cheesemaking, Canadian cheesemakers have been developing from 1 to 1.2 per cent. acid on the curds, or more correctly, in the whey running from the curds, at the time of salting. Sixteen experiments were made during the past season to test the value of more or less acid than the usually accepted standard. Altogether 12,000 lbs. milk testing 3.78 per cent. fat were used in the experiments. The whey contained an average of .23 per cent. fat. The quantity of milk used for each experiment varied from 600 to 1,400 pounds. After mixing the milk thoroughly, it was divided into two parts. One vat was handled as a normal curd. The other vat was treated similarly up to the time of salting the curd, when the salt was applied at different degrees of acidity which varied from four and one-half to six times the amount of acid contained in the milk at the time of adding the rennet. For example: If the vat of milk had .18 per cent. acid at the time of adding the rennet, the normal or control vat would be salted with about one per cent. of acid, while the other would vary from .18x4½, equal to .817, to .18x6, equal to 1.08 per cent. measured as lactic acid, using phenolphthalein as an indicator. If the milk contained .2 per cent. acid, then the curd would be salted with .2x4½ .9 per cent. to .2x6, equal to 1.2 per cent. acid.

RESULTS. The main points in the results are conveniently placed in a table as follows:

Acidity of curds at time of salting.	Average per cent. acid.	Weight of cheese at end of one month.	Scorer.	Average Scores.				
				Flavor 40.	Closeness 15.	Even color 15.	Texture 20.	Total 100.
		Lbs.						
Normal.....	1.08	114.14	Dairy.....	35.3	13.9	14.1	17.2	90.5
			Mr. Woodard..	36.0	14.0	14.0	19.0	93.0
6 times acid at setting or renneting.	1.20	113.57	Dairy.....	35.3	14.0	14.1	17.1	90.6
			Mr. Woodard..	35.5	14.0	14.0	19.0	92.5
Normal.....	1.06	94.16	Dairy.....	37.0	13.6	14.2	18.0	92.8
5½ times acid at setting or renneting.	1.04	94.75	"	36.8	13.8	14.2	18.0	92.8
Normal.....	1.03	180.13	"	36.2	13.4	14.0	17.6	91.3
5 times acid at setting or renneting.	.94	181.33	"	36.1	13.3	14.0	17.6	91.2
Normal.....	1.00	113.30	"	36.0	13.0	14.0	17.6	90.5
4½ times acid at setting or renneting.	.86	114.75	Mr. Woodard..	36.5	13.0	13.0	19.0	91.5
			Dairy.....	35.9	12.2	14.0	17.6	89.0
			Mr. Woodard..	36.0	13.0	13.0	19.0	91.0

1. The greater the amount of acidity on the curds at the time of salting the less was the yield of cheese.

2. The tendency was for a lower score when the acidity was below one per cent. or in other words, according to our present standards, the quality of the cheese tended to be somewhat poorer when the curds were salted with less than one per cent. acid.

3. Further work is required, but it would seem as if present market requirements need a comparatively high acid at salting time, but this is done at the expense of the yield of cheese. Other things being equal, the cheesemaker who can make marketable cheese with the least acid may be regarded as most skillful, because such a maker will require less pounds of milk to make a pound of cheese, or, in the words of the trade, "he will have a better average."

EFFECT OF FIVE DIFFERENT TEMPERATURES ON CHEESE RIPENING.

This is the third year for these experiments, and it is probably all that will be necessary to do in this connection at present. During the past year seventeen experiments were made, for which 29,044 lbs. milk, averaging 3.78 per cent. fat were used. The average quantity of milk used for each experiment was 1,708 lbs. The whey tested an average of .22 per cent. fat. The vat was handled as an ordinary curd until "hooping" time when it was divided among five hoops and pressed. The average weight of the green cheese was about 32 pounds each. After taking the cheese from the press they were weighed and marked A, B, C, D, and E. The A cheese were placed on a shelf in an ice cold-storage at about 40° F.; the B cheese were placed on a shelf in mechanical cold-storage at about 38° F.; the C cheese were placed on a shelf in mechanical storage at about 44°; the D's were in mechanical storage at about 33°; the E's were placed in a cellar or basement room cooled during a part of the season by means of ice to an average

temperature of about 54° F. All cheese were weighed a second time at the end of one month. They were scored or judged at the Dairy by our own staff for the first time about two months after being made and again at intervals of about one month during the season. A number of them were sent to Montreal where they were judged by Mr. Woodard, the Official Referee. A number were also scored, Nov. 15th, by G. H. Barr, Chief Dairy Instructor for Western Ontario. All cheese were given full points (10) for finish. This is done in the scoring of all experimental cheese in order to have the more important qualities on a uniform basis.

SHRINKAGE AND QUALITY OF THE CHEESE. The main points in the results of the experiments may be summarized in the following tables:

Cheese.	Method of ripening.	Average Temperature.	Average per cent. moisture in air of rooms.	Average per cent. shrinkage in one month.	Average Scores.				
					Flavor 40.	Closeness 15.	Even color 15.	Texture 20.	Total 100
A.....	Ice-storage.	40.7	88.2	2.2	35.8	14.0	14.3	18.1	92.2
B.....	Mechanical storage..	38.2	81.8	2.8	35.9	13.7	14.2	18.0	91.8
C.....	Mechanical storage..	43.6	80.6	3.2	35.5	13.9	14.2	18.2	92.2
D.....	Mechanical storage..	33.5	81.0	2.7	35.9	14.0	14.1	18.1	92.3
E.....	Cellar.....	53.9	87.4	4.0	33.9	13.9	14.0	17.6	89.5

Cheese.	Average Messrs. Woodard & Barr's Scores.					Cheese.	Average of all Scores.				
	Flavor 40.	Closeness. 15.	Even color 15.	Texture 20.	Total 100.		Flavor 40.	Closeness 15.	Even color 15.	Texture 20.	Total 100.
A..	37.0	14.6	14.5	19.2	95.3	A..	36.4	14.3	14.4	18.6	93.7
B..	37.3	14.7	14.0	18.9	94.9	B..	36.6	14.2	14.1	18.4	93.3
C..	37.0	14.5	14.4	18.6	94.6	C..	36.2	14.2	14.3	18.4	93.4
D..	37.9	14.8	14.0	18.9	95.6	D..	36.9	14.4	14.5	18.5	93.9
E..	35.0	14.7	14.5	18.5	92.7	E..	34.5	14.3	14.2	18.1	91.1

1. The higher the temperature for ripening cheese the greater the loss by shrinkage. An average temperature of 54° for ripening flat cheese weighing about 32 lbs. each, caused an excess shrinkage of 1.8 per cent. as compared with ripening cheese in ice storage at about 40° and where the air of the rooms contained about the same percentage of moisture; viz., 87 to 88 per cent.

2. The quality of the cheese ripened at average temperatures of 33° F., 38°, 40°, and 44°, as very much alike. Those ripened at the higher temperature of 54° scored from 2 to 3 points less—chiefly in flavor. The texture of these cheese was also somewhat poorer, averaging about one-half point less than those ripened at the lower temperature.

3. Considering all the results obtained from three years experiments we should conclude that the lower the uniform temperature at which cheese can

be ripened economically the better will be the quality of the cheese and the less will be the loss in weight during the ripening process.

It is granted that with perfect milk for manufacturing cheese good results can be obtained by ripening at 60° to 65°, but under ordinary Canadian factory conditions, perfect milk is seldom, if ever, got for cheese-making, consequently cheese made from imperfect milk are likely to develop "off" flavors when ripened at a temperature much above 40° F. British cheese merchants are, as a rule, prejudiced against this "new fangled notion" of curing cheese in cold-storage. We hope to be able to make some commercial experiments during 1906, and bring to a commercial basis the work done in this connection during the past three years.

Moving Cheese from Ordinary Room at the end of one Week to Ice and Mechanical Cold-Storage for Ripening.

This is the third season for this experiment and all that will be necessary at present. During the year, eleven experiments were made for which were manufactured 18,167 lbs., milk testing an average of 3.75 per cent. fat. An average of 1,651 lbs., milk were used for each experiment. The whey contained an average of .23 per cent. fat. The acidity at "dipping," "milling" and "salting" averaged .190, .741 and 1.04 per cent. respectively. Most of the season, four cheese weighing an average of about 35 lbs., each, were made from each lot of milk. Two of the cheese were placed in an ordinary ripening (curing) room where the average temperature was 65°, for one week. At the end of a week, one cheese was removed to an ice cold-storage and the other to mechanical cold-storage. The other two were put directly from the press into mechanical or ice storage and remained there during the ripening period.

One experiment was made in September and one the first week in October by using sufficient milk to make six cheese. Four of the cheese were treated as above, but one was moved from the ordinary room to a room in the basement of the Dairy at the end of one week. Another cheese was placed directly from the press in the basement room where the temperature averaged 51° F. The September lot was made from milk having a bad flavor. The lots ripened in cold-storage all scored an average of 38.5 out of a possible 40 for flavor, while the cheese ripened in the basement room scored but 33 for flavor and the one moved to the basement from the ordinary room at the end of one week scored 31. This emphasizes the principle previously noted, that cheese made from milk of poor flavor should be ripened at as low a temperature as possible. The lot made in October and ripend in the basement were scored somewhat higher by Mr. Barr than were those ripened in cold-storage. This was probably due to those cheese being riper at the time of scoring.

The cheese were weighed when taken from the hoops and again at the end of one month. Part of the cheese were scored by the Dairy staff and part by Messrs. Barr and Woodard. The scores of the latter are averaged together.

Shrinkage and Quality of the Cheese.

The main points in the results of the experiments are shown in the table which follows:

Method of Ripening.	Average temperature of room.	Average per cent. moisture in air of room.	Average per cent. shrinkage.	Cheese.	Scorer.	Average Scores. Flavor. 40	Closeness. 15	Even color. 15	Texture. 20	Total. 100
Ice storage	40.7	88.2	2.1	A	Dairy	35.60	13.83	14.06	18.06	91.56
Mechanical storage	38.2	81.8	2.6	B	"	35.86	13.80	14.06	18.00	91.73
One week ordinary room then ice storage			2.5	C	"	36.00	13.90	14.06	18.20	92.13
One week ordinary room then mechanical storage			3.0	D	"	36.13	13.96	14.06	18.06	92.23
Basement room	51	85.0	2.8	E	Mr. Barr	35.20	14.50	14.50	18.20	92.70
One week ordinary room then basement			3.3	F	" "	34.20	14.50	14.50	18.20	94.50
				A	Messrs. Barr & Woodard	37.25	14.62	14.56	19.00	95.18
				B	Messrs. Barr & Woodard	37.37	14.62	14.56	19.00	95.67
				C		37.62	14.50	14.37	18.56	95.18
				D		36.61	14.21	14.30	18.50	93.58
				A	Average of all scores.	35.94	14.00	14.17	18.31	92.38
				B		36.18	13.97	14.17	18.21	92.56
				C		36.34	14.00	14.13	18.27	92.75
				D		36.31	14.05	14.10	18.16	92.63

1. The cheese ripened in the ordinary room for one week then moved to the basement room lost most in weight. Those moved to mechanical storage at the end of one week came next and those in the ice storage had least loss during one month. Allowing the cheese to remain in the ordinary room for one week before moving to cold-storage, caused a loss, of about one-half per cent. more as compared with those placed directly in cold storage after taking them from the press.

2. When all the scores are averaged we find little or no difference in the quality of the cheese whether placed directly into cold storage or at the end of one week in an ordinary room. We may therefore conclude that cheese may be moved once a week to cold-storage from the ordinary factory ripening (curing) rooms, without deteriorating the quality of the cheese, though the shrinkage will be greater.

In the September experiment where the cheese were made from milk which was not of good flavor, we have a striking example of the value of a low temperature for ripening cheese. The cheese ripened in cold-storage were good in flavor, while those ripened at 51°, much lower than the average factory room, were decidedly "off" in flavor. We also found that allowing this cheese to remain in the ordinary room at 65° for a week before moving to the basement ripening room tended to cause an increase in the objectionable flavor.

Placing Cheese on Shelves vs. Boxing Directly from the Press.

This is the third year during which these experiments have been conducted. The practical bearing lies in its application to a system of ripening (curing) cheese in cold storage at the factory or at some central point during which the cheese would not be removed from the boxes. If this be

practicable it means a great saving of labor in the handling of the cheese and also a saving of space for ripening and storing the cheese.

PLAN OF EXPERIMENTS. During the year ten experiments were made, in which were used 13,382 lbs. milk, testing an average of 3.6 per cent. fat. The average loss of fat in the whey was .21. About 1,400 lbs. milk were made into two cheese, weighing about 65 lbs. each, for each experiment. In half the experiments one cheese was placed directly from the hoops into a well-seasoned, clean box and the other cheese was placed on a shelf, in mechanical or ice cold-storage. The other half of the experiments were conducted similarly, except that one of the cheese was placed in a box in cold storage after being on a shelf for one week in cold storage. A portion of the cheese from the ice storage were sent to Montreal where they were scored by A. W. Woodard, Official Referee. The remainder were scored at the Dairy Department of the College. All cheese were weighed when taken from the hoops and again at the end of one month. This latter is known as "ripened cheese".

RESULTS. The main points of the experiments may be summarized conveniently in the following table:

Method of Ripening.	Scorer.	Average Flavor. 40	Average Closeness. 15	Average Color. 15	Average Texture. 20	Average Total. 100	Per cent. Shrinkage in one month.
Ripened in box, ice storage 40° F	Dairy	37.5	14	14.2	18.8	94.5	1.4
" " " "	Mr. Woodard	38.5	14.5	11.0	18.0	92.0	
" on shelf, " "	Dairy	37.0	14.0	14.2	18 0	93.2	2.4
" " " "	Mr. Woodard	36.5	14.5	11.0	18.5	90.5	
" on shelf one week then boxed	Dairy	35.5	14.0	14.2	18.2	91.7	1.8
" " " "	Mr. Woodard	37.0	14.0	14.0	19.0	94.0	
" in box, ice storage.....	Dairy	35.2	14.0	14.2	18.0	91.4	1.4
" " "	Mr. Woodard	37.0	14.5	14.5	19.5	95.5	
" " mech. storage 40° F..	Dairy	35.5	14.0	14.0	18.0	91.5	1.6
" on shelf, " " ..	"	35.5	14.0	14.0	18.0	91.5	2.3
" " " one week then boxed	"	38.0	14.0	14.0	19.0	95.0	1.8
" in box whole periad.....	"	38.0	14.0	14.0	19.0	95.0	1.5

1. Averaging all the scores for flavor and total, we find that the cheese ripened for the full period in the box, stand first for flavor (36.9) and second in total score (93.3). Those ripened one week on a shelf in cold storage then placed in a box, stand second in flavor (36.8) and first in total score (93.5). Those ripened on the shelf scored an average of 36.3 and 91.7 respectively for flavor and total. These results agree with the experiments of the past two years, and indicate that it is quite practicable to put cheese from the hoops into a clean dry box and place them in cold storage at 40 degrees F. If preferred, they may be placed on a shelf for a week before placing in the boxes. The chief objection to the plan is the strong development of mould on the cheese and in the box.

2. The shrinkage in the ice storage was about one per cent. less on cheese boxed directly from the press as compared with the shrinkage on

cheese placed on shelves in an ice cold storage, and about one-half per cent. less than on those put on shelves for one week before boxing.

In mechanical cold storage the differences were about three-quarters of one per cent. in favor of direct boxing as compared with ripening on the shelf and one-third of one per cent. as compared with boxing at the end of one week.

Paraffining Cheese.

Five experiments were made to test the merits of coating cheese with paraffine wax. For this work, 7,259 lbs. milk, testing an average of 3.7 per cent. fat, were used. The average percentage of fat in the whey was .19. From 1,400 to 1,500 pounds of milk were made into four cheese for each experiment. The cheese weighed an average of about 37 pounds each when green. From seven to ten days after making, two of the cheese were dipped in hot, paraffine wax. The other two remained uncoated. Three lots of cheese made in May were ripened in the ordinary ripening room at an average temperature of 60 degrees to 70 degrees F. and 80 to 85 per cent. moisture in the air. Two lots made in September were ripened in mechanical cold storage at a temperature of about 44 degrees F. and 75 to 80 per cent. moisture in the air of the room.

Some of the lots were scored by Messrs. Woodard and Barr and some by the Dairy staff. The main points of the experiment are shown in the following table:

Kind of cheese.	Weight of cheese.		% shrinkage in one month.	Average scores.				
	Green.	1 month.		Flavor 40.	Closeness 15.	Color 15.	Texture 20.	Total 100.
	lbs.	lbs.						
Paraffined	374.57	366.57	2.1	33.3	13.2	14.05	18.2	89.0
Not paraffined	374.10	360.13	3.7	34.1	13.9	14.10	18.3	90.3

1. The cheese not paraffined lost in weight about 1½ per cent. more in one month than did similar cheese paraffined.

2. The quality of the cheese paraffined was not quite so good as the uncoated.

3. It is doubtful whether paraffining cheese is advisable for the ordinary factoryman. Most of the dealers in Great Britain object to paraffined cheese. The plan may be advisable for the cheese speculators, as it prevents excessive shrinkage.

EXPERIMENTS IN DAIRY STABLE.

Bran, Oats and Oil-cake Compared with Bran and Blatchford's Calf Meal for Feeding Calves.

The experiment commenced February 1st. 1905. Four Holstein calves, varying in weight from 195 to 525 lbs., and in age from 2½ months to 6 months, were selected for the test. There were two calves in each lot and each lot was fed for three weeks on one of the meal mixtures, then they were

changed to another after weighing on two consecutive days. All the calves were given what hay and silage they would eat during the first two periods. In the last two periods roots also were given. No account of this rough feed was kept.

During the first period of three weeks, February 1-21, the two calves in Group 1 fed on our regular skim-milk and meal ration, consumed 1,344 lbs. skim-milk, 42 lbs. bran, 31 lbs. oats and 11 lbs. oil-cake. The two calves gained 101 lbs. in 21 days—an average of 2.4 lbs. per day for each calf.

The next three weeks, February 22-March 14, they were fed similarly to what they had been during the previous three weeks, except that Blatchford's calf meal was substituted for the oats and oil-cake. The two calves consumed 1,205 lbs. skim-milk, 49 lbs. bran and 28 lbs. Blatchford's meal. They gained 79 lbs. in live weight—an average of 1.9 lbs. per day for each calf.

From March 15th to April 5th, these two calves were continued on bran and calf meal, together with roughage, but without skim-milk. The two calves consumed 56 lbs. bran and 28 lbs. calf meal. They gained 60 lbs. in 21 days—an average of 1.4 lbs. per day for each calf. During the three weeks of April 6th to 27th, when this same group was fed bran, 42 lbs.; oats, 31 lbs.; and oil-cake meal 11 lbs., they gained 58 lbs.—an average of 1.38 lbs. daily for each calf.

Group 2, consisting of two calves, one of which was the youngest of the four, was fed from Februarv 1st to 21st, on 1,134 lbs. skim-milk, 46 lbs. bran, and 23 lbs. Blatchford's calf meal, in addition to hay and silage. In the 21 days the calves gained 76 lbs.—an average of 1.8 lbs. per day for each calf.

During the next three weeks, February 22nd to March 14th, when fed on skim-milk, 1,260 lbs.; bran, 37 lbs.; oats, 27 lbs.; and oil-cake, 9 lbs. they gained 91 lbs.—an average of 2.16 lbs. daily for each calf.

From March 15th to April 5th, when they were continued on practically the same ration as for the previous 21 days, except that the allowance of skim-milk was increased to both calves and the meal increased for the younger calf, they gained 98 lbs.—an average of 2.3 lbs. per day for each calf.

For the 21 days, April 6th to 27th, Blatchford's meal 14 lbs., was substituted for the skim-milk, oats and oil-cake for the older calf. The gain was 35 lbs. in live weight. The younger calf was given 714 lbs. skim-milk in the three weeks in addition to bran and the calf meal. The gain was 53 lbs. in live weight.

Summary.

Group 1 gave an increase of 22 lbs. more in live weight when fed skim-milk in addition to bran, oats and oil-cake as compared with being fed on skim-milk, bran and calf meal. Without the skim-milk, the calf meal produced two pounds more of an increase in live weight. We must, therefore, conclude that for these two calves when skim-milk was withdrawn the results were in favor of the calf meal, but the results were not nearly so good as when given skim-milk with either meal combination. Taking both periods, with and without skim-milk into consideration, we find that the relative gains were 159 lbs. on skim-milk, bran, oats and oil-cake, as compared with 139 lbs. on skim-milk, bran, and the calf meal.

Group 2, during the first period when fed on skim-milk, bran and calf meal, gained 76 lbs. in live weight. During the second period when fed on skim-milk, bran, oats and oil-cake, they gained 91 lbs. in live weight, an increase of 15 lbs. over the preceding period. For the next 21 days on similar feed, the gain was 98 lbs. For the last period of 21 days when the skim-milk was withdrawn from one of the calves and the calf meal substituted, the gain dropped from 50 to 35 lbs. The other calf, fed on the calf meal and skim-milk, continued to gain satisfactorily, 53 lbs. as compared with 48 lbs. for the previous period on the regular ration. Summing up all the gains made on the skim-milk, bran, oats and oil-cake we find the total to be 348 lbs. The total gains on skim-milk, bran, and Blatchford's calf meal were 303 lbs., a difference of 45 lbs. in favor of the former.

Nearly all our experience goes to prove that thrifty calves for the Dairy may be reared on skim-milk, wheat bran, ground oats, and a little oil-cake or flax-seed meal, after getting a start for about three weeks on whole milk. The meal should be fed dry as soon as possible. Some clover hay and pulped roots and a small amount of good corn silage or green feed may also be fed. If kept clean and dry and in the stable largely during the first season, there is no reason why dairymen may not rear thrifty calves without whole or new milk except for a short time, say three weeks. It is difficult, however, to rear thrifty calves without the aid of skim-milk.

Meal for Cows Milking.

Owing to the increased price which dairy farmers must pay for meal which is purchased, it is very important to know how much meal may be economically fed to cows giving milk. It is obvious that this will vary according to the appetites and capacities for milk, of different cows. The period of lactation is also an important factor in determining the amount of meal which can be profitably fed to cows.

The standard in the dairy stable of the College is about eight pounds of meal, composed of four parts bran, three parts oats, and one part oil-cake by weight, per cow daily, where cows are producing about three gallons of milk or one pound of butter per day. In order to secure some data on the relative food cost of milk and butter from feeding 4, 8 and 12 pounds of meal daily, in addition to roughage consisting of corn silage, mangels and hay, an experiment was commenced January 1st, 1905, and was continued for three months. As originally planned it was intended to have three cows in each group—one fresh, one which had been milking for three or four months and one over six months in lactation. One cow in each of two groups ceased milking before the experiment was continued very far, consequently, they had to be dropped from the test. Seven of the cows continued throughout the three months of the experiment.

Group 1, consisting of cows 67 and 71 were given four pounds of meal daily during January and produced 1,519 pounds of milk testing an average of 3.3 per cent. fat. The average daily yield per cow was 24.4 lbs. The yield of butter from the two cows, adding one-sixth to the fat, was 58.9 pounds. The cost of the feed for the two cows during January was $6.20. The food cost of one hundred pounds of milk was 40.8 cents. The food cost of one pound of butter was 10.5 cents. The cows gained 68 pounds live weight during the month. During February this group, fed on eight pounds of meal daily, produced an average of 24.5 pounds of milk per cow

daily, testing an average of 3.3 per cent. fat. The average food cost of 100 lbs. milk was 52.2 cents and of a pound of butter, 13.6 cents, an increase in cost of 11.4 cents per 100 lbs. milk and 3.1 cents per pound of butter. A part of this, however, was doubtless due to advancing lactation. One cow lost 17 lbs. live weight and the other gained 17 lbs., so that the group neither gained nor lost in weight. The cost of the feed was $7.19 for the month.

In March this group fed on 12 lbs. meal daily, produced an average of 24.5 lbs. milk per cow daily, testing an average of 3.3 per cent. fat. The food cost of 100 lbs. milk was 71.2 cents; of a pound of butter 18.3 cents. The cows did not gain any in live weight, but on the contrary lost 30 lbs. The cost of the feed for the two cows for the month was $10.85.

Group 2, consisting of Nos. 15 and 78, when fed on eight pounds of meal daily produced 1,791 lbs. milk testing 3.15 per cent. fat during January, or an average of 28.8 lbs. daily per cow during the month. The production of butter was 65.21 lbs. for the month. The cost of the feed was $8.48 for the two cows. The food cost of 100 lbs. milk was 47.3 cents and of a pound of butter 13 cents. The gain in live weight was 80 lbs. for the group or 40 40 lbs. per cow.

In February, this group fed on 12 lbs. meal daily, produced an average per cow of 28.7 lbs. milk daily, testing 3.25 per cent. fat. The food cost of 100 lbs. milk was 60.5 cents and of a pound of butter 15.9 cents. The total cost of the feed for the two cows was $9.75 for the month. The gain in live weight was 4 lbs., or 2 lbs. per cow for the month.

In March this group received 4 lbs. meal daily in addition to roughage. The average daily milk yield per cow was 24.2 lbs. testing 3.3 per cent. fat. The food cost of 100 lbs. milk was 44.8 cents, or 15.7 cents less than for the previous month when fed 12 lbs. meal daily. The food cost of one pound of butter was 11.4 cents as compared with 15.9 cents for the previous month. One cow gained three lbs. in live weight and the other lost 33 lbs., making an average loss of 15 lbs. live weight per cow for the month. The cost of feed for the month was $6.74.

Group 3, consisting of three cows, Nos. 21, 76 and 99 produced during January, when fed on 12 lbs. meal daily per cow, in addition to roughage, an average of 25.5 lbs. milk daily per cow. The milk tested 3.9 per cent. fat. The cost of the feed was $5.76 per cow for the month. The average food cost was 72.7 cents per 100 lbs. milk and 16.8 cents per pound of butter. The gain in live weight was an average of 29.3 lbs. per cow for the month. Group 3, during February when changed from 12 lbs. to 8 lbs. meal daily per cow produced an average of 23.8 lbs. milk per cow daily, testing an average of 4 per cent. fat. The food cost of 100 lbs. milk was 54.7 cents and of one lb. of butter 12.5 cents as compared with, 72.7 cents and 16.8 cents for the previous month when fed 12 lbs. meal daily. One cow gained 3 lbs. in live weight, one lost 6 lbs., and the other lost 15 lbs. The average loss in live weight per cow during the month was 6 lbs.

In March this group when fed 4 lbs. meal daily gave an average daily milk yield of 20.9 lbs., testing 4.1 per cent. fat. The food cost of 100 pounds milk was 50.7 cents and of a pound of butter 11.1 cents. All three of the cows lost in live weight during the month, the average being 18.3 lbs. per cow for the month.

The following table shows the chief points of the experiment in brief form:

Lbs. meal fed daily.	Group.	Month.	Average daily milk yield per cow.	Average % fat in milk.	Food cost of 100 lbs. milk.	Food cost of 1 lb. butter.	Live weight per cow. Gain (+ Loss (-
			lbs.		cents.	cents.	lbs.
..	1	Jan.	24.4	3.3	40.8	10.5	+34
4	3	March	20.9	4.1	50.7	11.1	=18
..	2	March	24.2	3.3	44.8	11.4	=15
..	Average.	.....	23.16	3.56	45.4	11.0	+1
..	2	Jan.	28.8	3.1	47.3	13.0	+40
8	1	Feb.	24.5	3.3	52.2	13.6	
..	3	Feb.	23.8	4.0	54.7	12.5	=6
..	Average.	.....	25.7	3.46	51.4	13.0	+34
..	3	Jan.	25.5	3.9	72.7	16.8	+29
12	2	Feb.	28.7	3.2	60.5	15.9	+2
..	1	March	24.5	3.3	71.2	18.3	=15
..	Average.	.....	26.2	3.46	68.1	17.0	+12

1. Different cows and groups of cows give different yields of milk and milk-fat when fed on feed similar in kind and quantity. The same may be said regarding the percentage of fat in the milk and the food cost of the milk and butter. This difference is probably due to the individuality of the animals and to the effects of lactation. However, when we average the percentages of fat in the milk given by the different groups, we find it is about the same whether fed on 4. 8 or 12 lbs. of meal daily per cow. The average percentages of fat were 3.56, 3.46 and 3.46, for 4, 8 and 12 lbs. of meal respectively.

2. The highest daily yield per cow was from the 12 lbs. meal fed daily. but the milk was produced at an average cost of 68.1 cents per 100 lbs., while the 8 and 4 lbs. meal produced milk respectively at 51.4 cents and 45.4 cents per 100 lbs. The food cost of one pound of butter was 17, 13 and 11 cents respectively from feeding 12, 8 and 4 lbs. meal daily to each cow.

3. All three groups made gains of live weight in January, and tended to lose in weight during the next two months. Owing to the difficulty in securing accurate live weights of cows we are not inclined to lay much stress on this point, except to say that the heavy meal ration apparently did not cause much increase in live weight. It would seem as if the heavy meal ration was largely wasted on these particular cows.

4. The lesson for the practical feeder to learn is that he needs to study each cow in order to know her meal capacity for economical milk production. This capacity with average cows will probably be about 8 lbs. per cow daily and less than this for many cows.

"Sugar and Flax-seed Meal."

We receive many requests to test different kinds of feed. This we do so far as possible, on two conditions:

1. That the party supply the feed free of cost to us.

2. That the results shall be available for publication whether for or against.

Beginning February 1st, 1905, two cows, Nos. 56 and 69, received 1½ lbs. daily of "sugar and flax-seed meal" in addition to the regular meal ration, and roughage consisting of corn silage, hay and mangels.

During January, No. 56 produced 1,184 lbs. milk, a daily average of 38.1 lbs., testing 3.8 per cent. fat, or a total of 44.9 lbs. fat for the month, when fed the regular meal ration of bran, oats and oil-cake, eight pounds daily.

In February, when receiving the "sugar and flax-seed meal" in addition to the regular ration, the average daily production of this cow was 36.7 lbs. of milk, testing 3.6 per cent fat. The cow gained 13 lbs. in live weight.

Cow No. 69 produced during January an average daily milk yield of 32 lbs., testing 3.5 per cent. fat. In February, when receiving the "sugar and flax-seed meal" in addition to the regular meal ration, this cow produced an average of 27.7 lbs. milk daily testing 3.8 per cent. fat. She lost 23 lbs. in live weight during the month.

If we allow ten per cent. per month decrease in the milk flow as the result of advancing lactation then the "sugar and flax-seed meal" more than sustained the natural decrease. This, however, is probably too much to allow for cows comparatively fresh. During March, the month following that of the experiment, on the ordinary ration, No. 56 gave 1,073 lbs. milk, or a daily average of 34.6 lbs., as compared with 36.7 lbs. for February, and 38.1 lbs. for January. Cow No. 69, on the ordinary ration, produced 798 lbs. milk in March, a daily average of 25.7 lbs., as compared with daily averages of 27.7 and 32 lbs. for February and January respectively.

If we take the average daily yield of milk for January and March, the months before and after using the "sugar and flax-seed meal", and compare this with the average daily yield for February, the month of the test, we shall have eliminated the effects of lactation period to a large extent. By so doing, we find that cow No. 56 produced an average daily yield of 36.3 lbs. milk for the two months—one before and one after using the "sugar and flax-seed." During the month on which she was fed the "sugar and flax-seed", the average daily yield was 36.7 lbs., an average increase of .4 lbs. daily, which would not be sufficient to pay for the cost of the feed. Cow No. 69 produced an average daily yield of 28.8 lbs. for the two months on ordinary feed, and 27.7 lbs. when the "sugar and flax-seed meal" was added. Averaging the results from the two cows we find that on the ordinary ration for the two months, they gave an average daily yield of 32.5 lbs. milk. For the month when "sugar and flax-seed meal" was added, the average daily yield was 32.2 lbs. In the case of these two cows we conclude that the addition of 1½ lbs. of "sugar and flax-seed meal" did not increase the flow of milk.

DAIRY HERD.

The herd in the Dairy Department on November 30th, 1905, consisted of seven Holstein cows, six heifers, and two calves; six Ayrshire cows, and two calves; four Jersey cows, and one calf, eight grade cows, and four grade heifers and calves, making a total of forty head.

While it is no doubt convenient for class-room purposes to have representatives of three dairy breeds in the herd, we think it is not economical to maintain a herd composed of three distinct breeds of cattle. It would be much easier to maintain an efficient herd consisting of *one distinct breed*, and, if necessary, a few grades for milk production, than to try to keep up a composite herd, or what is reallv three herds. By having but one breed all our energies and funds could be directed towards securing the best specimens of this breed, and the results would be much more satisfactory.

The milk from each cow in the dairy herd is weighed morning and evening and samples are taken daily for testing. What is known as a composite sample is made and this is tested once a month for fat. The pounds of milk given by each cow are multiplied by the test to ascertain the amount of fat. One-sixth is added to the fat in calculating the yield of butter. The feed was charged to each cow at the following prices: hay, $6 per ton; corn silage, $1.50 per ton; mangels, 7 cents per bushel of 60 pounds; wheat bran, $14 to $16 per ton; oats, $20 per ton; oil-cake, $28 per ton; and pasture $5 per cow for the season. Most of the milk produced by the herd is sold to customers or to the College and Macdonald Hall at four cents per quart. In calculating the profit from the cows over cost of feed, they have been credited with milk at $1.60 per 100 lbs. The value of, and profit on, the fat, is based on the prices per pound of fat paid farmers for milk delivered at the Dairy during the past year, which were as follows by months: December, '04, January, February and March, '05, 25 cents; April, 22 cents; May, June and July, 18 cents; August and September, 20 cents; October and November, 22 cents.

The main points in the record of the herd for the year are shown in the table. The cows are ranked in the order of milk production, because our chief business is to produce milk for sale. No attempt is made to charge for labor, which in our case, is above the average. Neither are the cows credited with the value of the offspring, or by-products.

A few cows are purchased each year, but the herd is largely maintained by the natural increase, as practically no heifer calves are sold. Our aim has been to spend little or no more money for the purchase of stock than is received from the sale of cows which have proved to be unprofitable milkers, or which have failed to breed; and from the sale of bull calves. As the bulk of such stock must necessarily be sold cheap, we are unable, by pursuing this policy, to pay fancy prices for cows. This is rather a slow method of building up a Dairy herd, but it is the plan chiefly followed by economical farmers.

Record of Dairy Herd for 12 Months from Dec. 1, 1904, to Nov. 30, 1905.

Rank.	Name or No. of cow.	Age in years.	Breed.	Live weight.	No. days milking.	Lbs. milk.	Av. % fat.	Lbs. fat in milk.	Lbs. butter, adding 1/6 to fat in milk.	Value of fat @ 18c. to 28c. per lb.	Value of milk @ $1.60 per 100 lbs.	Cost of feed.	Profit over cost of feed — On milk fat.	Profit over cost of feed — On milk
				lbs.						$ c.	$ c.	$ c.	$ c.	$ c.
1	Mercena II (38)	8	Holstein	1,130	285	10,249	3.6	368.32	429.70	81 20	163 98	46 20	35 00	117 78
2	Abby Mercena (56)	4	"	1,400	313	9,646	3.8	369.47	431.05	81 20	154 33	43 18	38 02	111 15
3	Margaret Corn (15)	8	"	1,378	320	9,527	3.2	309.35	360.90	69 02	152 43	38 60	30 42	113 83
4	Molly (21)	9	Grade Holstein	1,355	302	9,449	3.6	335.52	391.44	75 46	151 18	35 93	39 53	115 25
5	Dolly (17)	9	"	1,540	301	8,648	3.5	299.13	348.98	61 05	148 36	36 50	24 55	111 86
6	Beauty of Norval (67)	11	Holstein	1,115	325	8,356	3.4	283.27	330.48	63 62	133 69	40 41	23 21	93 27
7	Lady Rockwood (78)	3	"	1,060	365	7,680	3.3	256.04	300.04	55 64	122 88	33 25	22 39	89 63
8	Molly II (69)	3	Grade Holstein	1,230	350	7,645	3.6	272.83	318.30	59 59	118 32	36 42	23 17	81 90
9	Jean III (28)	6	Grade Ayrshire	1,075	250	6,572	3.91	259.56	302.82	50 96	105 15	28 19	22 77	76 96
10	Lilly (26)	7	Jersey	749	300	6,559	4.3	284.00	331.33	58 50	104 94	30 74	27 76	74 20
11	Lady Nancie (66)	5	Ayrshire	890	287	6,487	3.8	246.32	287.37	49 32	103 79	28 42	20 90	77 37
12	Molly de Kol (77)	4	Holstein	1,365	271	6,390	3.2	203.61	237.54	45 05	102 24	33 81	11 24	68 43
13	Florence (44)	5	Grade Ayrshire	1,065	286	6,040	3.5	210.95	246.10	43 08	96 64	27 51	15 57	69 13
14	Rena (70)	4	Cross-bred Ayrshire-Jersey	870	306	5,497	4.7	261.97	305.63	56 36	87 95	25 77	30 59	62 18
15	Lady Springwood (61)	4	Holstein	1,225	268	5,102	3.3	169.27	197.48	37 19	81 63	23 02	14 17	58 46
16	Lucy II (71)	3	Grade Holstein	895	268	4,740	3.2	155.17	181.03	34 23	75 84	24 36	9 87	51 47
17	Margaret II (79)	5	Holstein	1,176	212	4,726	3.1	146.50	170.90	33 21	75 61	21 14	12 07	54 76
18	Glen Bessie (65)	5	Ayrshire	998	239	4,528	3.6	163.32	190.54	34 17	72 44	25 84	8 33	46 60
19	Anna Dobbins (99)	3	Jersey	815	365	4,374	5.2	226.77	264.56	49 01	69 98	31 38	17 63	38 60
20	Glennie (97)	2	Ayrshire	822	179	4,173	3.8	160.38	187.11	31 96	66 76	11 39	20 57	55 37
21	Matty (101)	6	Grade Jersey	1,160	211	4,157	4.1	170.93	199.41	32 96	66 51	16 97	15 96	49 54
22	Daisy De (72)	3	Holstein	1,200	340	3,939	3.3	128.34	149.73	27 96	63 02	23 32	4 64	39 70
23	Kalopathakes (98)	3	Jersey	760	332	3,909	4.4	172.99	201.82	37 56	62 54	27 70	9 86	34 84
24	Patience 6th (96)	2	Ayrshire	850	170	3,310	3.8	124.83	145.63	24 81	52 96	11 39	13 42	41 57

COMMENTS ON HERD RECORD.

1. As in former years, the Holsteins stand at the head of the list in quantity of, and profit on, milk and butter. One Jersey stands sixth in profit on milk-fat (butter), and quantity of butter, and tenth in quantity of milk.

2. One cow gave over 10,000 lbs. of milk during the year; four gave over 9,000 lbs.; six over 8,000 lbs.; eight over 7,000 lbs.; and thirteen over 6,000 lbs. A number of those under 6,000 lbs. are heifers with first calf. Some of those under the 6,000 lbs. mark have been disposed of as unprofitable milkers. Some of them will be given another opportunity to demonstrate their ability to produce milk profitably. Our herd numbers about thirty cows, of which nearly one-third are in the transitional stage; *i.e.*, either beginning their record, or about to leave. Some have left. The average for the whole herd is 6,321 lbs. milk per cow for the year. Two of the cows have produced over 400 lbs. butter, and eleven over 300 lbs. butter during the year. The average for the herd is 270 lbs. butter per cow for the year. In calculating the butter, one-sixth is added to the milk-fat.

3. The cost of the feed for cows which have been in the herd for the full year varied from $23.31 to $46.20. Numbers 61, 71, 79, 96, 97, and 101 have been members of the herd for only part of the year, hence their cost of feed is comparatively low. Cows which have been in the herd for the whole year are charged for their feed whether milking or not.

4. The value of the milk, at four cents per quart ($1.60 per 100 lbs.) ranged from $52.96 to $163.98. The value of the milk, at the prices paid farmers who patronized our creamery during the past year, ranged from $24.81 (a two-year old heifer milking for less than half the year) to $81.20. (It is possible that one cow might give more milk fat in a year than another, yet the fat might be of less value, if she produced this largely at a season of the year when fat was lower in price, for instance in June.)

5. The profit on the milk-fat (butter) over cost of feed, ranged from $4.64 (a heifer that did not drop a calf during the year) to $39.53. The profit on the milk, over cost of feed, ranged from $34.84 to $117.78.

6. We may repeat what we stated last year, that if we were aiming at high yields regardless of cost of production we could increase the average record considerably, but we are aiming to produce milk and butter economically. After a certain point in milk and butter production is reached, the cost to increase the yield is very much greater. We are continually striving to find cows that will give a maximum quantity of milk and butter at a minimum cost of feed. This is not an easy thing to do, unless we are prepared to expend considerable capital in the purchase of *tested* cows.

The breeding, feeding, and economical management of profitable dairy cows is one of the greatest problems in connection with the dairy industry.

All of which is respectfully submitted.

H. H. DEAN.

PART IX.

THE PROFESSOR OF ANIMAL HUSBANDRY AND FARM SUPERINTENDENT.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith my thirteenth annual report.

Regarding my work in the College, I beg to say that my assistant, Mr. M. Cumming, resigned during the year to accept the position of Principal of the new Agricultural College at Truro, N. S. Mr. Cumming's resignation was a distinct loss to the College, but we have been very fortunate in securing the services of Mr. H. S. Arkell, B.S.A., M.A., who is exceptionally well equipped for the work, and is giving excellent satisfaction.

FARM SUPERINTENDENCE.

ROTATION OF CROPS. The rotation of crops practised upon the College farm is practically the same as that inaugurated by my predecessor, Mr. William Rennie. The farm is divided into four sections. One of these sections consists of newly seeded meadow, and another of second year meadow. The third section contains the roots, potatoes, and corn, and the balance of the section which is not required for these crops is sown with either barley or oats. Formerly, peas used to be employed in filling out this section, but, owing to the prevalence of the pea weevil, we have not sown peas for the past two years. The fourth section is sown with cereal crops, such as fall wheat, oats and barley, and is all seeded with clover and timothy. If this rotation were followed out strictly, it would give us half the arable land in hay and pasture, which is rather more than our circumstances require. During the past few years, therefore, we have made a practice of plowing up a part of our one year old meadow in the fall and sowing it with rape the following season. As the remainder of the section is in grass, it gives an excellent opportunity to pasture stock on the rape, as the animals do much better when they can secure a certain amount of grass with the rape. If a part of any section is infested with any specially troublesome weed, this practice also gives us an opportunity to check the growth of this weed, as we can cultivate the ground until nearly the end of June before sowing the rape, and, if we think it advisable, we can follow the rape crop with corn or roots the following season. Two hoed crops such as these grown in succession form a very effective manner of dealing with most troublesome weeds. In our rotation, the corn, roots, etc., follow the two year old sod, and are followed in turn by the cereal crops. Owing to the fact that we have to fill in part of the section upon which the hoed crops are grown with a cereal crop, it necessitates growing two cereal crops in succession on part of this section. This is not a serious objection, however, when the land is allowed to lie two years out of four under grass, but care must be taken the next time that this section comes under the same crops, that the hoed crops are put on that part of the section which previously grew cereal crops. By observing this precaution, all parts of each section receive the same treatment in the course of eight years.

CULTIVATION. As previously intimated, our root and corn crops follow two year old sod. This sod is plowed the previous season, about four inches deep, commencing as soon after haying as possible, and plowing whenever

harvesting operations will permit. In this way, practically all the land that is intended for hoed crops the following year can be plowed before the end of August. Immediately after plowing, the ground is rolled and then harrowed, and in a very short time the sod will rot. Subsequently, the spring tooth cultivator is used to tear up any weeds that may start. We usually employ broad points on the teeth of the spring tooth cultivator for the purpose of cutting weeds. We also use the King cultivator for this purpose, which is equipped with extra broad points and is very useful for cutting thistles. Two or three cultivations of this kind during the autumn are very beneficial in checking the growth of weeds. The manure is applied to the root and corn ground during the fall and winter, and is spread upon the surface, except when the snow is extremely deep, when we sometimes pile it in large heaps in the field and draw it from these heaps in the spring with the manure spreader. For potatoes, we prefer to have the manure applied in the fall and the ground afterwards ribbed up with double mould-board plows, but some years there is not time to do this before the frost comes. In the spring, the ground which has been manured is gang plowed lightly, harrowed, and then cultivated both ways with the King cultivator with narrow points, which loosens the ground to a depth of from six to eight inches, and thoroughly mixes the manure with the soil. We use this implement for the potato, mangel, and corn ground. That part of the section which is filled in with a cereal crop, such as barley or oats, is merely harrowed and cultivated to prepare the seed bed. If any of it, as is frequently the case, is manured through the winter, it is gang plowed in the spring. During the past two seasons we have sown mangels on the flat, using a corn planter for the purpose, setting the planter to sow the seed in drills. It requires a good deal of seed for this purpose, but we have had very satisfactory results so far as germination is concerned. It takes more time to thin the plants when they are on the flat, but in a dry season, we think the better germination pays for the trouble.

For potatoes, the ground, after being thoroughly prepared as previously described, is rolled and then ribbed up with a double mould board plow in ridges thirty inches apart. The potatoes are planted about a foot apart between these ridges, and as soon as the potatoes are planted the ridges are split with the plow. After the ground has had time to settle, it is harrowed so as to make the surface level. Occasional strokes with the harrow prevent the formation of a crust on the surface and also tend to check the growth of weeds. After the potatoes are well up, the scuffler must be used between the drills.

The corn ground is prepared practically the same as the mangel ground, and we have planted both in hills and in drills. The only advantage that we can see from planting in hills for silage purposes, is that it allows of cultivation both ways and thus lessens the amount of hand hoeing. We plant our corn forty-two inches apart whether in hills or in drills. The ground is prepared for cereal crops by means of the harrow and cultivator, and we believe it pays to thoroughly prepare a seed bed for all crops.

Crops. Our crops during the past season were as follows:—

119 acres of hay, which averaged nearly 3 tons per acre.

10 acres winter wheat, which is not yet threshed, but which will yield about 35 bushels per acre.

38 acres of Mandscheuri barley, with an average yield of 50 bushels per acre.

58 acres of Siberian oats, which are not yet threshed.

10 acres Yellow Intermediate mangels, which yielded 1,050 bushels per acre.

8 acres of potatoes, mostly Empire State, which averaged 190 bushels per acre.

33 acres White Cap Yellow Dent corn for silage. The crop was well matured at the time of cutting and yielded about 15 tons per acre.

14 acres of rape, which was used for pasturing steers and sheep. In addition to this we have about 50 acres in pasture.

MEADOW. Our usual mixture for hay consists of eight pounds of red clover and four pounds of timothy per acre. Sometimes a small proportion of alsike is included in the mixture, but not always.

PASTURE. For several years we have been using some grasses in addition to the ordinary seed mixture on that part of the farm which is intended for pasture. The grasses used are orchard grass, meadow fescue, and tall oat grass. These were sown at the rate of five or six pounds per acre in addition to the ordinary mixture of red clover and timothy. From observations on these grasses, we have come to the conclusion that probably a mixture of orchard grass and meadow fescue, in addition to the red clover and timothy, will give the best results for pasture. Orchard grass is very early, will keep green during extremely dry weather, and will grow up quickly after being eaten. Meadow fescue is not quite so early, but grows well during the summer, and is a grass of excellent quality. They are very much more satisfactory for pasture than timothy alone, as timothy is a very slow grower after being eaten down, especially during dry weather. Timothy also does not start nearly so early in the spring as the other grasses mentioned. Orchard grass, however, is not very satisfactory for hay, as it is a rather coarse grass, and therefore we do not include it in our hay mixture. By adding one or two of these quick growing grasses to our ordinary mixture on the ground intended for pasture, we are able to carry more stock through the summer on a given acreage.

LIVE STOCK.

The most important additions to our stock during the year comprise an imported Shorthorn cow and her calf, purchased at W. D. Flatt's dispersion sale; and an imported Shorthorn cow and her calf, and a yearling heifer, purchased at the dispersion sale of E. C. Attrill. We believe that our stock is improving from year to year, though it will be necessary to make additions from time to time for some years to come.

STEERS. At the present time we have thirty-four steers on experiment. These comprise both short-keep and long-keep steers. The ration for the short-keep steers is as follows: Mixed feed in proportion of 1 part of hay, 2 parts of pulped roots, and 3 parts of silage, by weight. Of this mixture they get all they will eat up clean, and they take from 40 to 45 pounds each per day. The meal ration consists of 3 parts of barley to one of bran by weight. The heaviest steers are receiving about 10 pounds of meal each per day, and the lighter ones about 7 pounds. These short-keep steers average in weight from 1,200 to 1,500 pounds. Some of them we expect to go in December or January, and the balance in February or March. The long-keep steers, which we do not expect to market until May, are receiving about the same bulky food as the short-keep steers, but at present they are receiving only 4 pounds of meal each per day. They received no meal at all until after the middle of November.

BREEDING COWS. Our breeding cows receive a mixture of bulky food similar to that fed to the steers, except that it contains slightly more roots, and each cow also receives from 8 to 10 pounds of roots at noon beside the

mixed food. Their meal ration consists of two parts ground oats to one part of bran by measure. Some of the cows receive no meal whatever, and others receive anywhere from one-half pound to five pounds of meal per day, according as we think it is required.

CALVES. Calves eight to twelve months old receive a mixture of foods consisting of one part of hay, three parts of roots, and two parts of silage, by weight. Of this they are fed all they will eat up clean three times a day, and most of them will eat from 15 to 20 pounds of this mixture. Their meal ration is the same as that fed the cows, and they eat from 4 to 5 pounds per day, each, of this mixture. In addition to this, they receive from one pound to one and one-half pounds per day of oil cake.

Younger calves receive the same kind of meal ration as the older ones, the quantity being governed by their appetite. They receive no silage, however, but are fed what clover hay and pulped roots they will eat up clean.

BULLS. Bulls are usually fed long hay, of which they eat from 12 to 15 pounds per day each. The meal ration is the same as that fed to the cows, and they receive from 3 to 6 pounds each per day according to requirements. They also receive from 30 to 40 pounds of roots per day.

SWINE. Sows with young pigs receive a meal mixture consisting of two parts of middlings, two parts of oats, and one part of bran. They are fed all they will eat up clean of this mixture, and also receive a mangel every day. After the pigs are weaned, the meal ration is cut down considerably and more roots are fed. The meal ration usually consists of middlings, oats, and bran, though sometimes other grains are included in the mixture.

Young pigs after weaning are fed a mixture of meal very similar to that fed the sows before the pigs are weaned, with the addition of skim-milk when available. If possible, the young pigs are taught to eat before they are weaned, and we get better results when they also learn to eat a few roots before they are weaned. The addition of a small proportion of mangels or sugar beets to their meal ration is a very great advantage. In summer, green feed of some kind takes the place of roots.

In winter, the sows are induced to take exercise in a shed adjoining the piggery, or sometimes they are kept in a lot near the buildings in which is a small house for them to sleep in, and they are compelled to walk about one hundred yards from their sleeping pens to the trough to get their feed. We find such an arrangement necessary in order to give the sows sufficient exercise. In summer, we have a convenient wood lot into which the sows are turned, and where they do extremely well. They receive very little meal of any kind while they are on pasture, especially those sows which are inclined to become too fat.

SHEEP. Our sheep are usually fed clover hay and roots with a light grain ration during the latter part of the winter. During the fore part of the winter, the ewes are usually fed about four pounds of roots each per day, but during the latter part this quantity is reduced at least one-half, and they are fed from one-half to one pound of oats and bran each per day.

Of course, the outline given here for feeding stock is merely approximate, as different circumstances call for changes in methods; but the brief outline submitted gives a good general idea of our methods of feeding.

PUBLIC SALE.

Our public sale of surplus stock was held October 25th, and attracted a very good attendance. Prices were not high, but, on the whole, they were

satisfactory. The sale was conducted on a cash basis, and all the money was promptly collected. The stock sold comprised the following:

Shorthorns: 2 bulls and 5 females. Two of the cows were sold with their calves.

Aberdeen-Angus: 2 bulls and 2 females, of which one cow was sold with her calf. One of the bulls was less than four months old.

Galloways: 1 bull and 2 females.

Herefords: 1 bull.

Swine: 43 head, large and small, were sold. The offering comprised Yorkshires, Berkshires, and Tamworths.

Sheep: 5 Leicester ram lambs, 13 Shropshire ram lambs, and 14 Shropshire ewes, six of which were lambs, made up the lot. Considering the ram lambs represented our entire ram lamb crop, the prices realized were very satisfactory. Below is given a general statement of prices.

	Total.	Average per head.
2 Shorthorn bulls	$115 00	$57 50
5 Shorthorn females	390 00	78 00
2 Aberdeen-Angus bulls	165 00	82 50
2 Aberdeen-Angus females	140 00	70 00
1 Galloway bull	50 00	50 00
2 Galloway females	150 00	75 00
1 Hereford bull	75 00	75 00
43 pigs, all ages	700 00	16 28
18 ram lambs	260 00	14 44
14 ewes	160 00	11 43
Total cash proceeds	$2,205 00	

Blood Meal, Tankage, and Skim-Milk for Swine.

This experiment is a repetition of last year's experiment with these foods. Blood meal and tankage are by-products of the slaughter-house, and some large slaughter-houses have special equipment for manufacturing animal foods from certain of their by-products. The blood meal and tankage used in this experiment were furnished by Swift & Company of Chicago. As yet, Canadian packing houses have made no special effort to prepare stock foods from these substances, but manufacture them all into fertilizers.

For this experiment, 40 young pigs were divided into five groups of 8 pigs each, though one pig was afterwards removed from each of Groups II and IV, as being unsuitable for the work, and the experiment was finished with 7 pigs in each of these two groups. The rations for the different groups were as follows:—

Group I. Mixed Meal and Blood Meal. At first, the ration comprised about one part of blood meal to 12 parts of mixed meal, the object being to test blood meal as a substitute for skim milk for young pigs. As the pigs grew older, the total amount of blood meal was increased but very slightly, owing to its high cost, and the average amount of blood meal to meal for the whole period was about 1:23.

Group II.—Mixed Meal and Tankage. Owing to the fact that tankage is less concentrated than blood meal, and also lower in cost, the proportion of tankage used was somewhat greater than in the case of blood meal. At the commencement, the pigs were fed tankage and meal in the proportion

of about 1:11, and the average proportion of tankage to meal for the whole period was about 1:17.

GROUP III.—MIXED MEAL AND SKIM MILK. During the earlier stages of the experiment, the pigs in this group were fed about three pounds of skim milk to each pound of meal. Towards the close of the experiment, skim milk was not always available, and the average of the whole experiment shows a little less than 2 lbs. of skim milk to each pound of meal.

GROUP IV.—MIXED MEAL, SKIM MILK AND TANKAGE. In this group, the pigs were fed about half the quantity of skim milk fed to Group III, and about half the quantity of tankage fed to Group II.

GROUP V.—MIXED MEAL. This was a check group, and was fed only the meal mixture. It contained the heaviest pigs in the experiment.

MEAL MIXTURE. During the first month of feeding, the meal mixture consisted of 3 parts of middlings to 1 part of ground oats, by weight. Then ground barley was gradually added until the mixture comprised 2 parts middlings, 2 parts ground barley, and 1 part ground oats by weight.

Valuation of Foods. The foods are valued as follows:—Meal mixture, $20.00 per ton; tankage, $33.00 per ton; blood meal, $55.00 per ton; skim milk, 15c. per cwt.

Table showing Weights, Gains, Food Consumed and Cost of Gain.

Group.	Average weight at commencement of experiment.	Total food consumed	Total gain.	Cost of 100 lbs. gain.
I. 8 pigs. Blood meal and meal.	34.5 lbs.	Meal, 4,248 lbs. Blood meal, 179¾ lbs.	1044 lbs.	$4.54
II. 7 pigs. Tankage and meal.	29.18 lbs.	Meal, 4,290 lbs. Tankage, 247¾ lbs.	1094 lbs.	$4.29
III. 8 pigs. Skim milk and meal.	28.37 lbs.	Meal, 4,520 lbs. Skim milk, 7965 lbs.	1246 lbs.	$4.58
IV. 7 pigs. Skim milk, tankage, and meal.	22.18 lbs	Meal, 4,225 lbs.; skim milk, 3,746 lbs.; tankage 131¼ lbs.	1147 lbs.	$4.36
V. 8 pigs. Meal.	40.31 lbs.	Meal, 4,705 lbs.	979 lbs.	$4.81

1. One of the first points to attract attention is the fact that the cost of producing 100 pounds of gain in weight is somewhat high. Owing to the fact that we wished to make a careful comparison of the different foods, we did not feed any succulent food, such as green food or roots, during the experiment, and there is no doubt that this omission increased the cost of production. It is a well known fact that the use of even a small amount of succulent food will increase the gain for food consumed.

2. In this experiment, tankage proved better value at $33 per ton than skim milk at 15c. per cwt. In this connection it must be remembered that tankage is a high-priced food, and must be used only in limited quantity. Our different experiments would indicate that one part of tankage to fifteen parts of meal is very near the limit of profitable feeding with this food.

3. The fact that the skim milk and tankage group made more economical gains than the skim milk but more expensive gains than the tankage group, is another indication that tankage at $33.00 per ton is rather better value than skim milk at 15c. per cwt.

4. Blood meal did not give as good results as tankage. It is a very concentrated food and requires to be fed with a great deal of care to avoid

injurious results. It should be fed in even a smaller proportion than that recommended for tankage. Possibly, where corn is fed, blood meal might prove more satisfactory than when fed with such a meal mixture as was used in this experiment.

5. Group V made much more expensive gains than the other groups, and forcibly demonstrates the lack of economy in the method of exclusive meal feeding.

Pen Feeding vs. Pasture.

For several years we have conducted experiments with feeding pigs on pasture as compared with feeding them in pens. In other years, however, the pigs kept inside were fed green feed in addition to their meal ration, and in each case they made more economical gains than those fed on pasture. This year, eight pigs were turned upon a rape pasture, and fed a lighter meal ration than those in Group V of the experiment previously described, that is, the group which was fed inside upon an exclusive meal ration. The pigs intended for pasture were not turned out at the commencement of the experiment, but were given a month's feeding inside, and weighed nearly 50 lbs. each when they were turned out. They were on pasture nearly four months, and were then brought into the pens for finishing. After a month of inside feeding, they were still unfinished, so that in comparing this group with Group V, it must be remembered that the pasture group is unfinished, and that to finish them would make the cost even higher.

The meal ration is valued at $20 per ton, and the rape pasture at $15 per acre. It is difficult to say just how much should be charged for the rape, but $15 per acre looks like a very reasonable estimate. The eight pigs consumed a little less than a quarter of an acre of rape.

Table showing Weights, Gains, Food Consumed, and Cost of 100 lbs. Gain.

Group.	Average weight at beginning of experiment.	Total food consumed.	Total gain.	Cost of 100 lbs. gain.
V. Meal. Fed inside.	40.31 lbs.	Meal, 4,705 lbs.	979 lbs.	$4.81
VI. Meal and pasture.	34.68 lbs.	Meal, 4,474 lbs. Pasture, 5-24 acre of rape.	869 lbs.	$5.51

1. Though the pigs on the exclusive meal ration made somewhat expensive gains, those on pasture proved a great deal more expensive.

2. Pasturing proves very satisfactory for matured, or comparatively well matured pigs, and is beneficial in promoting health and general vigor; but for young, growing pigs, all our work goes to show that it is vastly more economical to restrict the amount of exercise, and to feed the pigs green food with their meal ration.

Cost of Raising Pigs.

The cost of raising pigs is a matter which has attracted a great deal of attention of late, and has been discussed at considerable length in certain agricultural papers. As it is a very important question, an attempt will be made to add a little to the sum of knowledge regarding the problem, by presenting and discussing a few figures from our experimental work.

SIZE OF LITTER. The cost of producing young pigs depends largely upon the number in the litter, a small litter costing more per pig before weaning, than a large litter. In these calculations we wish to be on the safe side, and hence we are estimating only 6 pigs in a litter, or a total of 12 pigs per sow per year. This, we think, is a modest estimate.

VALUATION OF SOW. A young grade sow about eight months old can be bought at a very reasonable price, and after the farmer is through with her, he can sell her for quite as much as he originally paid for her, provided she makes a reasonable growth, and is well cared for. For this reason, we are omitting the value of the sow from the calculation. We are assuming that the young sow has not been bred at the time of purchase.

RISK. This is a factor which is very difficult to deal with, and because there are no means of arriving at a satisfactory basis for an estimate, and because the estimated number of pigs in a litter is rather below what may be reasonably expected, we are leaving the element of risk out of the calculation.

COST OF MAINTENANCE OF SOW. This is a matter upon which there may be some controversy. We have figures representing the actual cost of feeding sows while suckling pigs, but the cost of maintaining sows between litters is rather difficult to arrive at, owing to the fact that pasture plays an important part in the maintenance, and many foods can be used that have very little market value. We think, however, we are making a liberal estimate when we place the cost of maintenance of a sow which is not suckling pigs at 75c. per month. Thus, if the sow raises two litters a year, and nurses each litter six weeks, it will leave about 9¼ months of maintenance between litters, which, at 75c. per month, would amount to $6.94.

COST OF MAINTAINING SOW AND YOUNG PIGS. For this calculation we shall use five sows under experiment at the College. An accurate record was kept of what the sows and little pigs consumed before the pigs were weaned. The meal consumed by the sows was composed of bran, middlings and oats, and is valued at $20.00 per ton. The sows nursed their pigs 43 days on an average, and the cost of the food consumed was as follows. Sow and litter No. 1, $3.20; No. 2, $3.18; No. 3, $3.87; No. 4, $3.70; No. 5, $3.04. Total cost of 5 sows and their litters for 43 days, $16.99, or an average of practically $3.40 per sow.

COST OF RAISING YOUNG PIGS UNTIL SIX WEEKS OLD. Two of the five sows mentioned in the previous paragraph, raised very small litters, and the five litters totalled only 32 young pigs, which, however, is a slightly higher average than the number of pigs to a litter upon which we decided to base our calculations, namely, six. We shall count the cost per pig, however, on the basis of six pigs per litter, which makes the cost a little higher than it really was. Assuming, therefore, that a sow will produce twelve pigs during a year (two litters), that the original cost of a young grade sow is offset by her value when through breeding, and neglecting the element of risk, we have the following items of cost entering into the raising of young pigs until six weeks old: —

2 service fees at $1.00 each	$2 00
9¼ months' maintenance of sow at 75c. per month	6 94
2 six weeks' periods of nursing at $3.40	6 80
Total cost of 12 pigs	$15 74
Average cost of pigs	1 31

COST OF FINISHING FOR MARKET. Unfortunately, none of the young pigs mentioned above, are yet ready for market, so that we shall refer to

30 pigs which were used in an experiment with blood meal, tankage, and skim milk. These pigs were all purchased, and we have always found that pigs of our own raising give more satisfactory results than those we buy. Moreover, the nature of the experiment was such as to make the cost rather high on the average, though we have omitted one group which was fed exclusively upon meal as a check group. We think, therefore, that by using these pigs in our calculation, we are making use of a rather extreme case of cost. If we assume that we raised these pigs, and the cost until six weeks old was $1.31 each; that meal is worth $20.00 per ton; blood meal, $55.00 per ton; tankage, $33.00 per ton; and skim milk 15c. per cwt., the financial statement for these 30 pigs would be as follows:—

30 pigs six weeks old at $1.31 each	$39 30
Cost of food after weaning	201 57
Total cost	$240 87

Total weight of hogs, 5,332 lbs.
Total cost per 100 lbs., nearly $4.52.

In selling these hogs, therefore, whatever was received above $4.52 per cwt., plus the manure, would represent the farmer's interest on capital and recompense for labor. If, however, these pigs were bought at $2.50 each, the cost would be nearly $5.20 per cwt. These figures show a striking advantage in favor of the farmer who breeds his own pigs.

As previously intimated, we think the figures above represent an extreme case, and below we offer some more encouraging figures.

Another Instance of Cost. This case deals with 15 pure bred Yorkshires which were upon experiment, and were sold at our public sale. When we closed the experiment on account of the sale, they weighed a small fraction over 149 lbs. each. The cost of feeding these hogs, therefore, can be accurately estimated only until they reached the weight specified above. The cost of raising the pigs while on the sow was not ascertained, so that we shall use the figures obtained from the average of five litters, namely, $1.31 per pig. The account against these pigs stands as follows:—

15 pigs six weeks old at $1.31	$19 65
Cost of food after weaning	66 68
Total cost	$86 33

Weight of 15 pigs, 2,238 lbs.
Cost per 100 lbs., $3.86.

Of course these pigs were not up to market weights, and the cost increases as the pig gains in weight. If we assume that it would cost 5c. per pound to put another 40 lbs. on each of these pigs, the total cost would become $116.33, and their total weight would be 2,838 lbs., representing a cost of nearly $4.10 per 100 lbs. This is certainly a much better showing than the one previously presented, and shows the possibilities of healthy, growthy pigs. It may be that this group of Yorkshires represent an extreme case of cheap production, in which case the normal cost per cwt. would be somewhere between $4.10 and $4.52.

It must be remembered that these figures are not regarded as conclusive, but are offered merely as a contribution towards present knowledge on the subject. Before the close of another year, we hope to have considerably more data, which may modify the calculations contained herein.

Respectfully submitted,

G. E. DAY.

PART X.

THE PROFESSOR OF HORTICULTURE.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to present herewith my thirteenth annual report on the work of the Horticultural Department of the College. In a general way our work may be grouped under the three following headings:

1. Instruction to students; and information to the public generally, through correspondence and the publication of articles, reports, and bulletins.

2. The management of the outside work of the Horticultural Department, including investigations carried out at the College.

3. College extension work throughout the Province, including the direction of co-operative experiments, inspection of the Ontario Fruit Experiment Stations, judging at fall fairs, and attending public meetings.

I. INSTRUCTION TO STUDENTS.

During the eight or nine months of the College year the instruction of our students is naturally our first duty. This work is growing from year to year with the increased attendance and addition of new departments to the College courses. The following is a brief outline of the work taken up with the various classes throughout the year:

First Year (92 students in class entering 1904, and 92 students in class entering 1905). As each of these classes were too large to handle conveniently all together, they were both divided into two sections, which, consequently, necessitated a duplication of lectures and field work with them. In the fall term the new students were taken two afternoons a week for five or six weeks for an outside talk in the garden, orchard, fruit plantations, or some branch of the department. Their attention was called to the work in progress in the department, and the necessity impressed upon them of keeping their eyes open and learning as much as possible by observation.

Beginning about the middle of November and continuing throughout the year, each division of these classes received two lectures a week on the first principles of horticulture. This course includes the systematic study of a tree in all its parts, from seed to fruiting, the description and classification of fruits; production of new varieties; methods of propagation; and general management of orchards and fruit plantations.

Second Year (55 students in class entering 1903, and 61 students in class entering 1904). These classes received two lectures a week throughout the College year, and laboratory or practical work for one afternoon a week for the winter and spring term. For laboratory, or practical work, the class had to be taken in two sections, which necessitated repeating the work. This course includes a detailed and thorough study of all Canadian-grown fruits and vegetables, and a shorter course on landscape gardening and floriculture. The laboratory course includes seed testing, plant breeding, plant propagation by cuttings and graftings, potting and handling plants, study of fruit buds, etc.

Fourth Year. (Six students who graduated in 1905, and two who expect to graduate next year). These classes were made up of those students specializing in Horticulture for their degree. Their work required three lectures and three half days per week at laboratory or practical work throughout the College year. With these advanced classes we found the seminar method of teaching preferable to lectures. The course for these classes includes a thorough discussion of the principles of fruit-growing, the theory and practice of plant breeding and propagation, systematic pomology, the production and forcing of vegetable crops, landscape gardening and floriculture.

Girls' Classes. Horticulture is an optional subject for the young ladies taking the short course in Home Economics at the Macdonald Institute. Thirteen of the students in the Winter Class, 25 of those in the Spring Class, and nine of those in the Fall Class chose this option, and took a three months' course in Horticulture. These classes came twice a week, and usually had an hour's lecture and from one to two hours' laboratory or greenhouse work each day. In this course the subjects dealth with were vegetable gardening, landscape gardening, and floriculture, special attention being given to floriculture.

Teachers' Classes. To both the spring and fall classes of teachers taking the Nature Study course at the Macdonald Institute a course of half a dozen lectures was given on school garden work, including the laying out and preparation of gardens, selection and study of seeds, transplanting, thinning, and cultivation of garden crops, planting of flower borders, trees, and shrubs, and care of school grounds generally.

Extra Classes. To the Short Course class in Stock Judging, and the Winter Dairy class I gave lectures on the Farmers' Fruit and Vegetable Garden. And to the Domestic Science Class at the Macdonald Institute a lecture on Fruits for Domestic Purposes.

Correspondence.

No small part of our duties, in addition to lecturing to students, is the answering of questions sent in by correspondents. The amount of correspondence in this department is increasing year by year, and it now requires the time of an expert stenographer three half days during the week to keep up with this part of the work. Although such work consumes time, and leaves us but little to show for it, we feel that it is time well spent, and the thankful letters frequently received from correspondents assure us that our efforts in their behalf are appreciated. Many of the questions asked are of general as well as personal interest; these with the answers given have been published from time to time in the *Farmers' Advocate* and *Canadian Horticulturist.*

Bulletins, Reports, and Articles Published.

The following bulletins, reports and articles have been published during the year:

College Bulletin No. 144 on "Apple Culture," prepared jointly by Mr. H. S. Peart, Prof. Lochhead, and myself.

Four Press Bulletins. Two by myself, on "The Leading Varieties of Vegetables for the Farmer's Garden," and the "Fall Pruning of Vines and Bush Fruits," and two by Mr. Peart on the "Spring Pruning of Bush Fruits" and "Care of the Strawberry Plantation."

For the Fruit Experiment Station Report, a Report on my annual inspection of the Stations.

For the Ontario Fruit Growers' Report, a Report on Some of the Promising Seedling Fruits of the year.

For the Experimental Union Report, an account of our work in the Co-operative Testing of Small Fruits throughout the Province.

Forty-three short articles for the *Farmers' Advocate;* twenty-five for *The Canadian Horticulturist,* and two for the *Farmers' Sun.*

A class at work in the horticultural laboratory.

II. Management of Department.

The superintendence of the outside work of the department is an agreeable change from the regular routine of class-room and office work. Yet in a department of the extent and varied nature of ours, it places one under no small responsibility. Until last year, when the forestry plantations were given over to the newly formed Forestry Department, 80 acres of the College farm were under the management of this department. We still have over 71 acres under our charge, upon which is practised a more or less intensive style of farming, and which requires nearly as great an outlay for labor as all the rest of the farm. This includes 42 acres in lawn and grounds, with its arboretum, flower borders, beds, etc.; 23 acres of orchard and fruit plantations; 6 acres of vegetable garden; and 8,000 square feet under glass in greenhouses.

Wholly apart from any investigation or experimental work which may be carried on in them, these various branches of the department must be

managed first to meet the requirements of the College and in a sense the demand of the general public. That is, we must apply those in residence at the College and Macdonald Hall with vegetables throughout the year, fruits in their season, and flowers and plants for decoration and public functions; and keep the grounds, orchards, gardens, greenhouses, etc., in such a condition that they are not only above criticism, but an object lesson for our students and the thousands of visitors who see them every year. In all of this we have been fairly successful during the past year. The season was a favorable one, crops have been good, and the grounds never looked better.

Investigation and Experimental Work.

At an educational institution of the kind where teaching and office work demand our attention, the greater part of the time for nine months of the year, experimental work must necessarily take second place. Nevertheless we are undertaking as much as we can, and hope for help that we may accomplish more. Among the investigations under way are extensive variety tests with apples, pears, plums, cherries, grapes, raspberries, blackberries, currants, gooseberries, and strawberries; plant breeding work with strawberries and raspberries; tests with tomatoes and various garden vegetables; tests with orchard cover crops; tests with fruits in cold storage; tests with ornamental trees, shrubs, and vines; and tests with numerous greenhouse and border plants and flowers, some of which will be reported upon in the following pages.

Orchard Fruits.

Last winter was not a severe one on trees or vegetation generally, but many fruit trees were so nearly killed with the severity of the previous winter that they had not vitality enough to carry them through another winter, although a comparatively mild one. Consequently we had nearly as many dead trees to take out of our orchards last spring as the year before. As far as was possible last spring we filled in all spaces with new trees. We hope we may not in a long time have another such disastrous winter as that of 1903-4.

Apples. This has been an off year for apples throughout the Province generally, but in our orchard the crop was the best we have had for years. Nearly all of our older trees bore heavily. In our young orchard, planted nine years ago, most of the trees have begun bearing. With the new varieties which have been grafted in from time to time, there are about 120 varieties in the orchard. Sixty-five varieties bore fruit this year. These are grouped below according as they bore a heavy, medium, or light crop:

Those which bore heavily were: Alexander, Ben Davis, Fameuse, Maiden's Blush, Peter, Shackleford, Stark, Shiawassee, Utter's Red, Wealthy, Yellow Transparent, and General Grant, Hyslop and Martha Crab apples.

Those which bore a medium crop were: Babbit, Duchess, Early Harvest. Fall St. Lawrence, Gano, Gideon, Grimes, Golden, Haas, Hurlburt, Lawver. Magog Red Streak, McMahon White, Ontario, Salome, Wagener, Wallbridge, Wellington, and Whitney Crab.

Those which bore a light crop were: Astrachan, Baxter, Bellflower. Beitigheimer, Benoni, Bethel, Canada Baldwin, Hare Pipka, Hastings, Fallawater, Fanny, Golden Russett, Colvert, Fall Jennetting. Hubbardston. Jona-

than, Lady, Longfield, McIntosh, Milding, Northwest Greening, Pewaukee, Ribston, Rhode Island Greening, Scott's Winter, Seek-no-further, Sutton Beauty, Tetofsky, Trenton, Talman, Winter St. Lawrence, and Transcendant and Montreal Beauty crab apples.

It may be rather early yet to draw conclusions from the data of only two or three year's fruiting, but judging from the evidence at hand, we would select the following as a dozen of the most promising varieties to plant in this or similarly located districts. These are given in the order of season of use: *Summer*, Yellow Transparent and Duchess. *Autumn*, Alexander, Wealthy, Fameuse, and McIntosh. *Winter*, Blenheim, Talman, Grimes Golden, Ontario, Spy, and Stark.

All of the crab apples do remarkably well. Of the half dozen tested the Hyslop and Martha are the most desirable.

Practical work in plant breeding.

PEARS. Over 35 per cent. of our pear trees were killed during the winter of 1903-4, and many of those which survived succumbed the following winter. There were 40 varieties in the collection. Most all trees of the following were winter killed: Belle Lucrative, Boussock, Bosc, Clairgeau, Duchess, Dempsey, Deil, Giffard, Hardy, Howell, Kieffer, Louise Bonne, Manning's Elizabeth, Pres. Drouard, Seckel, Vermont Beauty, and Wilder.

Of the survivors the following appear to be the hardiest but only a few of these have borne any fruit so far: Bissemianka, Bartlett, Clapp's Favorite, Flemish Beauty, Goodale, Josephine de Malines, Lawson, Lawrence, Lincoln, Petite Marguerite, Ritson, Sheldon and Tyson.

As far as our experience goes here, pears are far from being a reliable crop in this section, although there are in the neighborhood, on more suitable soils and in more sheltered localities than ours, a few trees which have done well for a number of years. Among these the following have been the most satisfactory: Bartlett, Flemish Beauty, Sheldon, and Anjou.

PLUMS. Our plum orchard is made up of 6 Japanese, 22 American, and 30 European varieties. Over 20 per cent. of the trees were killed during the winter of 1903-4, most of the failures being among the European varieties. Some of the Japanese varieties such as Abundance, Burbank, Red June. and Satsuma, which have always been supposed to be more or less tender, proved to be even more hardy than many of the European kinds. Twenty varieties fruited this year. Those which bore heavily were: Coe's Golden Drop, Field, Grand Duke, and Stoddard, the last being one of the American and the rest European varieties.

Those which bore a medium crop were: Burbank, De Sota, Hawkeye. Rollingstone, and Weaver. The first being a Japanese and the rest American.

Those which bore only a light crop were: French Damson, Gueii, Glass, Moore's Arctic, Reine Claude, Shipper's Pride and Washington of the European varieties, and Penning's Free, Smith, Surprise, and Wolf of the American varieties.

CHERRIES. Out of thirty varieties of cherries planted nine years ago, only eight now survive, and these are all of the sour type. So far they have borne but little fruit, and what was borne was outnumbered by the robins, who could not even wait for it to ripen.

ORCHARD COVER CROPS.

Within the last few years modern methods of culture for orchards have materially changed. At first orchards were cultivated for a few years, then seeded down and left in sod for a few years. This did not prove satisfactory. and in many of the best orchards the plan of clean cultivation without seeding down was adopted, but this proved to be exhaustive of soil fertility and in some cases endangered the life of trees in the winter. Of late years the more rational method has been adopted of clean cultivation throughout the early and growing part of the season, followed by a cover crop on the land after the last cultivation about the end of July. Cover crops used in this way are valuable in affording a protection to the tree roots if the ground is bare of snow in winter, in holding the snow as an additional cover when it comes, in checking a late growth of trees in the fall, in taking up plant food in the soil which might otherwise be lost by leaching, and above all by adding to the fertility and friability of the soil when the crop is turned under in spring. Our experiments, conducted during the past three years, have been for the purpose of determining what are the most satisfactory kinds of crops to use, and also what rate of seeding would give the best results. The following Notes by Mr. H. S. Peart, B.S.A., Demonstrator in this Department, give these particulars with the crops sown in 1904 and 1905.

NOTES ON THE SPRING CONDITION OF COVER CROPS SOWN 1904.

The following notes taken May 2nd, 1905, on the crops sown July 20th and 21st, 1904, will show their relative value as winter covers:

No. 1. *Red Clover.* Sown at the rate of 20 pounds per acre wintered in first-class condition, and formed a dense mat 4 inches thick.

No. 2. *Mammoth Clover.* Sown at the rate of 20 pounds per acre was very similar to Red Clover. There was not sufficient difference to be of any practical importance.

No. 3. *Crimson Clover.* Sown at the rate of 30 pounds per acre was nearly all killed, the ground being almost bare in the spring.

No. 4. *Hairy Vetch.* Sown at the rate of 35 pounds per acre wintered very well, remaining green and vigorous, forming a low dense mat. This is one of the most desirable cover crops.

No. 5. *Alfalfa.* Sown at the rate of 30 pounds per acre was frozen down badly, but the crowns were fresh and green and just bursting into new growth in the spring.

No. 6. *Rye.* Sown at the rate of 1½ bushels per acre wintered well and had made about 2 inches of fresh growth.

No. 7. *Rape.* Sown at the rate of 8 pounds per acre was all killed but a few large stalks. The stiff stalks hold the snow very well, but do not aid in drying out the soil in early spring.

No. 8. *Hairy Vetch.* 20 pounds and *Red Clover* 10 pounds per acre wintered very well and made considerable growth this spring.

No. 9. *Hairy Vetch.* 20 pounds and *Mammoth Clover* 10 pounds per acre, was similar to No. 8.

No. 10. *Hairy Vetch,* 20 pounds and *Crimson Clover* 12 pounds per acre. The vetch wintered well and made a good spring growth but the clover nearly all killed out.

No. 11. *Alfalfa,* 15 pounds and *Red Clover* 8 pounds per acre. The clover was nearly all smothered out by the alfalfa which made a growth similar to that in No. 5.

No. 12. *Grass Peas,* sown at the rate of 2 bushels per acre was all killed by late fall frosts, but the heavy tops formed a large amount of vegetable matter to plow under.

No. 13. *Alfalfa,* 15 pounds and *Crimson Clover* 10 pounds per acre. The clover was nearly all winter killed, but the alfalfa was making fresh green growth in the spring.

No. 14. *Medium Green Soy Beans,* 50 pounds and *Early Yellow Soy Beans,* 100 pounds per acre were all killed with the fall frosts and very little crop left on the ground for winter cover.

No. 15. *Crimson Clover,* 10 pounds, *Horse Beans,* 25 pounds, and *Prussian Blue Peas,* 25 pounds per acre. Very little of any of these could be found in the spring and on the whole they do not make a desirable winter orchard cover.

From the results of two years' trial, it may be seen that Hairy Vetch is still the most desirable cover crop. Red and Mammoth Clover give about equal results, while Crimson Clover is scarcely hardy enough for this district. Alfalfa is valuable but does not form so much root in one year as the vetch or red clover. Rye is still the best of the non-leguminous crops, as it will stand over winter and begin growth early in spring, which is very desirable in a cover crop.

Notes on the Autumn Growth of Cover Crops 1905.

The various kinds of cover crops grown during the past two years were again used this year. The seed, with the exception of that for No. 13, was sown on July 28th and 29th. The soil was in excellent condition, having been thoroughly cultivated up to that time. On the night of July 27th about 1-10 of an inch of rain fell, so that the soil was moist enough for rapid germination of seed. The following notes on the autumn growth, taken Nov. 21st, after killing frosts had cut down any tender crops, will show their relative condition in the autumn.

No. 1. *Hairy Vetch*, sown at the rate of 35 pounds per acre made a growth of about 12 inches in length and formed a moderately dense mat about 2 inches thick.

No. 2. *Crimson Clover*, sown at the rate of 30 pounds per acre made a growth of about 7 inches and formed a mat about 2½ inches thick, but rather too thin for a really good cover.

No. 3. *Hairy Vetch*, was duplicate of No. 1 and was very similar.

No. 4. *Alfalfa*, sown at the rate of 30 pounds per acre grew about 15 inches high and made a thin but fairly uniform cover. The tops were somewhat frosted.

No. 5. *Rye*, sown at the rate of 1½ bushels per acre made a growth of about 15 inches and formed a dense mat about 5 inches thick. This is one of the best non-leguminous cover crops.

No. 6. *Rape*, sown at the rate of 8 pounds per acre made a spindly growth of about 1½ feet, but formed a good leaf surface; consequently a considerable amount of humus will be formed by the decay of the crop.

No. 7. *Red Clover*, sown at the rate of 20 pounds per acre made a growth of about 8 inches and formed a mat 3 inches thick. The tips were slightly frosted.

No. 8. *Mammoth Clover*, sown at the rate of 20 pounds per acre, was similar to that in No. 7.

No. 9. *Hairy Vetch*, 20 pounds and *Mammoth Clover* 10 pounds per acre made a thicker mat than clover alone, but no better than that No. 14.

No. 10. *Alfalfa*, 15 pounds and *Red Clover* 8 pounds per acre. The clover was rather thin, but the alfalfa made a good stand. Owing to the clover in the bottom, this was superior to alfalfa alone.

No. 11. *Grass Peas*, sown at the rate of 2 bushels per acre made a growth of about 2 feet and formed a heavy thick mat. The first hard frost killed all the plants, but left a large quantity of vegetable matter on the ground.

No. 12. *Crimson Clover*, 10 pounds, *Prussian Blue Peas*, 30 pounds, and *Horse Beans*, 30 pounds. The clover made a good start nearly equal to that in No. 2, but because of poor seed the peas and beans failed almost entirely.

No. 13. *Cow Horn Turnip*, sown August 4th at the rate of 7 pounds per acre made a vigorous growth of 15 inches, but was not as vigorous and hardy as rape.

No. 14. *Hairy Vetch*, sown at the rate of 35 pounds per acre made a very dense mat 3½ inches thick.

No. 15. *Red Clover*, sown at the rate of 20 pounds per acre made a growth of about 8 inches and formed a mat 3½ inches thick. This was somewhat superior to that in No. 7, partly owing to the nature of the soil.

Our intention is to continue the same crops on the same land for a series of years, and to determine by chemical analyses from time to time the value of the different crops in enriching the soil.

Bush Fruits.

For the past ten years we have been carrying on extensive variety tests with the bush fruits, including raspberries, blackberries, currants, and gooseberries. Our fruit plantation of these, put out about twelve years ago on fairly high rolling land did well, but eventually reached its limit of pro-

ductiveness and began to fail. A new and larger plantation was set out five years ago on lower and more level ground in the same field, but which was well underdrained. Apparently the soil in our newer plantation is not so well adapted to fruit as the results have been far from satisfactory. In the following paragraphs we note the results with the various fruits in this new plantation.

RASPBERRIES. Sixty varieties of raspberries were fruited side by side on uniform trial plots for three years, but at the end of that time we had to destroy the whole plantation because of infestation with the raspberry root gall, a slimy fungus which caused gall-like swellings on the roots, and a dwindling, sickly growth of the bushes. Fresh healthy plants were obtained of a few of the standard varieties and another plantation was set out on new ground. This has made good growth, and promises well for a crop next year.

Practice in planting and pruning.

The varieties which gave the best results in our former trials were: *Red*,—Marboro for early and Cuthbert for late; *Purple*,—Columbian; *Black*,—Eureka for early, Older for midseason, and Smith's Giant for late. *White*,—Golden Queen.

BLACKBERRIES. During the ten years we have been experimenting with this fruit we have never yet had a satisfactory crop, and it is doubtful if any of the varieties we now have will ever be hardy enough to thrive well in this section. Twenty-three varieties are now under test, including Snyder, Agawam, and Eldorado, the varieties which have done so well at our Simcoe Fruit Experiment Station, thirty-five miles farther north, but all have been badly killed back here every winter.

CURRANTS. Have been one of our most reliable bush fruits and we have a large plantation of them, including forty-six varieties—twenty-one red, twenty-two black, and three white.

The following table gives the average yield per bush for the past three years. These yields may seem small, but it must be remembered they are the first years of fruiting.

AVERAGE YIELD PER BUSH FOR THREE YEARS' CROP.

White Currants.

1. White Grape	37 ozs.	3. Cleopatra	9 ozs.
2. White Imperial	25 "		

Red Currants.

1. Red Cross	36 ozs.	12. Porter's Foundling	15 ozs.
2. Victoria	30 "	13. Wilder	15 "
3. Fay	24 "	14. North Star	14 "
4. Red Grape	24 "	15. Belle de St. Giles	14 "
5. Greenfield	24 "	16 Pomona	14 "
6. Red Dutch	24 "	17. Moore's Ruby	12 "
7. Raby Castle	21 "	18. La Versailles	10 "
8. London Red	20 "	19. New Victoria	7 "
9. Porter's Prolific	18 "	20 La Conde	7 "
10. Brayley	17 "	21. Prince Albert	4 "
11. Cherry	16 "	22. Fertile de Angers	2 "

Black Currants.

1. Naples	14 ozs.	12. Ogden	4 ozs.
2. Beauty No. 7	9 "	13. Black English	4 "
3. Champion	8 "	14. Climax	3 "
4. Pr. of Wales	8 "	15. Beauty	3 "
5. Saunders	6 "	16. Clipper	3 "
6. Standard	5 "	17. Monarch	3 "
7. Black Victoria	5 "	18. Collin's Prolific	3 "
8. Winona	5 "	19. Dominion	2 "
9. Star	4 "	20. African	2 "
10 Lee's Prolific	4 "	21. Charmer	2 "
11. Success	4 "		

The White Grape currant has from the very first been our most productive variety. In the market it does not have such a demand as the red or black kinds, but for home use it should be in every farmer's fruit plantation.

Taking all points into consideration Red Cross, Victoria, and Fay have been our most satisfactory red varieties. Fay has not come up to the other two in point of yield, but for size and quality of fruit it ranks first.

Among the black currants there has been much less variation in yield and quality than among any of the other fruits. Naples has been the most productive, but when size and quality of fruit are taken into consideration Champion and Black Victoria rank ahead of it.

GOOSEBERRIES. Forty-five varieties of gooseberries were included in our new plantation, but for some reason, most likely the uncongeniality of the soil, the bushes have not done well. Forty varieties bore fruit this year, but the crop was light on all except a few of the old standard varieties. Of these the most satisfactory have been Downing, Pearl, Red Jacket, and Whitesmith. Downing has been the most productive, but Whitesmith produces the largest, finest berries.

STRAWBERRIES. During the past ten years we have grown in our trial plots and thoroughly tested nearly four hundred varieties of strawberries. Careful records have been made each year of the vigor and health of the

plants, the date and kind of bloom. Every picking of fruit has been weighed throughout the season, and notes taken of size, color, firmness, and quality of the fruit. Space will not permit a full report here. We hope to bring out a bulletin on the subject soon, giving a full account of this work. The varieties mentioned below have been found among the most desirable to cover the season from early to late: *Early*—Splendid, Wesley, and Van Deman; *Midseason*—Warfield, Haverland, Williams, Tennessee, and Ruby; *Late*—Irene, Saunders, and Buster.

TOMATOES. For eight years we have been carrying on a variety test with tomatoes, in which over fifty varieties have been under test. For two or three seasons previous to the past the average summer temperature was so low that only a few of the earliest kinds ripened much fruit. The summer just passed was an exceptionally favorable one for tomatoes, and we had the finest crop I have ever seen on our grounds.

With the establishment of canning factories in many parts of the Province, the tomato crop has wonderfully increased in importance. There are thousands of acres of them now grown for the factories, where a few years ago they were grown only in small quantities for local consumption. In the Southern section of the Province they are also being largely grown as an early forcing crop, and as such bring good prices in the large markets before the general crop comes in. For the latter purpose only the earliest varieties are of much use, while for the canning factories the firmer, meatier varieties ripening later are most desired.

In our tests the earlier varieties have always given the best results because our seasons here, 1,196 feet above the sea level, are usually too cool and short to mature a full crop of the midseason or late varieties. Our results, therefore, do not represent what might be done with these later varieties in more favorable sections. The following list shows the crop of ripe fruit per plant obtained from the forty-four varieties under test this year:

Average Yield Per Plant of Tomatoes in 1905.

1. Dominion Day	36 lbs.	24. Golden Queen	17 lbs.
2. Earliana	32 "	25. Ignotum	15 "
3. Atlantic Prize	29 "	26. Fordhook First	15 "
4. Dreer's Earliest Cluster	28 "	27. Plentiful	14 "
5. Early Conqueror	28 "	28. Imperial	14 "
6. Early Michigan	28 "	29. Purdy	12 "
7. Trophy	27 "	30. Livingston's New Globe	12 "
8. Mayflower	27 "	31. New Dwarf Champion	9 "
9. Early Ruby	27 "	32. Rennie's New	9 "
10. Climax	26 "	33. Dreer's Dwarf Stone	9 "
11. Livingston's Beauty	24 "	34. Bruce's Niagara	9 "
12. Express	23 "	35. Ponderosa	8 "
13. Thornburn's Rosalind	23 "	36. Livingston's New Dwarf Stone	6 "
14. Frogmore Selected	23 "	37. Early Jewel	6 "
15. Early Hustler	23 "	38. Noble	6 "
16. Bruce's Dominion Day	23 "	39. Dwarf Champion	6 "
17. Tenderloin	23 "	40. New Stone	5 "
18. Burpee's Combination	22 "	41. Acme	4 "
19. Becker's Excel All	20 "	42. Livingston's Magnus	4 "
20. Crimson Cushion	19 "	43. New Enormous	3 "
21. Creekside Glory	18 "	44. Century	2 "
22. Paragon	18 "		
23. Freedom	18 "		

PLANT BREEDING.

The improvement of plants by selection and crossing is a line of work deserving of much greater attention in this country. What has been accom-

plished by a few workers such as the late Charles Arnold of Paris, Ont., and the late P. C. Dempsey of Trenton, as well as by Dr. William Saunders, Director of the Central Experimental Farm, Ottawa, is evidence of what might be done if we had some one who could devote his whole energies to it, as Luther Burbank is now doing in California. The work, however, is too uncertain and offers too little immediate returns for the private individual to undertake unless he has means of support independent of such work. The results of the plant breeder's work usually benefit the public at large more than the private worker. For this reason the plant breeder should be an employee of the Government.

Four years ago we began work upon the improvement of strawberries and raspberries, selecting as our parents for crossing plants of those varieties which had given the best results in our variety tests up to that time. The work has been followed up each year since then, and we have some very promising new varieties now beginning to fruit, but we have not made as much progress as we would like, because we have not had sufficient time to devote to it in the blossoming season, when the pollination must be done.

We would like another assistant who could devote his whole energies to this work, and have in view one of our students who is in every way capable and eager to undertake it. Now that our orchards are coming into bearing, we have good material here to work upon, and those fruits that do not thrive here might be worked upon at any of our Fruit Experiment Stations. We trust that before long provision will be made for extending this feature of our work.

Vegetable Gardening.

Vegetable gardening is a branch of Horticulture which is receiving more and more attention throughout the country. It is a style of farming in which the most intensive methods are practised in order to make the most possible out of a small area. In the suburbs of many of our large towns and cities it is carried on more or less extensively. The growing importance of the industry in Ontario is evidenced by the fact that during the year a Provincial Vegetable Growers' Association was formed for the purpose of better co-operation and mutual benefit. I was present at their first annual meeting, and the eagerness with which they sought information and the practical way in which the members discussed matters relating to their calling, augurs well for the progress of the organization.

The numerous questions we have had during the year from farmers all over the country bear testimony that the farmer's vegetable garden is also receiving more attention. For the benefit of farmers and amateurs as well as commercial growers, we give in the following list the names of the leading varieties of the different garden crops. This list gives the results of our experience here during the past thirteen years, in the management of our six-acre vegetable garden:

Vegetable Garden Crops, Leading Varieties.

Asparagus. Conover's Colossal and Palmetto.

Beans. Summer, Golden Wax; Autumn, Bush Lima; Winter, Navy.

Beets. Globe, Egyptian Turnip; Long, Long Smooth Blood.

Carrots. Chantenay and Scarlet Nantes.

Cabbage. Early, Winningstadt; Late, Flat Dutch and Savoy; Red. Mammoth Rock.

Cauliflower. Extra Early Erfurt and Early Snowball.
Celery. Early, White Plume; Medium, Paris Golden Yellow; Late, Giant Pascal.
Corn. Early, Golden Bantam and White Cory; Medium, Metropolitan; Late, Country Gentleman and Stowell's Evergreen.
Citron. Colorado Preserving.
Cucumber. White Spine, for slicing; Cool and Crisp, for pickling and slicing.
Egg Plant. New York Improved.
Kohl Rabi. Early Purple Vienna.
Lettuce. Hanson and California Cream Butter.
Muskmelon. Rocky Ford, Hackensack, and Montreal Market.
Onions. Yellow Danvers, Prizetaker, and Red Wethersfield.
Parsnips. Hollow Crown.

Practice in plant propagation.

Peas. Early, Steele, Briggs' Extra Early, and Nott's Excelsior; Medium, Gradus; Late, Champion of England and Improved Stratagem.
Potatoes. Early, Early Ohio; Late, Empire State.
Pumpkin. Small, Sugar; Large, Jumbo.
Radishes. Early, Rosy Gem and French Breakfast; Winter, Scarlet China.
Rhubarb. Victoria, or any other carefully selected seedling variety.
Salsify. Long White.
Spinach. Victoria.
Squash. Summer, Crookneck and White Bush Scallop; Winter, Hubbard.
Tomatoes. Early, Earliana, Dominion Day, and Mayflower.
Turnips. Golden Ball and Hartley's Bronze Top.
Vegetable Marrow. Long White Bush.
Watermelon. Hungarian Honey and Cole's Early.

Hardy Perennial Borders.

One of the most interesting features of the College grounds of late years has been the hardy perennial flower borders. From the early spring to late fall there is always bloom of some kind to be found on these borders, but probably they are at their best through June and July, when our friends from the country visit us by the thousands. During the time the excursions are here, not only the women and children but the horny handed sons of toil may be seen at any time wandering up and down these borders admiring the display and recognizing here and there some of the old favorites which grew in "grand-mother's garden".

The hardy herbaceous perennials are quite distinct from the regular bedding plants used so much in formal flower beds. They are particularly adapted to planting in irregular places here and there about the home and in long informal borders along the drives or walks or in front of a border of shrubbery. Because of their easy culture and durability, they are among the most desirable plants for beautifying the grounds around the country home. And they impart to such places a charm that the boys and girls leaving home never forget.

In establishing a perennial border, it is well to remember that if given a chance it will become a permanent thing. The ground should, therefore, be well prepared and made as rich as possible by digging in plenty of well rotted manure or compost. Planting may be done more or less throughout the entire season, depending upon the nature of the plant, but with most plants it can best be done in the spring, most of the bulbs, of course, being planted in the fall.

The best arrangement of the plants in the border must be learned more or less by experience, and rearranging may be done from time to time as may be desired. An irregular profusion is on the whole the most pleasing. It is well, therefore, to avoid planting in straight lines or square blocks. Usually the best effects are produced by grouping a number of one kind together so as to present a mass of color when in bloom. Naturally the smaller growing kinds should be placed near the front, and the taller kinds in the background, or in the centre if the border is seen from both sides. Many kinds are at their best early in the season. and their tops die down before midsummer, while others come on later and last till the end of the season. These should be so grouped and fitted in with each other that the space left by the dying tops of the early ones will be filled by the later ones. In this way the border may be made to present an attractive appearance throughout the whole season.

The annual care required to keep a border in good condition consists in removal of all dead tops in the spring; dividing and thinning out those kinds which tend to spread too much and crowd out neighboring plants: introducing new kinds from time to time as they may be procured; keeping out weeds and loosening the ground whenever it may be bare and have a tendency to become crusted.

The following list includes 50 of the most desirable kinds growing in our borders. Those marked * are what would be selected as the best 25. Brief notes are added stating how each is propagated.

Achillea "The Pearl"—Seeds and division.
Adonis Vernalis (Spring Adonis) Seeds.
Agrostemma coronaria (Mullein Pink) Seeds.
*Aquilegia chrysantha (Golden Columbine) Seeds.
*Aquilegia coerulea (Rocky Mountain Blue Columbine) Seeds.

Asclepias tuberosa (Butterfly Weed) Seeds and roots.
Aster Novae Angliae (Wild Purple Aster) Division.
*Bellis Perennis (English Daisy) Seeds.
Bocconia cordata (Plume Poppy) Division.
*Calliopsis lanceolata—Seeds.
*Campanula carpatica (Carpathian Bells) Seeds.
Campanula media (Canterbury Bells) Seeds.
*Convallaria majalis (Lily of the Valley) Division.
*Crocus in variety—Bulbs.
Corydalis nobilis—Seeds or roots.
*Delphinium hybridum (Larkspur) Seeds.
Dianthus barbatus (Sweet William) Seeds.
*Dielytra spectabilis (Bleeding Heart) Division.
*Digitalis (Foxglove) Seeds.
Doronicum caucasicum—Seeds and division.
Epimedium alpinum (Barren-wort) Division.
Funkia subscordata grandiflora (Giant Day Lily) Division.
*Gaillardia grandiflora—Seeds.
Gypsophila paniculata (Baby's Breath) Seeds and division.
Helenium grandicephalum straitum—Division.
*Hemerocallis flava (Yellow Day Lily) Division.
Helianthus multiflorus (Double Sunflower) Division.
Hollyhock—Seeds.
*Iris Germanica (German Iris) Division.
*Iris Kaempferi (Japanese Iris) Division.
*Lilium in variety—Bulbs.
Lychnis chalcedonica—Seeds.
Mertensia virginca (Blue Bell) Roots.
Myosotis (Forget-Me-Not) Seeds and division.
*Narcissus in variety—Bulbs.
*Paeonia (Paeony) Roots.
*Papaver nudicaule (Iceland Poppy) Seeds.
*Papaver orientale (Oriental Poppy) Seeds.
*Phlox, hybrid perennials in variety—Division.
*Phlox subulata (Moss Pink) Division.
Platycodon grandiflora (Chinese Bell Flower) Seeds.
Pyrethrum uliginosum (Giant Daisy) Seeds and division.
*Rudbeckia lanceolata (Golden Glow) Division.
Scilla Siberica—Bulbs.
Spiræa filapendula (Dropwort) Division.
*Tulips in variety—Bulbs.
*Valeriana officinalis (Garden Heliotrope) Division.
Veronica in variety—Seeds and division.
Vinca minor (Periwinkle or Trailing Myrtle) Plants.
*Viola corunta (Tufted Pansy) Seeds and division.

III. College Extension Work.

While our first duty requires our attention to the instruction of students and management of our own department of College and farm work, we have been able to extend this in a way to the farmers and fruit-growers throughout the Province. This has been done largely through attending meetings and conventions; securing the co-operation of farmers and fruit-growers all over the country in carrying on tests upon their own farms, and in inspecting and directing the work of the Ontario Fruit Experiment Stations.

Co-operative Experiments.

Through the agency of the Experimental Union about 2,000 farmers throughout the Province are now carrying on co-operative experiments on their own farms with small fruits sent out by this department. This work is encouraging the growing of fruits for family use on farms all over the country; and many of those in the newer parts of the Province where fruits are but little cultivated are getting a start which they probably would not have got in any other way. The plants are sent by mail free of any expense, all that we require before sending plants is a promise that the experimenter will honestly try to follow the directions furnished and will report the results each year when required to do so.

Anyone, within the Province of Ontario, wishing to join in this co-operative testing next spring may do so by selecting any one of the experiments, agreeing to follow the directions given, and to report the results as required. Applications should be sent to H. L. Hutt, Ontario Agricultural College, Guelph, Ont.

Ladies' class—Seed testing.

Fruit Markets of Western Canada.

The following notes by Mr. H. S. Peart, B.S.A., Demonstrator in this department, contain some valuable information for the fruit-growers of this Province:

"During the month of October I had the opportunity of visiting some of the largest markets of Manitoba, Saskatchewan, and Alberta with a view

to making comparisons of Ontario, British Columbia and United States fruit, as it appeared in these markets. I found that while Ontario still ships large quantities of fruit, especially winter apples, into the western markets, British Columbia is gaining a very strong foothold in these markets and is crowding Ontario out.

"The reasons for this are not hard to find. Ontario has in the past shipped a great deal of inferior fruit, badly packed, to the west; British Columbia, on the other hand, ships only XXX fruit which is uniformly and honestly packed, so that the buyers know without examination exactly what they are receiving. First-class Ontario fruit, however, owing to its superior flavor can, when properly and honestly packed, compete favorably with that from the Pacific Province.

"Leaving the Prairies, I spent some time in British Columbia studying the methods of packing employed there. The box is used exclusively for apples; and *all* the fruit is graded and tiered in the boxes by careful packers. Only XXX fruit is marketed at present, so that a high standard of excellence goes with the name 'British Columbia Fruit.'

"British Columbia has a decided advantage over us in several particulars: 1. From the fact that no codling worm, or San José Scale has as yet entered the Province. How long these may be kept out remains to be seen, but vigorous measures are being used to prevent their entrance.

"2. Co-operation may be more successfully carried on there than in the older fruit districts, because most of the fruit sections of British Columbia are comparatively new, and the growers are working in unison to keep up their present reputation for high standard of excellence.

"3. The nature of the fruit itself gives the British Columbia shipper an advantage over us. Their fruit is less juicy than ours, permits of tighter pressing and longer shipment without injury.

"To gain a stronger foothold in the western markets, Ontario shippers must look as carefully after the packing and quality of fruit sent to the western markets as to the European markets. With such strong competition from the west, the day is past when Manitoba can be made the dumping ground for low grade fruit from the East."

Inspection of Fruit Experiment Stations.

Realizing that the tests with fruits carried on here or at any one central experiment station were not of value to all parts of the Province, the Government eleven years ago adopted the plan of selecting one of the leading fruit growers in each of thirteen different sections of the Province to carry on tests with the fruits specially grown in his section. At the time these stations were established, growers were more or less at a loss to know what was best to plant. Many of the older varieties were not all that could be desired, but the great number of new ones recommended by nurserymen and agents only added to the grower's confusion.

The Fruit Experimenters have been able to solve this problem for their own localities better and cheaper than it could have been done in any other way. The last Annual Report of the Stations gives reliable lists for the guidance of planters in nearly all parts of the Province. That report should be carefully studied by every one who intends planting out more fruit.

As inspector of the Stations, I visited each of them this year and took note of the condition and progress of the work. My report on this to the Board of Control will be contained in the next Annual Report of the Stations.

Meetings Attended.

During the year I attended and took part in the following public meetings:

The Hamilton Horticultural Society, and gave an address on "Ornamental Trees and Shrubs, their Care and Management".

The Aberfoyle Women's Institute, and gave an address on "The Cultivation of Flowers about the Home". The Grimsby Horticultural Society, and gave an address on "The Hardy Perennial Flower Border".

The Guelph Board of Trade, The Niagara Falls Horticultural Society, and the St. Catharines Horticultural Society, and gave an address on "Civic Improvement." The Hamilton Fruit, Flower, and Vegetable Show.

The Commencement Exercises in the Guelph Central School in connection with the awarding of prizes in the Children's Aster Competition. The Guelph Central Exhibition, and judged the display of fruits. The Esquesing Township Fall Fair at Acton, and judged the fruit. The Norfolk Union Fall Fair at Simcoe, and judged the display of fruits. The Horticultural Exhibition and Convention at Toronto, where this department made a display of fifty-six varieties of apples. Reported at the Fruit-growers' Conventions on New and Seedling Fruits, and before the Vegetable Growers' Convention on the Varieties of Vegetables Recommended. The Ontario Agricultural and Experimental Union, and reported on our Co-operative Testing of Fruits throughout the Province.

Acknowledgements.

In closing this report I wish to bear testimony to the faithful and efficient services of those who have assisted me in this department. Mr. H. S. Peart, Demonstrator, has rendered cheerful and able assistance in the class-room and in the outside work of the department. Mr. William Hunt, florist, has proven his acceptability as an instructor in floriculture with the ladies' classes, and his writings on floriculture in the horticultural journals have done him credit. Mr. William Squirrell, foreman of the outside work, has for thirty-one years been a trusted employee in the department, which in itself speaks for his reliability and work.

Respectfully submitted,

H. L. HUTT.

PART XI.

THE RETIRING PROFESSOR OF BACTERIOLOGY.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit to you the report of the work of the Bacteriological Department from the first of January to the end of September.

LECTURES AND LABORATORY WORK. The same course of lectures were given during this year as last, and detailed statements of these are set forth in the College Report for 1904. The Laboratory work whilst essentially the same as that taken up in 1904 was in reality heavier, because of larger classes, requiring more preparation of material. Special laboratory work was also given during the summer months to men who had come here especially to take a course in our methods for the preparation of nitro-cultures. Several fourth year students commenced their theses in this department during the summer, and will continue their work during the session.

MEETINGS ATTENDED. I attended a few meetings and conventions during the year, and delivered several addresses, besides taking part in discussions, etc.

1. The Royal Society of Canada. Address: "The Viscous Fermentation of Milk and Beer." 2. Short-Course Students in Stock Judging. Address: "The Farm Water Supply." 3. The Ontario Bee-Keepers' Association. Address: "The Diffusion of Knowledge concerning Methods in Apiculture." 4. Strathroy Dairy School. Four lectures on Dairy Bacteriology. 5. The Dairymen's Association of Western Ontario. Address: "The Bacterial Contamination of Milk."

PUBLICATIONS. During the year we prepared and the Ontario Department of Agriculture published the following bulletin:

Bulletin 141. Gas-Producing Bacteria and their Effect on Milk and its Products.

This bulletin was based on a comprehensive study of the gas-producing group of bacteria. A more technical paper on the subject was published in the Centralblatt für Bakterioligie, and La Revue Genérale du Lait under the title: "A Comparative Study of Sixty-six Varieties of Gas-Producing Bacteria Found in Milk."

The department has also another bulletin in press "On the Viscous Fermentation of Milk." My address on the "Bacterial Contamination of Milk" appeared as an appendix to the Report of the Dairymen's Association of Western Ontario. The article is well illustrated and gives a resumé of the latest knowledge regarding the manner in which milk becomes contaminated with bacteria.

Other articles were contributed to the *Farmers' Advocate,* the *O.A.C. Review,* and the local press of the Province.

ROUTINE LABORATORY WORK AND ANALYSES. We have manufactured and distributed 58 doses of tuberculin and 137 pure cultures or starters for cheese and buttermakers.

We commenced the manufacture of nitro-cultures this year and sent out 200 of these.

Bacteriological analyses and diagnoses of the following substances were made and the results reported to those sending in the material. These figures are for the eleven months ending November 30th and thus include the analyses made by my successor, Prof. S. F. Edwards, in the months of October and November.

Diseased hens	31
" chicks	12
" gosling	1
" pheasant	1
" quails	2
" organs	9
Anthrax	2
Suspected diphtheria	21
Milk, off-flavored or suspected of causing disease	5
Cream	3
Suspected cerebro-spinal-meningitis	3
Canned pork and beans	1
Meat (poisoned)	1
Foul brood	7
Butter	1
Butter paper	1
Flour	1
Bread	2
Tomato pulp	1
Sputum	3
Tuberculosis	1
Hog Cholera	1
Water	7
	117

ASSISTANCE. The time of the Demonstrator in this department, Mr. B. Barlow, has been largely occupied with the preparation of material for class work, and with the preparation of the nitro-cultures sent out in the early spring; he has also taken the laboratory work with the specialists in Horticulture and Dairying, and in addition has shared in the research work undertaken by the department, and which is referred to below. Mr. Barlow is a good observer, faithful and diligent in his work, and in severing my connection with the Bacteriological Department, I wish to place on record my appreciation for his valued and esteemed services.

RESEARCH WORK. As intimated in the College Report for 1904, we sent out nitro-cultures (or a bacterial preparation for inoculating the different species of legumes with nitrogen-fixing bacteria) to all Ontario farmers who applied for them. Due notice of this distribution was given in the agricultural press, and we received applications for these cultures from all over the Dominion. These orders were filled as far as possible, and in response to a circular letter sent to all farmers who used the inoculating material for their spring sowing of legumes we are now getting replies as to the success or failure of the inoculations. We hope to have the results of these trials, together with a short and popular discussion of the nitrogen fixing bacteria, published in bulletin form some time during the winter.

Our study on the Rot of the Potato has been continued, and the work is almost finished and will be prepared shortly for publication.

The biology of an interesting slime-producing organism, new to science, was also worked out, and the description of it will be published in the Transactions of the Royal Society of Canada.

CONCLUSION. In my last year's report I called attention to the need of a new laboratory large enough to give laboratory instruction to the increasing number of students, and cited the example of certain United States Agricultural Colleges which were spending large sums on new bacteriological laboratories; among others, I mentioned that Sir Wm. C. Macdonald was to have a modern and well equipped laboratory for bacteriological research at the new Agricultural College, situated at Ste. Anne de Bellevue, near Montreal. During the course of the summer I had the honor of being offered the direction of this laboratory, accepted the offer and sent in my resignation to you, and whilst I regret leaving the institution with which I have been connected for the last twelve years, I cannot but feel gratified at the opportunity which a large and well equipped laboratory will afford. I also regret that my successor, Prof. S. F. Edwards, will be so handicapped by the lack of space for the laboratory classes, and I sincerely trust that a new laboratory will be built at the earliest possible moment, and that the example of the Macdonald College will stimulate the Ontario Government to erect a building, suitable for the growing needs of the Bacteriological Department.

I have the honor to be, Sir,

Your obedient servant,

F. C. HARRISON.

THE NEW PROFESSOR OF BACTERIOLOGY.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to hand you the following report of the Department of Bacteriology.

As my duties did not begin until October 1st, my report will consequently be brief.

Two lectures a week have been given to the fourth year students, and four and one-half hours a week of laboratory practice to such of these as selected the horticulture and biology options.

Two of the fourth year men are doing their thesis work in this laboratory.

Six lectures on micro-organisms and their relation to various phenomena of nature have been delivered to the class in nature study. The work consisted largely of demonstrations of simple bacteriological experiments such as might be conducted in the ordinary country school room. This course is an innovation in the department, and one, it seems to me, worthy of a regular place in the Nature Study curriculum. With the country school teacher lies the opportunity for implanting in the child's mind a reverence and love for nature which he will never outgrow. The smallest tot of the school room knows that milk turns sour; that sweet cider turns to vinegar; that mother's fruit sometimes goes mouldy; that father sometimes loses live stock by disease; but he does not understand the causes of these and many other phenomena which he observes so frequently. After a course of lec-

tures supplemented, as it should be, by a laboratory course, the teacher would be qualified to explain the hitherto hidden reasons for these phenomena of the farm and the home, and thus help to instil into the child's being a thirst for a higher and broader knowledge as the years advance, of all that pertains to the science of agriculture.

In research, Mr. Barlow and myself are engaged in a practical study of a bacterial disease of celery which at times causes severe losses to the market gardener and farmer. We are also working out a problem in tomato pulp preservation for a large canning company of the Province.

I would respectfully direct your attention to the need of more extensive instruction in this department, especially with reference to practical work.

Chemistry tells us about some of the elements of the soil and the materials in the soil necessary for plant growth. Physics tells us of its physical structure. But it remains for bacteriology to tell us of the agents by which the plant food locked up in the soil in a combination unavailable to plants is rendered assimilable by them. Again, chemistry tells us about the composition of dairy products and the changes occurring in transforming milk into butter and cheese, but bacteriology deals with the forces responsible for these changes. Veterinary science treats of the anatomy, physiology, and diseases of domestic animals, but it is only through a knowledge of the organisms causing these diseases that they may be intelligently dealt with. Further, bacteriology explains the phenomena of the preservation of meats and other foods, and fermentative changes commonly met with on the farm and in the farm home.

Without a thorough knowledge of the principles of the science of bacteriology, the agricultural education of the farmer's son or daughter is incomplete. Such a knowledge can only be gained, not by a short course of lectures only, but by actual practical work with the micro-organisms with which the farmer's life is so intimately associated.

With our present laboratory space and equipment, the giving of such a course of instruction is impossible, and I would respectfully urge upon you the necessity for a building in the near future in which the young man who is to return to the farm may gain the knowledge of micro-organisms and their functional activities of which he stands so much in need.

Respectfully submitted,

S. F. EDWARDS.

PART XII.

PROFESSOR OF FIELD HUSBANDRY AND EXPERIMENTALIST.

To the President of the Ontario Agricultural College:

SIR,— I have the honor of submitting herewith my report of the work done in the department of Field Husbandry for the year 1905. This is my nineteenth annual report since I became connected with the experimental work at our Agricultural College, my thirteenth annual report as Director of the Experimental Department, and my second report as Professor of Field Husbandry.

During the past year, the experimental work in field husbandry has been conducted on about 2,000 plots at the College, and on about 4,000 farms throughout the Province of Ontario.

I wish to express my appreciation of the valuable services rendered by those who have assisted me in the work of the Department during 1905. Mr. J. Buchanan, B.S.A., who was Demonstrator in 1904, has been advanced to the position of Lecturer in Field Husbandry. Mr. A. E. Whiteside, who has been connected with our experimental work for the past fifteen years, and who has been foreman in the department since 1897, has had charge of the labor and the grounds. I have been ably assisted also by Mr. W. J. Squirrell in the note-taking in the department, and in the co-operative work of the Experimental Union, by Mr. J. Buchanan, B.S.A., Mr. W. J. Squirrell and Mr. H. G. Bell, B.S.A. in the work of plant breeding, and by Miss M. Laughlin in the work of the office. Within the past year, several other graduates of our College have been employed in the Experimental Department to assist in the work and to enable them to become more familiar with the various operations and methods of experiment station work. Messrs. A. W. Mason, G. G. Whyte, and T. B. Henderson, all of whom received their degrees in May, 1905, were here for two or three months each; and Mr. C. C. Thom, a graduate of 1904, who started with us in the early spring, is here still. Each of these gentlemen have given good satisfaction.

GENERAL OUTLINE OF THE WORK IN FIELD HUSBANDRY IN 1905.

(1) The conducting of experiments in field agriculture on about 2,000 plots at the Ontario Agricultural College.

(2) The breeding of plants by systematic selection and by cross fertilization, in order to improve some of the best old varieties and to originate new ones of superior excellence.

(3) The directing of co-operative experiments on about 4,000 farms throughout Ontario. The report of the results of the co-operative work can be found in the annual report of the Ontario Agricultural and Experimental Union.

(4) The furnishing of plans, seeds, and instructions for illustration plots on the exhibition grounds at Simcoe, Whitby, and Richmond in Ontario, and at Brome in Quebec.

(5) The delivering of lectures to the freshmen, sophomore and senior class students, as outlined in the College circular; also to the students taking the dairy course, to those taking the short course in stock judging and seed judging, and to those taking the nature study course at the Macdonald Institute.

(6) The delivering of popular lectures to various gatherings of farmers as follows: Fifty or sixty in the experimental grounds to the thousands of excursionists who visited the College in the month of June; ten to the students of the Agricultural College, Truro, N.S.; two at the annual meeting of the Nova Scotia Farmers' Association, Truro, N.S.; one at the annual meeting of the Canadian Seed Growers' Association, Ottawa; four at Seed Fairs at Guelph, Brampton, Markham, and Fergus; three at Agricultural Fairs at Whitby, Richmond and Simcoe; one at the Provincial Fair, Guelph; three at the annual meeting of the Experimental Union, held at the Ontario Agricultural College; one at the Ontario Vegetable Growers' Association, Toronto; one at the Consolidated School, Guelph; and ten at Farmers' Institute meetings in the Temiscaming District.

(7) The writing of agricultural reports and articles. This includes the report of the Experimental Department of the College and of the co-operative experimental work throughout Ontario; a bulletin entitled "Results of Experiments with Farm Crops," and articles on agricultural subjects which were sent to the farm journals and newspapers occasionally throughout the year.

(8) The carrying on of a very large correspondence with farmers, seedsmen, etc. During certain seasons of the year, the letters received daily number nearly two hundred. Many of these letters require much thought and care in answering.

(9) The judging of farm crops at agricultural exhibitions. Within the past year, the writer, or one of his staff, acted as judge at the Spring Seed Fair, Guelph; the Autumn Seed Fair, Guelph; the Fall Fair, Simcoe; the Fall Fair, Guelph; the Fall Fair, Richmond; the Fall Fair, Whitby; the Spring Seed Fair, Fergus; the Canadian National Exhibition, Toronto; the Provincial Seed Fair, Truro, N.S.; the Canadian Seed Growers' Association Fair, Truro, N.S.; the Consolidated School Fair, Guelph.

(10) The fulfilling of duties required of the Secretary of the Ontario Agricultural and Experimental Union, the Vice-President of the Canadian Seed Growers' Association, Prof. Robertson's representative on the Board of the Macdonald Consolidated Rural School, etc.

During the past year, the writer has been ably assisted in the work of delivering lectures, judging at Seed Fairs, etc., by Mr. J. Buchanan and Mr. W. J. Squirrell.

Experimental Work in Field Husbandry.

The work in the Experimental Department consists in planning the various experiments; laying out, seeding, and looking after the field plots: harvesting, threshing, weighing, and testing the grain; taking up, weighing, counting, testing, and storing the potatoes and roots; cutting, weighing, and harvesting the grass, corn, and fodder crops, etc., and also in picking by hand the samples of grain grown on the plots, some to be sown on the plots the following year, and some to be distributed for co-operative experimental work throughout Ontario. But few people realize what a large amount of very careful thought is required in planning, supervising, and examining these plots, and in studying, comparing, and summarizing the results for presentation in reports, bulletins, newspaper articles, and lectures.

Experimental Grounds. About fifty acres of land, divided into about 2,000 plots, are used for agricultural field experiments, conducted with

varieties of grain, root, tuber, grass, clover, fodder, silage, and miscellaneous crops; with artificial, green, and farmyard manures; with methods of cultivation, selection of seed, dates of seeding, etc.—all with the greatest care, and for several years in succession—in order to secure strictly accurate and reliable results. These experiments deal with the crops grown on over nine-tenths of the cultivated land in Ontario, that is, fully 10,000,000 acres.

EXPERIMENTAL PLOTS. The experimental grounds have a gentle slope towards the southwest, and the soil is what might be termed an average clay loam. Nearly one-quarter of the land is manured each year with twenty tons (about twelve loads) of farmyard manure per acre. It will thus be seen that the most of the land receives farmyard manure once every four years. No commercial fertilizers are used except in distinct fertilizer experiments, which occupy from two to three acres each year, and on which tests are made to ascertain the comparative value of different fertilizers with different crops. Within the past eight years, one green crop has been plowed under. The plots vary in size according to the requirements of the different experiments, and the yields per acre are determined from the actual yields of the plots in every instance.

RESULTS OF EXPERIMENTS.

All our field experiments are conducted for at least five years before any of them are dropped. For the results of many of the tests, which were carried on for five years previous to 1905, the reader is referred to former reports. The results of some of the experiments which have yet been conducted for only one or two years are held back until the tests can be carried through at least another summer. As different seasons vary so much in temperature, amount of rainfall, etc., the average results of experiments continued for several years are of much greater value than those secured from only one year's work. We submit the results with much confidence in their reliability and in their real, practical value. The writer has had good reason to believe that the work of the Experimental department is being appreciated by the farmers of the Province, and that the results are being studied more and more each succeeding year. I shall limit my remarks on each separate experiment, the results of which are here presented, to a few of the points which seem to be of the greatest value to the agriculture of Ontario.

WEATHER CONDITIONS IN 1905.

In order to study the results most intelligently, it is well for us to have some understanding of the weather conditions at the time when the crops were growing on the plots. According to the observations made at the Physical Department of the College at Guelph, we learn that for the six months from April to September there were 18.7 inches of precipitation. The precipitation in each of the five years previous was as follows: 1904, 19.9 in.; 1903, 15.8 in.; 1902, 19.4 in.; 1901, 16.5 in.; and 1900, 12.6 in. It will therefore be seen that 1905 was a comparatively wet season, there being about one-half as much again rainfall as there was during the same period in 1900. The amount of rainfall at the College in each of the six growing months in 1905 was as follows: April, 1.75 in.; May, 3.89 in.; June, 3.54 in.; July, 4.66 in.; August, 1.98 in.; and September, 2.85 in. These figures show us that the amount of rainfall in

April and in August was rather light; while that in July was comparatively heavy.

The spring of 1905 opened up much earlier than usual, thus enabling us to sow the spring wheats and the barleys during the last three days of March, which is fully two weeks earlier than the average date at which the seeding is started at the College. During the early part of April, however, the weather was cold and unsettled, and the oats were not sown until about the middle of the month.

Comparative Results of Different Classes of Grain Crops.

We learn from the reports of the Bureau of Industries for Ontario that in 1905 there were 13,809,368 acres of cultivated land, of which 8,897,898 acres were used for field crops. Great care should be exercised in the selection of those classes of farm crops which are likely to give the best results. The selection of crops is necessarily governed to a considerable extent by the location of the farm, the quality of the soil, the particular kind of farming which is being followed, etc. There are many things to be taken into consideration in the selection of those crops which are likely to give the best general satisfaction. As there are about four million acres of the cultivated land of Ontario now devoted to the growing of oats, barley, spring wheat, spring rye, and peas, it is both interesting and valuable to make a study of the comparative yields of these crops. In the Ontario Agricultural College bulletin, No. 140, a considerable amount of information regarding the comparative yields of these crops throughout Ontario was given.

In order to glean as much reliable data as possible regarding the relative productiveness of the principal spring grains, an experiment has been in progress at the College for four years in succession, and the results are interesting. For this experiment, the seeding took place on April 24th in 1902, on May 5th in 1903, on May 4th in 1904, and on April 24th in 1905. In each of these years, twelve varieties and classes of farm crops were grown in duplicate, making in all twenty-four plots each season. The following gives the average results of the eight tests made in the four years:

Varieties.	Date of ripening.	Average length of plants. (ins).	Percentage of rust.	Yield per acre.	
				Straw. (Tons).	Grain. (Pounds).
Emmer (Common)	Aug. 19.	39	4	2.2	2,621
Barley (Mandscheuri)	" 4.	40	7	1.9	2,616
Oats (Joanette)	" 15.	40	9	2.9	2,497
Hulless Barley (Black)	" 4.	31	11	2.1	2,484
Early Oats (Alaska)	" 7.	42	12	2.2	2,355
Hulless Barley (White)	" 8.	33	5	1.9	1,961
Spring Wheat (Wild Goose)	" 26.	48	12	2.3	1,739
Spring Rye (Common)	" 15.	53	4	2.2	1,731
Field Peas (Early Britain)	" 24.	46	.....	1.8	1,600
Flax (Common)	" 18.	27	.....	2.0	1,041
Grass Peas (Common)	Sept. 10.	53	.....	2.2	768
Spring Vetches (Common)	" 7.	39	.....	1.8	722

We notice from the foregoing table that the greatest number of pounds of grain per acre has been produced by Emmer, which is a comparatively new crop in Ontario. This is a type of spring wheat in which there is not a clear separation of the grain and the chaff in the process of threshing. Although this is the case, the percentage of hull, or chaff, in Emmer is not as great as the percentage of hull in the average oats. It might be well to here mention that, on the average, barley has about 12 to 15 per cent., Emmer about 22 per cent., and oats about 30 per cent. of hull. Fuller information regarding this new crop can be ascertained further over in this report. The Emmer is followed very closely by the barley in yield of grain per acre. It is also found that the barley has given a larger yield of grain per acre than any of the other ordinary spring grains, according to the results obtained by the members of the Experimental Union and as reported by the Bureau of Industries for Ontario. The general impression seems to be that oats yield more heavily than barley. This is true when measured bushels form a basis of reckoning, but apparently does not hold good when the weight of grain forms the basis of comparison, if the average yields of the Province as well as the results at the College are taken into consideration. The Black Hulless barley, which has a standard weight of sixty pounds per measured bushel, does not yield nearly as many measured bushels of grain per acre as the Joanette oats, but when the number of pounds per acre are considered, there is a difference of only some thirteen pounds per acre between the average yields of these two classes of grain.

Influence of Variety on Production.

After carefully watching the crop production of the Province and closely observing the experimental work at the College for the last twenty years, the writer is more than ever convinced of the importance of farmers securing the best varieties of crops possible for their own particular farms and requirements. As some breeds of live stock have been bred for many years to fulfil certain purposes, so have certain varieties of farm crops been raised for long periods of time with different objects in view. Some varieties are well adapted to rich loamy soils; others to heavy clay land; and still others to soil of a light character. For instance, it would be unwise to grow the Joanette oats on a light, weak soil, or the Black Tartarian oats on a rich bottom land. It would be equally unwise to grow the White Wonder peas on a poor soil, or the Prussian Blue variety on land which naturally produces a large amount of straw. The best results could not be expected from growing the Turkey Red wheat where the crop is apt to lodge, or the Black Hulless barley on rich alluvial soil. Decidedly better results could be expected from growing the Longfellow corn in Northern Ontario and the Leaming variety in Southern Ontario than if this order were reversed. Much greater yields can nearly always be expected from the Banner than from the Black Tartarian oats; from the Dawson's Golden Chaff than from the Surprise Winter wheat; from Mandscheuri than from the Common Six-rowed barley; from the Early Britain than from the Golden Vine peas; from the White Wonder than from the common small field bean, etc. Certainly great differences exist between different varieties of grain crops in length of straw, strength of straw, susceptibility to rust, and quality of grain, as well as in yield per acre and in many other respects. The farmer who looks carefully after his own interests will certainly give a considerable amount of attention to

the securing of those varieties of farm crops which are especially suited to his own particular soil and conditions. The Experimental Department has therefore given considerable attention to the testing of different varieties of crops, in such a way that the information obtained might be of service to the farmers of the Province in helping them to secure such varieties as might prove of the greatest service to their varying requirements. We would therefore recommend that farmers glean as much information as possible regarding the most suitable varieties for them to grow by observing the results on neighboring farms, by studying the reports of Experiment Stations, and by a limited amount of definite and systematic experimental work conducted by themselves.

One Year's Influence from Seed Selection.

Within the past twelve years, a large amount of very careful work has been done to determine the influence of different selections of seed upon the resulting crop. The reader's attention is directed to the results of this experiment, which are becoming more and more valuable from year to year, owing to the increasing number of times that the experiment has been repeated. Fresh seed has been taken each year from the general crop of grain grown either in the Farm or the Experimental Department, or from seed of the leading varieties of roots and rape as obtained from some of the best seedsmen. It will therefore be understood that the results will represent simply the one year's influence from seed selection, but, in order to ascertain the influence from one year's work of this selection, the experiments have been repeated from season to season in order to secure a good average of conditions of soil, temperature, and rainfall. For the large seed, none but well-developed grains were selected; for the medium-sized sample, the grains selected were of a uniform character, plump, and of medium size; and for the small, none but sound, plump, and apparently good seeds of small size were used. In the selection of large plump grain, one-half pound of each class was carefully weighed and counted. A corresponding number was then taken of the medium sized and of the small plump grains. The different selections were sown upon plots of similar size. Four tests were made annually with the different selections of seed of both the root and the rape crops. Duplicate experiments were conducted, in which the seeds of the different selections were planted separately, and a duplicate experiment was also conducted by dibbling three large, five medium, and eight small seeds at each place where it was desirable for a root or a rape plant to grow. The plants were afterwards thinned, leaving one in each place and having the plants of the different selections of each class at an equal distance apart. The results of the duplicates of each method were then averaged, and afterwards those of the two methods were averaged together. It will therefore be seen that the results of all the selections with roots and rape are those of four distinct tests made in each of the years in which the experiment was conducted.

From the figures here presented in tabulated form, it is most interesting to observe the marked influence of one year's selection of seed on each of the eleven different crops here enumerated. It will be seen that the large seeds of oats produced about eight bushels per acre more than the medium sized, and the medium about seven and a half bushels per acre more than the small sized seed; or an advance of over fifteen bushels per acre from the large as compared with the small seed. Averaging the results for each class of crop,

it is found that the large seed surpassed the small seed by 19.1 per cent. for the grain crops, 40.3 per cent. for the rape, and 60.1 per cent. for the root crops.

	Crops.	Number of years of tests.	Yield of crop per acre. Large seed.	Medium sized seed.	Small seed.
			Bus.	Bus.	Bus.
Grains.	Oats	7	62.0	54.1	46.6
	Barley	6	53.8	....	50.4
	Spring Wheat	8	21.7	....	18.6
	Winter Wheat	6	46.9	....	40.4
	Field Peas	6	28.1	....	23.0
			tons.	tons.	tons.
Field Roots.	Mangels	5	33.2	29.6	21.5
	Sugar Beets	5	22.9	21.9	14.3
	Swede Turnips	5	17.1	15.2	8.7
	Fall Turnips	4	25.4	21.7	16.2
	Field Carrots	5	24.5	22.2	16.2
Rape	Rape	5	17.4	15.0	12.4

In another experiment conducted in a similar way to the one just described, a comparison was made between plump and shrunken seeds of barley, spring wheat, and winter wheat. In this case, none but either plump or shrunken seeds were selected, and the selections were made regardless of the size of the kernels. The same number of seeds of the different selections for each class of grain was taken and the different lots were sown on plots of uniform size. The average of several years' results show that in weight of grain per measured bushel and yield of both straw and grain per acre, the large plump seed surpassed the shrunken seed in every instance for each of the grains here mentioned. In averaging all the results, it was found that the plump seed gave a yield of 20.2 per cent. more than the shrunken seed.

Unless care is exercised, a considerable amount of grain is frequently broken in the process of threshing. In order to ascertain the amount of injury done to the germination of the grain by means of its being broken at the time of threshing, experiments have been conducted for at least six years, by sowing both sound seed and broken seed of barley, winter wheat and peas, and the results carefully recorded. The following gives the average yield of grain per acre of each selection of each class of crop: *Barley*: sound seed, 53.8 bus., broken seed, 46 bus.; *Winter Wheat*: sound seed, 46.9 bus., broken seed, 9.3 bus.; and *Peas*: sound seed, 29.2 bus., broken seed, 10.2 bushels. As the barley nearly always breaks crosswise of the grain, the germ is usually left uninjured. In the case of winter wheat and peas, however, the grain usually breaks along the crease and in very many cases the germ is either totally or partially destroyed.

As we sometimes have wet weather at the time of harvesting our crops, a considerable amount of the grain becomes more or less sprouted before it can be properly cured. As the winter wheat crop was badly sprouted in 1897 and again in 1902, it gave us an opportunity in each of those years to compare the value of sprouted and unsprouted seed. As the results of tests

made in those two years, we find that the wheat which was in the field during the rainy weather, and which showed no signs of being sprouted, gave a germination of 94 per cent.; while that which was slightly sprouted gave 76 per cent.; that which was considerably sprouted, 30 per cent.; and that which was very badly sprouted, only 18 per cent of germination.

Selection of Seed Oats for Thirteen Years in Succession.

An interesting experiment has been conducted for thirteen years in succession with a systematic selection of seed oats. The selections were made with large, plump, well-developed seeds; light-weighing and light-colored seeds; and also seeds from which the hulls had been removed by the separator. The test was commenced in the spring of 1893, by selecting seed from the general crop of the Joanette black oats of the previous year. The selection made in each of the following years has been from the product of the selected seed of the previous year. The selections in each of the three crops in each year were composed of an equal number of grains, and were sown on plots of uniform size. As the selection for this experiment has been continuous, selecting the seed each year from the crop produced in the year previous, the average results are of little value, but the yearly results are interesting, valuable, and quite suggestive. In the crop produced in 1905, it was found that the large plump seed produced 65.5 bus.; the light seed, 44.7 bus.; and the hulled seed, 69.4 bus. per acre. In each of the past few years, the results have been much the same as those for 1905, except that in most of the years the yield of grain from the large plump has been slightly greater than that from the hulled seed. As only the best quality of seed becomes hulled, we find that the oats from which the hulls had been removed gave about as good results as those obtained from the carefully selected, large, plump seed, from which the hulls had not been removed in the process of threshing. In weight per measured bushel, the crop produced from the large plump seed weighed 35.5 pounds; from the light seed, 24.3 pounds; and from the hulled seed, 34.3 pounds. The difference, therefore, between the large, plump, well-developed seeds and the light-weighing and light-colored seeds is very marked and shows the great importance of sowing the former and discarding the latter. It is interesting to notice that the crop produced from the large plump seed required only 1,149 grains to weigh an ounce; while the crop produced from the light seed required 2,066 grains to make the same weight.

Oats, Barley, and Potatoes, Grown on the Same Farm for Sixteen Years without Change of Seed.

The question of the advisability of making a frequent change of seed from one farm to another is one which has claimed the attention of farmers for long periods of time. It is a problem which it is extremely difficult to solve; in fact it is practically impossible to find a solution which will comply with all cases. Any information, however, which can throw light upon this perplexed question should be welcome. If it is necessary to change seed grain and potatoes every two or three years in order to keep up the vigor of the plants, the problem of seed selection is an exceedingly difficult one. We find at the present day a considerable number of the very best farmers who think that good results may be obtained by growing the same varieties on the same farm for several years in succession without the introduction of fresh seed from other farms, soils, or localities. At the Ontario Agricultural College, eight varieties of oats, eight varieties of barley, and seven varieties of

potatoes have been grown for sixteen years without change of seed. Care has been exercised each year to select the best grain and potatoes for seed purposes. The crops have been grown each year in the Experimental Department. The soil is what might be termed an average clay loam. Neither the grain nor the potatoes were grown on sandy soils or on heavy clays during the sixteen year period. The land received no commercial fertilizers whatever, but was manured with about twelve tons of farmyard manure per acre each four years. It has been cropped heavily with grain, roots, corn, potatoes, etc., and has probably changed but little in its productive capacity. As accurate records have been kept regarding the comparative yields per acre of each variety in each of these years, we are thus in a position to present results for comparison. The following table gives the average yields per acre per annum for each of the four periods of four years each; also the average yield per acre per annum for the whole period of sixteen years:

Crops and varieties.	Average yields per acre per annum for each of four periods of four years each.				Average annual yield per acre for 16 years.
	1890–1893.	1894–1897.	1898–1901.	1902–1905.	1890–1905.
Oats.	Bush.	Bush.	Bush.	Bush.	Bush.
Joanette	84.8	88.7	84.9	102.4	**90.2**
Siberian	72.9	83.9	90.4	105.4	**88.2**
Waterloo	74.3	84.1	85.6	105.9	**87.5**
Oderbrucker	74.6	85.1	85.8	102.9	**87.1**
Probsteier	75.7	81.6	88.1	100.3	**86.4**
Bavarian	70.6	79.9	86.6	103.3	**85.1**
Egyptian	70.7	71.4	76.4	88.5	**76.7**
Black Tartarian	67.2	60.5	66.5	91.9	**71.5**
Barley.					
Mandscheuri	60.3	72.2	70.3	76.4	**69.8**
Oderbrucker	53.1	61.6	68.4	68.9	**63.0**
Common Six-rowed	50.5	56.7	68.4	68.9	**61.1**
French Chevalier	54.6	55.8	68.3	61.2	**60.0**
New Zealand Chevalier	49.6	56.7	68.2	64.7	**59.8**
Mensury	48.4	53.4	73.9	59.0	**58.7**
Black Hulless	38.8	39.1	47.5	50.1	**43.9**
Hungarian	42.7	34.8	42.2	50.8	**42.6**
Potatoes.					
Empire State	183.2	231.2	229.0	280.5	**231.0**
Rural New Yorker No. 2	130.5	226.5	221.5	251.0	**207.4**
The Daisy	128.9	204.4	234.9	248.4	**204.2**
White Elephant	102.4	216.6	224.6	271.1	**203.7**
Rose's New Invincible	103.8	224.7	238.0	240.6	**201.8**
Rural Blush	107.3	213.9	207.5	234.9	**190.9**
Stray Beauty	86.7	192.5	168.1	216.7	**166.0**

The results here presented are very interesting and quite suggestive. Without one exception, the average yield per acre for the last four years is greater than for the first four years for each variety grown during the sixteen year period. The average results of all the varieties for each of the first, second, third, and fourth periods are given in the same order as the periods just mentioned: Oats—74 bushels, 79 bushels, 83 bushels and 100 bushels; barley—50 bushels, 54 bushels, 63 bushels and 63 bushels; and potatoes—120 bushels, 216 bushels, 218 bushels and 249 bushels. It will therefore be seen that the average yield per annum for the last four years surpassed that

of the first four years by 26 bushels per acre for the oats, 13 bushels per acre for the barley, and 129 bushels per acre for the potatoes. The figures here presented show quite clearly that it is possible to grow the same varieties of grain and potatoes on the same farm for a considerable number of years without change of seed, providing great care is exercised each year in the selection of the seed and in the handling of the crop.

Improvement of Varieties of Grain Crops by Plant Selection.

A large amount of experimental work has been conducted at the College in a careful and systematic selection of seed for crop production. From the results given in the earlier part of this report, it will be seen that the selection of the seed itself has had a marked influence upon the vigor of plants and upon the production of grain. Although some work has been done in the subject of plant selection with winter wheat and with some of the spring crops from time to time, systematic work has not been followed in an extensive way until within the past few years. In the spring of 1903, some very choice grain of six varieties of oats, barley and spring wheat was selected from the crops grown in the Experimental department in 1902. Of each of these six varieties, one-sixteenth of an acre was sown with a grain drill in the ordinary way; one-sixteenth of an acre was sown with a grain drill by using every second tube of the drill; one-sixteenth of an acre was planted by hand, placing the seeds eight inches apart each way; and one-sixteenth of an acre was planted by hand, placing the seeds one foot apart each way. It will therefore be seen that one and one-half acres were devoted to this work in 1903. No less than 9,972 seeds of each variety, or a total of 59,832 seeds of the six varieties, were planted by hand. The four methods of planting were used in order that a comparison might be made as to the best method to use in plant selection. It was found that the grain which was sown with a grain drill, either from every tube or from every second tube, gave a very poor opportunity for plant selection. From grain sown with a drill, heads may be selected, but it is practically impossible to make a satisfactory selection of plants, owing, largely, to the uneven distribution of the seed. When plants are grown at unequal distances apart, they vary greatly, owing to the relative amounts of soil, moisture and air furnished the individual plants, by the uneven way in which the seeds were distributed in the soil. On a careful examination of the plants obtained from the drilled seed, it was found that some of them would be separated from all other plants by ten or twelve inches; while in other cases two or three plants would be growing so closely together that their roots and stems would become so much entangled that it was difficult to ascertain whether there was simply one plant or whether there were two or three or four plants, until a considerable amount of time and labor were expended in making the examination. It was therefore decided to make a few selections of heads, but not to make a selection of plants from the crop produced from the seed sown with the machine. The grains which were sown by hand, however, gave an excellent opportunity for the plants to grow under uniform conditions. As all the plants in each of the two methods of hand planting were at equal distances apart, it afforded an excellent opportunity for studying the stooling properties, the comparative strength of straw, the size and uniformity of the heads, etc., of the individual plants. When the crops of each variety on the hand-planted plots had reached the proper stage of maturity, careful examinations were made and the results recorded for reference. After this was done, a few of the very best plants were selected and harvested separately. All of the seed of the most promising

plant of each variety was sown in the spring of 1904, and nearly all the grain produced in 1904 was sown in the spring of the present year. A number of the other choice plants of each variety was also selected and harvested separately, and afterwards the best seed was selected and sown in single rows in the spring of 1904. From those strains which gave the best satisfaction in 1904, a sufficient amount of seed was selected and sown on uniform plots in the spring of 1905, and the yield and the quality of the crops produced were carefully recorded. The results so far are encouraging. A statement of a few of the records are here given.

INCREASED STOOLING PROPERTIES. The crops grown from the seeds planted one foot apart each way showed the following average number of heads per plant from the selected seed in 1903, and from the seeds produced from the selected plants in 1904, to be as follows:

Crops.	1903.	1904.
Six-rowed Barley (Mandscheuri)	10.8	13.5
Two-rowed Barley (Chevalier)	26.3	31.7
White Oats (Siberian)	13.6	18.4
Black Oats (Joanette)	27.6	46.9

As the seeds were planted exactly the same distance apart in each of those two years, it is quite probable that the influence of the selection made in 1903 is largely the cause of the increase in the average number of heads per plant in the crop of 1904, as compared with that of the previous year.

IMPROVED STRAINS OF LEADING VARIETIES OF SPRING GRAIN. Upwards of one hundred selected strains of leading varieties of winter wheat and spring grains were grown in the Experimental Department on uniform plots in 1905. Fifty-six of the plots contained selected strains of spring crops described previously. Some of these strains are promising, as they indicate a greater yield of grain per acre than was obtained from seed produced from plants which had not been specially selected. The table which follows gives the highest yields per acre obtaind in 1905 from seed resulting from the plants selected in 1903 as previously described. In comparison with these yields are those produced from selected seed obtained from plants which were not specially selected.

Crops.	Tons of Straw per acre from selected		Bushels of Grain per acre from selected	
	Seeds.	Plants.	Seeds.	Plants.
Six-rowed Barley (Mandscheuri)	1.8	2.0	68.4	78.5
Two-rowed Barley (Chevalier)	2.1	2.4	44.8	58.6
Hulless Barley (Guy Mayle)	1.6	2.0	47.3	48.6
White Oats (Siberian)	2.3	2.1	86.1	91.3
Black Oats (Joanette)	2.1	1.9	79.3	89.0
Spring Wheat (Wild Goose)	1.4	1.8	29.7	36.4

Although there is a slight irregularity in the yield of straw per acre, it will be seen that in every case the yield of grain from seed obtained from selected plants was higher than that produced from seed obtained from plants which were not selected. We hope to be able to distribute seed of some of the selected strains of the best varieties of grain crops in the spring of 1906 for co-operative experimental work throughout Ontario. This will enable the farmers to ascertain for themselves the productive power of some of these improved strains in comparison with some of the very best varieties which have not been thus selected. If the new strains prove highly productive throughout the Province, their increase would no doubt be rapid and in a short time they would be grown extensively.

THE PRODUCTION FROM ONE SEED OF GRAIN IN A PERIOD OF TWO AND A HALF YEARS. As previously stated, the most promising plant of the thousands of plants of each of six varieties of spring grain grown in 1903, was saved and the seed produced was all sown by hand in 1904, from which crop the grain was carefully saved and was sown with an ordinary grain drill in the spring of the present year. The following table represents the yield of grain in 1903, and the yield of both straw and grain in 1904 and in 1905:

Crops.	Yield of Grain 1903.	Yield of Crop 1904.		Yield of Crop 1905.	
		Straw.	Grain.	Straw.	Grain.
	ozs.	lbs.	lbs.	lbs.	lbs.
Six-rowed Barley (Mandscheuri)	2.3	148	68	2,887	1,929
Two-rowed Barley (Chevalier)	2.4	112	56	3,265	1,119
Hulless Barley (Guy Mayle)	2.9	184	98	2,178	2,109
White Oats (Siberian)	1.6	171	61	3,553	2,102
Black Oats (Joanette)	1.2	196	74	8,748	3,489
Spring Wheat (Wild Goose)	1.0	46	15	542	241

From these results, it will be seen that we obtained in 1905 fully 101 bushels of Joanette oats, 61 bushels of Siberian oats, 40 bushels of Mandscheuri barley, 35 bushels of Guy Mayle Hulless barley, 27 bushels of Chevalier two-rowed barley, and 4 bushels of Wild Goose spring wheat, as the direct result in every case from one seed planted two years ago last spring. When we realize the fact that one single grain of the Joanette oats planted in the spring of 1903 produced over 100 bushels of grain in 1905 on about two acres of land, we learn something of the importance of securing even single grains of the highest possible value. In comparison with 100 bushels from the Joanette oats, we have only about 4 bushels of the Wild Goose spring wheat under just as favorable conditions. The Wild Goose spring wheat has only a few heads per plant and a comparatively small number of grains per head. The crops which are here reported were greatly admired by thousands of farmers who visited the College and examined the experimental plots in the month of June of the present year.

THE PRODUCTION OF HYBRIDS.

Even though we take great pains in selecting the best seed from the best plants of the best varieties of cereals, we find that the plants produced, although greatly improved in many respects, have weaknesses. We observe

that some varieties are specially strong in certain characteristics, while other varieties are equally strong in other features. With the hope of originating new varieties possessing the good qualities and eliminating the weak features of some of the best kinds, efforts have been made to obtain the desired results through artificial cross fertilization. With the aid of the investigations made by Mendel, de Vries, Correns, Bateson, and others, we are obtaining new light upon this problem which we hope to be able to apply to excellent advantage. In former years when crosses of cereals were made, it was thought necessary to continue growing the crosses for six, eight, or ten years before the varieties became fixed. It is hoped that, with the new information obtained, more definite results may be secured in considerably less time. At our Agricultural College, we have crossed a few of our best varieties of spring wheat, winter wheat, oats and barley. The work has been largely accomplished during the last four years. The results in 1905 are certainly very encouraging. We had, in all, about eight thousand hybrids in the past season. In all our crosses, we are working along definite lines with the hope of securing what we are after. As, for instance, we have crosses between the Siberian and the Joanette varieties of oats. Of about two hundred and fifty varieties of oats which we have had under experiment, the Joanette black has produced the greatest yield of grain per acre, has been the greatest stooler, and has furnished grain which was exceedingly thin in the hull. This variety, however, is very short in the straw and unsuitable for general cultivation. The Siberian variety possesses straw of good quality and grain which is white in color, but the yield per acre is slightly less, the percentage of hull rather more, and the stooling properties not nearly as highly developed as in that of the Joanette. We now have hybrids which are long in the straw, possess good stooling properties, and furnish grain white in color and exceedingly thin in the hull. We hope that these properties may be retained, so that a variety may be secured which will be constant in its possession of the good characteristics obtained from these two prominent varieties of oats. We also have crosses and hope to unite in the same varieties the good qualities of the Dawson's Golden Chaff and the Turkey Red varieties of winter wheat, the Herison Bearded and the Red Fife varieties of spring wheat, the Mandscheuri and the Two-rowed Chevalier varieties of barley, the Common Emmer and the Red Spelt, etc. Although there is a great difference of opinion at the present time as to the outcome of the recent investigations in plant breeding, we believe, from what we have been able to learn from the work of others and from our own practical experience, that tremendous strides will be made along the line of plant improvement through artificial cross fertilization within the next few years.

It will be seen from what has already been said, that the work of the breeding of cereals, in its best form, means careful, systematic effort conducted along definite lines over a long period of time, by first selecting the best seed from the best plants of the best varieties, in order to secure a foundation stock for crossing for the production of new varieties, eliminating as many of the poor qualities and incorporating as many of the best characteristics as can be brought together in any one variety to fulfil a certain and definite purpose.

Seed Mixtures for Grain Production.

A large amount of experimental work has been carried on at the College within the past sixteen years in the endeavor to glean reliable information regarding the comparative values of grain mixtures in comparison with the growing of the same grains separately for the production of both grain and

straw. Most of these experiments have now been conducted for at least five years in succession, and the results which have been obtained should prove quite serviceable.

FOUR CLASSES OF SPRING GRAIN GROWN SEPARATELY AND IN COMBINATION. For five years in succession, an experiment was conducted in growing oats, barley, wheat and peas separately, and in eleven different combinations, having two, three, or four grains in each mixture. It will thus be seen that in this experiment a comparison was being made between fifteen different crops. The experiment was conducted in duplicate each season. The results show that the grain which was sown in mixtures produced larger yields per acre than the same kinds of grain sown separately, in from ninety to ninety-five per cent. of the tests. Of the different mixtures used, oats and barley gave the heaviest average yield of threshed grain per acre.

DIFFERENT PROPORTIONS OF BARLEY AND OATS USED IN COMBINATION It was decided in the spring of 1899 to conduct an experiment in sowing nine different proportions of oats and barley in order to determine which mixture and which quantity of seed would give the best results in the production of grain and straw. The experiment has been conducted for six years in succession. The average results show that the greatest number of pounds of grain per acre was produced from a mixture of one bushel of oats (34 lbs.) and one bushel of barley (48 lbs.) per acre, or a total amount of 82 pounds of mixed seed per acre.

A MIXTURE OF OATS AND BARLEY WITH AND WITHOUT SOME OTHER GRAIN FOR SEED PURPOSES. In 1902, 1903, 1904, and 1905, an experiment was conducted in duplicate in order to ascertain whether a seed mixture composed of one bushel of oats and one and one-half bushels of barley per acre could be improved by the addition of a small quantity of some other kind of seed. In addition to the mixture of oats and barley here mentioned, one-half bushel of grain was used in each combination. The following table gives the average results in yield per acre of the two tests for each of the four years:

Mixtures.	Tons of straw.	Lbs. of grain.
Oats (34 lbs.) Barley (72 lbs.) Flax (28 lbs.)	2.4	2,492
Oats (34 lbs.) Barley (72 lbs.)	2.2	2,460
Oats (34 lbs.) Barley (72 lbs.) Emmer (22 lbs.)	2.3	2,479
Oats (34 lbs.) Barley (72 lbs.) Spring Wheat (30 lbs.)	2.2	2,438
Oats (34 lbs.) Barley (72 lbs.) Hulless Barley (30 lbs.)	2.2	2,388

The results here given seem to indicate the difficulty of surpassing a mixture of oats and barley for grain production. The mixture of oats, barley and flax is the only one which has given a greater yield of grain per acre than a combination of oats and barley.

TWELVE KINDS OF GRAIN GROWN IN COMBINATION. In the spring of 1902 an experiment was started in growing twelve kinds of grain in different combinations. One of the principal objects of this experiment was to ascertain the relative value of different kinds of grain when grown in combination in comparison with the same grains when grown separately. Another of the main objects was to learn which grain of twelve different kinds would produce the greatest percentage of both straw and grain in the crop produced. The

grains included in this experiment are as follows: Mandscheuri Barley, Black Hulless Barley, Spring Rye, Early Alaska Oats, Joanette Black Oats, White Hulless Barley, Field Peas, Wild Goose Spring Wheat, Emmer, Grass Peas, Vetches, and Flax. The mixtures were made up in two different ways, first, by using the same amount of seed of each variety which is usually sown when the grains are grown separately, and second, by using equal quantities of seed of all the varieties. Each of the mixtures here described was sown at the rate of 112 pounds of seed per acre. Each part of the experiment was conducted in duplicate. It will therefore be seen that there were four tests made with this mixture in each of the four years.

The crop produced by the mixture of twelve kinds of grain sown at the rate of 112 pounds per acre was carefully analyzed in order to ascertain the percentage of yield of each of the separate crops. The following table gives the average percentage of each grain in the crop produced from each of the methods of combination indicated above:

Varieties.	Percentage of Grains in Mixtures. four years—sixteen tests.		
	Uniform weights of seed sown.	Quantities of seed in same proportions as when grown separately.	Average of two classes of mixtures.
Six-rowed Barley (Mandscheuri)	18.0	16.5	17.3
Hulless Barley (Black)	13.2	15.0	14.1
Spring Rye (Common)	12.2	13.1	12.6
Early White Oats (Alaska)	12.4	7.5	10.7
Black Oats (Joanette)	11.3	4.8	9.6
Peas (Field)	5.2	9.5	7.3
Hulless Barley (White)	6.0	7.2	6.6
Emmer (Common)	6.0	7.1	6.5
Grass Peas (Common)	6.9	5.8	6.3
Spring Wheat (Wild Goose)	3.9	5.0	4.5
Vetches (Common)	3.4	2.8	3.1
Flax (Common)	1.5	1.2	1.3

The results here presented are very suggestive. The Mandscheuri six-rowed barley gave uniformly very high results in percentage of crop produced in each of the four years. It will be seen that the first five grains in the table produced about double the percentage of crop of that produced from the other seven kinds of grain. This experiment goes to confirm other experiments and to show that it is very difficult to make a mixture which will produce a heavier yield of grain per acre than one made by a combination of barley and oats.

VARIETIES OF BARLEY AND OATS MOST SUITABLE FOR GROWING TOGETHER. If barley and oats are grown together, it is, of course, important to secure those varieties which will mature about the same time. In order to do this, it is necessary to use a very early variety of oats with an ordinary ripening barley, or a very late variety of barley with an oat which matures at an average date. Of all the varieties which we have used in combination, we have found that the Early Daubeney oats and the Mandscheuri barley make a very excellent combination. Another mixture which has given very good

satisfaction is the Siberian or Banner oats and the Chevalier two-rowed barley. It is, however, difficult to secure true seed of the Chevalier barley in Ontario at the present time. Taking everything into consideration, the first mixture here mentioned is one of the most satisfactory to use at the present time.

Two Varieties of Winter Wheat Grown Together. In 1904 and again in 1905, an experiment was conducted with the object of finding out whether there was any advantage from growing two varieties of winter wheat together, in comparison with the same varieties grown separately for crop production. In each of the years, therefore, the Dawson's Golden Chaff and Turkey Red were grown separately and in combination. The experiment was repeated in each year by growing the Early Genesee Giant and the Michigan Amber in the same way. The results so far show that the mixed grain gave almost exactly the same results in yield of both straw and grain per acre and in weight per measured bushel as the average of the two varieties grown separately.

Sowing Grain on Different Dates.

In order to obtain some reliable and specific information regarding the actual results of sowing grains at different times, experiments have been conducted at the College in each of five years by sowing spring wheat, barley, oats, and peas, on each of six different dates in the spring; by sowing Emmer and Spelt on each of eight different dates in the spring; and by sowing winter wheat on each of six different dates in the autumn of the year.

Oats, Barley, Spring Wheat, and Peas. In each of the five years in which this experiment was conducted with oats, barley, spring wheat, and peas, the first seeding took place when the land was warm enough and dry enough to work to good advantage. One week was allowed between each two seedings unless unfavorable weather compelled a change of a day or two in the date of seeding. The grain was sown on each of six dates in each year, the average of the first date being April 18th and of the last date May 23rd.

The results show that the greatest average yield of grain per acre was produced by the spring wheat and by the barley from the first, and by the oats and peas from the second date of seeding. This also holds good in regard to the straw per acre. With a single exception, that in the case of peas, the seed sown on the third date produced a little higher yield than that sown on the second date. In weight of grain per measured bushel, the first two dates of seeding are decidedly the best with spring wheat, barley, and oats, but in the case of peas the highest weights of grain per measured bushel were obtained from the third and fourth seedings. It was observed that as the date of seeding was delayed the percentage of rust in the resulting crop was gradually increased, with only one slight exception. The results indicate the importance of sowing spring wheat, barley, oats, and peas, in the order here given, starting with the spring wheat and finishing with the peas. An exceedingly important lesson may be learned from the results of this experiment which show that for every day's delay in the seeding after the first week had passed in which the seeding took place, there was an average decrease of 56 pounds of oats, 53 pounds of barley, 29 pounds of spring wheat, and 23 pounds of peas per acre.

Emmer and Spelt. Both Emmer and Spelt were sown on eight different dates in the spring of the years 1903, 1904, and 1905, starting on April 2nd in 1903, on April 22nd in 1904, and on April 8th in 1905. One week was allowed between each two dates of seeding. The average results of the experiment for three years are presented in tabulated form as follows:

Dates of Seeding.	Lbs. per measured bushel.		Tons of straw per acre.		Lbs. of grain per acre.	
	Spelt.	Emmer.	Spelt.	Emmer.	Spelt.	Emmer.
First	29.2	40.3	1.8	2.0	2,604	2,850
Second	27.9	39.5	1.6	2.1	2,332	2,966
Third	27.4	39.4	1.8	2.0	2,191	2,851
Fourth	26.0	38.6	1.7	2.3	1,832	3,006
Fifth	25.1	38.5	1.8	2.3	1,639	2,983
Sixth	22.3	37.9	2.1	2.5	1,175	2,881
Seventh	21.4	36.8	1.8	2.9	930	2,891
Eighth	22.8	34.9	1.9	2.2	661	2,439

The average results of the experiment in sowing Emmer and Spelt on each of eight different dates show that decidedly the best yield of Spelt was obtained from the first date of seeding. This is true not only in the average of the three years but of each of the seasons in which this experiment was conducted. As the season advanced, there was a gradual decrease in the yield of Spelt per acre. The results for the Emmer, however, are decidedly different. The highest yields of Emmer were obtained from the fifth date in 1903, the sixth date in 1904, and the seventh date in 1905. The average results for the three years show that the greatest yield of Emmer was produced on the fourth date. There is not a very marked difference, however, in the production of Emmer from the eight dates of seeding, except from the very last one, which is about 400 pounds per acre less than that of the next lowest yield. The figures in this report show very forcibly the superiority of the Emmer over the Spelt as a grain producer in this section of the Province. It also shows that Emmer may be sown at a much later date in the spring than any of the other cereals.

Winter Wheat. Winter wheat sown at the College during the first ten days of September in each of nine years has yielded 5.2 bushels per acre more than that sown from the 16th to the 20th of September.

Time of Cutting Winter Wheat.

For seven years in succession, five plots of each of two varieties of winter wheat were sown at the same time in the autumn and cut at five different dates in the following summer, a week being allowed between each two dates of cutting. Seed from each of the seventy cuttings was sown and the crop therefrom was harvested when ripe. In the average results of six tests, it is found that the heaviest weight of grain per measured bushel and the largest yield of both straw and grain were produced from seed taken from the crops which had become very ripe by remaining uncut for the longest period of time.

Quantity of Seed Per Acre.

Experiments have been conducted in sowing different quantities of winter wheat and spring grains per acre in the past season. Many tests conducted at Guelph indicate the importance of sowing about ninety pounds of winter wheat per acre on average soil. This amount may be increased for poor land and decreased for rich soil.

In 1905, each of four varieties of flax were sown at the rate of one-quarter, one-half, and three-quarters of a bushel, and also at the rate of two, three, and four bushels per acre, making in all twenty-four plots in the experiment. Averaging the results of the four varieties sown with each of the quantities per acre here indicated, we find that the yields of flax per acre, after the seed used was subtracted from the crop produced, were as follows:

Quantities of Seed.	Tons of straw.	Bushels of seed.
1 peck	1.2	13.7
2 pecks	1.7	18.8
3 pecks	2.1	18.6
2 bushels	2.7	17.4
3 bushels	2.5	15.2
4 bushels	2.6	13.9

It will therefore be seen that the greatest yield per acre, less the seed used, was obtained by sowing two pecks of seed per acre. The largest quantities of seed were, of course, sown more especially for fibre production than for the yield of seed. Where two, three, and four bushels of seed per acre were used, the straw was very straight and upright, and where the smaller amounts of seed were used the plants were much more branching and less suitable for the production of fibre of high quality. There was a marked difference in the production from the different varieties, as will be seen under the discussion of the varieties of flax in a later part of this report.

Influence of Seeding with Timothy and Clover on the Production of Spring Grains.

It is the general custom among farmers to seed down various kinds of cereals with grass and clover seed. There has been little enquiry and less experimental work regarding the influence of the young plants of clover and grass on the larger and more vigorous plants of oats, wheat or barley, which form a nurse crop for the smaller plants. In the spring of 1904, thirty-two plots were sown with oats. Of this number, eight were seeded with Red Clover, eight with Alsike Clover, eight with Timothy, and the other eight were not seeded with either grass or clover seed. In 1905, a similar experiment was conducted with barley. On examining the results of the crops produced in each of these two years, it is found that on the average the oats and the barley which were seeded with timothy produced only one-tenth of a bushel of grain per acre less than that which was not sown with either grass or clover. The cereals which were grown along with Red Clover and Alsike Clover gave a slightly increased yield of grain, and those grown with timothy a slightly decreased yield of grain per acre, as compared with those grown by themselves.

Treatment of Grain for Smut.

In nearly every year, great losses are sustained throughout the Province of Ontario through the development of smut in the crops of wheat, oats, and barley. As a large amount of this loss can be easily checked, we

direct the reader's attention very particularly to the results of the experiments conducted here at the College.

Two varieties of winter wheat and two varieties of oats have each been treated in seven different ways, so that the different systems of treatment might be compared with one another, and also with seed which was left untreated. The various treatments were as follows:

(1) *Immersion in Diluted Formalin.* The solution of formalin used for the immersion process was made by pouring one-half pint of the formalin into 21 gallons of water, and the seed oats were immersed in the solution for twenty minutes.

(2) *Sprinkling with Diluted Formalin.* One-half pint of formalin was poured into 5 gallons of water. The oats were then sprinked with this solution and carefully stirred until the grain was thoroughly moistened.

(3) *Immersion in Hot Water.* For this treatment, the grain was placed in a bag, which was then immersed in water at about 115 degrees F. Soon afterwards it was placed in water which was kept at a temperature of between 130 degrees and 135 degrees F. The grain was occasionally stirred, and was allowed to remain in the water for a period of fifteen minutes. It was then spread out on a clean floor to dry, where it was stirred occasionally.

(4) *Immersion in Bluestone Solution for Twelve Hours.* In this treatment, the bluestone solution was made by dissolving one pound of bluestone in 25 gallons of water, and the oats were immersed in this solution for a period of twelve hours.

(5) *Immersion in Bluestone Solution for Five Minutes.* For this treatment, a strong solution was made by dissolving one pound of Copper Sulphate (Bluestone) in one gallon of water, and then immersing the oats in the solution for a period of five minutes.

(6) *Immersion in Potassium Sulphide Solution.* The potassium sulphide treatment consisted in soaking the seed for two hours in a solution made by dissolving eight pounds of potassium sulphide in 50 gallons of water.

(7) *Sprinkling with Bluestone Solution.* This solution was made by dissolving one pound of bluestone in 10 gallons of water, which was used for sprinkling over the oats until they were thoroughly moistened after being carefully stirred.

(8) *Untreated.* One sample of oats of each variety was left untreated in order that the influence of the various treatments might be observed.

It will be seen that eight lots of each variety of winter wheat and also of oats were used in the experiment each year. After the treatments had been completed a few hours, the grains were carefully sown on separate plots, each of which was exactly one rod square. When the winter wheat was about ready to cut, it was carefully examined and the smutted heads were picked out and shelled. The rest of the crop was then threshed and again examined for the smut balls. When the oats were coming into head, they were examined frequently and all smutted heads removed and carefully counted. The following table gives the results in the percentage of smutted grains of winter wheat and of smutted heads of oats for 1905, and for the average of two years for the winter wheat and of four years for the oats:

Treatments.	Winter wheat.		Oats.	
	1905.	Average of 2 years. 1904 and 1905.	1905.	Average of 4 years 1902-1905.
Immersion in Diluted Formalin	.0	.0	.0	.0
Sprinkling with Diluted Formalin	.0	.0	.0	.0
Immersion in Hot Water	.0	.0	.1	.1
Immersion in Bluestone Solution for twelve hours	.0	.0	.1	.2
Immersion in Bluestone Solution for five minutes			.6	1.0
Immersion in Potassium Sulphide Solution			1.5	1.3
Sprinkling with Bluestone Solution	.2	.1	.6	1.2
Untreated	9.3	6.4	4.3	6 3

The results here presented are certainly worthy of careful consideration. It will be seen that in the records for 1905, the untreated seed produced a crop which had upwards of nine per cent. of smut in the case of winter wheat and of four per cent. of smut in the case of oats. In the average results, it will be seen that there was upwards of six per cent. of smutted grain in both the oats and the wheat which was not treated. This would mean a tremendous loss to the Province. The grain which was immersed for twenty minutes in a solution made by adding one pint of formaldehyde (formalin) to 42 gallons of water produced a crop which was practically free from smut in the case of each variety of winter wheat and of oats in each of the years in which the experiment has been conducted. The treatment here mentioned was easily performed, comparatively cheap, effectual in killing the smut spores, and instrumental in furnishing the largest average yield of both wheat and oats per acre of all the treatments used.

In each of the past two years, an experiment has been conducted with two varieties of oats, the seed of which was one, two, three, four and five years of age. The object of the experiment was to ascertain whether the smut spores would lose their vitality sooner than the oat grains. The results so far, however, have been disappointing. As the age of the oats increased, the yield of grain decreased and the percentage of smut became greater. We had thought that perhaps oats which were four or five years of age might be used for seed purposes and produce a crop entirely free from smut. This, however, has not been the case.

Treatment of Grain for Rust.

In the spring of 1905, I received a letter from Messrs. W. H. Judd & Co., Hamilton, Ontario, from which I take the following extract: "We send you a package of Naptha Powder. We are told by Mr. Wilson, flour, feed and seed dealer, Orillia, to whom we refer you, that if mixed with grain, say wheat or oats, it possesses the property of preventing any rust on the said grain, and it has been successfully used for that purpose by farmers near Orillia. We most respectfully ask you to test its power, and should you need more for experiments shall be pleased to supply it free, only asking in return that you inform us of results arrived at. We are told it has been successfully used for wheat for several years."

After receiving this communication and also the package of Naptha Powder from Mr. Judd, we wrote him for fuller particulars. We then

conducted the experiment according to his suggestions, by sowing both spring wheat and oats which had been and which had not been treated with the powder. Careful observations were made regarding the amount of rust on the grain at twelve different dates between the 4th of July and the 16th of August. The rust began to develop between the 15th and the 18th of July, and by the 16th of August the straw was greatly injured. The crops were sown on comparatively low land somewhat subject to severe attacks of rust. The crops produced from the treated seed, however, showed exactly the same amount of rust as those produced from the seed which had not been treated with the powder, as near as could be ascertained from the careful examinations made.

Varieties of Oats.

Upwards of two and a half million acres were devoted to the oat crop in Ontario in 1905. This is about two-thirds of a million acres greater than the average area devoted to the oat crop throughout the Province for the past twenty-four years. We also learn from the report of the Bureau of Industries that the average yield of oats per acre for the Province was 39.6 bushels in 1905, 38.5 bushels in 1904, 41.6 bushels in 1903, and 42.6 bushels in 1902, thus making an average of 40.6 bushels per acre for the last four years. In the twenty years previous, the average yield of oats per acre was only 34.8 bushels. The average yield per acre for the last four years, therefore, is nearly six bushels greater than that for the twenty years from 1882 to 1901, inclusive. This amount of increase in yield per acre means an immense amount to the Province as a whole. An increase of six bushels per acre on an area of two and a half million acres would mean a total increase of fifteen million bushels. This amount of oats at twenty-eight cents per bushel would be equivalent to over $4,000,000, or sufficient to maintain about forty Agricultural Colleges similar to the one located at Guelph. The increase in the average yield of oats in Ontario during recent years has no doubt resulted from a variety of causes, among which might be mentioned the introduction of new and improved varieties which are now grown extensively throughout the Province. By means of an extensive enquiry made recently, it has been ascertained that decidedly the most extensively grown varieties of oats in Ontario at the present time are the Banner and the Siberian. Other new varieties are also grown quite extensively and are giving much better satisfaction than many of the old varieties such as the Egyptian, Black Tartarian, Potato, Sandy, Cluster, etc.

No less than two hundred and seventy-nine different varieties of oats have been grown in our experimental grounds within the past seventeen years. The object in testing such a large number is to ascertain the few very best varieties which are most suitable for the different soils and localities throughout the Province. It will be seen from a table presented in the earlier part of this report that eight varieties of oats have been under test for sixteen years in succession. Of this number, the greatest average yields per acre were produced by the Joanette, Siberian, Waterloo, Oderbrucker, Probsteier, and the Bavarian. Of the other varieties which have been grown for a considerable length of time, the Liberty and Irish Victor are prominent among the later varieties. Some very promising varieties of oats have been under test for a shorter period, namely, the Tartar King, the Twentieth Century, and two varieties obtained from the United States Department of Agriculture under the numbers 534 and 545.

According to the results of quite extensive experimental work at the College, we find that by growing oats and barley together a larger yield of grain can be obtained than from either one grown separately. In order to grow two grains together, however, it is important to select those varieties which will mature at about the same time. As nearly all varieties of oats are considerably later in maturing than most of the varieties of barley, it is important to select some very early variety of oats to use in combination with a six-rowed barley. Of the early varieties of oats which have been grown at the College, the following are some of the very best when yield per acre, quality of grain, and strength of straw are all taken into consideration: Daubeney, Prosperity, Alaska, Black Mesdag, Early White Pearl, Early Champion, and Early Ripe. The Daubeney variety is one of great promise, as it grows a good length of straw, stands up well, has a spreading head and a white grain which is very thin in the hull.

Varieties of Barley.

It is interesting to learn that the area devoted to barley in Ontario has increased from 438,784 acres in 1898 to 772,633 acres in 1905.

Six-rowed Barley. In the five years from 1898 to 1903, eighty-six different varieties of barley were grown in the experimental grounds. After five years' tests were completed, the poorest varieties were dropped from the experiment and all those which proved the most successful were retained for future experiments. New varieties were added from time to time, all of which were tested for at least five years. Four varieties of six-rowed barley have now been under experiment for sixteen years, the average yield per acre being as follows: Mandscheuri, 69.8 bushels; Oderbrucker, 63 bushels; Common Six-rowed, 61.1 bushels; and Mensury, 58.7 bushels per acre. As the Mandscheuri barley, which was imported by the Ontario Agricultural College from Russia in the spring of 1889, has given such excellent results, it is scarcely necessary to refer to the reports of other kinds. This barley is now grown very extensively throughout the Province, and undoubtedly has been instrumental in having much to do with the increased yield of barley throughout the Province at the present time in comparison with that of a few years ago. The California Brewing barley has also given a large yield per acre, but it is quite weak in the straw, very stiff in the beard, and produces a grain which gives a light weight per measured bushel. The Success variety, which is beardless and regarding which much has been said in recent years, has given comparatively poor results in both yield of grain per acre and in weight of grain per measured bushel.

Two-rowed Barley. The two-rowed barley is easily distinguished from the other species by the head being somewhat elongated and by there being only two rows of grain from one end of the head to the other. The heads of some varieties are long and slender, while those of others are short, very broad at the base, and taper towards the extremity. The two-rowed barley is largely cultivated in England and Central Europe, but is not grown to any great extent in Ontario. Of the two-rowed varieties of barley grown at the College for the past five years, the following are among the highest yielders: Two-rowed Canadian, Selected Canadian Thorpe, Jarman's Selected Beardless, Duckbill, New Zealand Chevalier, and French Chevalier. The French Chevalier is a variety which, owing to its stage of maturity, has been grown considerably with Siberian or Banner oats in making a mixture which would be uniform in ripening.

HULLESS BARLEY. A considerable amount of hulless barley is grown in some parts of Ontario, especially in those sections where the pea weevil has been doing serious damage to the pea crop in recent years and where the farmers are using the hulless barley as a partial substitute for the pea crop. The yield of grain of the hulless barley is usually very good, but, generally speaking, the straw is weak. The standard weight per measured bushel of the grain is 60 pounds.

Nine varieties of hulless barley were grown in the Experimental Department in 1905. The greatest yields were produced in the past year by the Purple, Guy Mayle, Hog, Black Hulless, and Winnipeg No. 2 varieties. Each of these gave upwards of 35 bushels of grain per acre, each bushel being composed of 60 pounds. In the average results for five years, the greatest yields have been produced by the Guy Mayle, 51.8 bushels; Purple, 48.5 bushels; Black Hulless, 47.9 bushels; and Hungarian, 46.8 bushels per acre. Taking into consideration yield per acre, weight per measured bushel, and strength of straw, the Guy Mayle is one of the best varieties, according to the experiments conducted at Guelph. This variety has also given very good satisfaction in the co-operative experiments throughout Ontario.

WINTER BARLEY. A few strains of winter barley have been tested at the College by sowing the grain in the autumn of the year. When the winters have been unfavorable, however, the barley has usually been winter-killed, but in those seasons in which the barley survived the winter the results have been exceedingly good. In eight out of the past thirteen years, the barley has survived the winter well, the average yield for the eight years being 64.1 bushels per acre. The crop during the last winter was considerably winter-killed, the yield being only 7.2 bushels per acre from a variety which we have grown for several years, and 8.7 bushels per acre from a variety recently imported from the United States.

VARIETIES OF WHEAT.

According to most authorities, there are in all seven types of wheat, and to one or the other of these types, or species, all varieties belong. The seven types of wheat are as follows:

(1) Common, fine, or soft wheat (*Triticum vulgare*).
(2) Turgid, or toulard wheat (*T. turgidum*).
(3) Hard, or flinty wheat (*T. durum*).
(4) Polish wheat (*T. polonicum*).
(5) Spelt (*T. spelta*).
(6) Emmer, or starch wheat (*T. dicoccum*).
(7) One-grained wheat (*T. monococcum*).

Nearly all of the varieties of spring and winter wheat which are grown in Ontario belong to the common wheat (*Triticum vulgare*). Some of the best known representatives of other types are as follows: Wild Goose spring wheat, Medeah spring wheat, Algiers spring wheat, Polish spring wheat, Miracle winter wheat, etc. Practically nothing is known throughout the Province regarding either the turgid or the one-grained wheats, as they have never been under general cultivation. For the sake of convenience, we have arranged our report of varieties of wheat as follows: Winter wheat for flour production, spring wheat for flour production, spring wheat for the production of macaroni, and spring wheat for feeding purposes.

WINTER WHEAT FOR FLOUR PRODUCTION. Two hundred and forty-five varieties of winter wheat have been grown at the Agricultural College within the past sixteen years. Of this number, about two hundred have been tested in each of five seasons and fifteen in each of ten seasons. All varieties of winter wheat are tested for a period of five years, after which the inferior kinds are dropped and the most promising sorts are continued in future tests. The following table gives the average of ten years' results of each of fifteen varieties regarding the color and the weight per measured bushel of the wheat, and the yield per acre of both the straw and the grain:

Varieties.	Color of grain.	Pounds per bushel. (9 years).	Tons of straw. (10 years).	Bushels per acre. (10 years).
Dawson's Golden Chaff	White	59.7	3.6	57.3
Imperial Amber	Red	60.2	4.0	54.3
Early Genesee Giant	White	59.5	3.7	52.8
Russian Amber	Red	60.6	3.8	51.8
Early Red Clawson	Red	58.7	3.5	51.6
Egyptian Amber	Red	61.1	3.9	50.9
Rudy	Red	60.6	3.2	48.8
Tasmania Red	Red	61.5	3.5	48.4
Tuscan Island	Red	60.9	3.5	48.2
Bulgarian	White	60.3	3.3	47.3
Geneva	Red	62.1	3.5	47.1
McPherson	Red	61.8	3.2	46.7
Turkey Red	Red	61.1	3.2	46.1
Kentucky Giant	Red	60.8	3.3	46.0
Treadwell	White	60.2	3.3	45.9

Sixty-one varieties of winter wheat were grown in the Experimental Department during the past year. The five highest yielding kinds were of the Dawson's Golden Chaff class, having beardless heads, red chaff, and white grain. The yields in bushels of grain per acre of these varieties were as follows: Abundance, 62.7; No. 6 White, 61.0; Superlative, 60.1; Dawson's Golden Chaff, 59.5; and American Wonder, 58.7. In weight of grain per measured bushel, all the five varieties went over the standard of 60 pounds, the Dawson's Golden Chaff and the Abundance reaching 61½ pounds. These varieties are all softer in the grain, but yield more bushels per acre than such sorts as Tasmania Red, No. 5 Red, Turkey Red, Crimean Red, and Buda Pesth. Those varieties of red wheat which gave the highest yields of grain in the past year were as follows: Imperial Amber, 58.2 bus.; Auburn, 57.7 bus.; Genesee Reliable, 57.1 bus.; Early Ontario, 56.8 bus.; and Prosperity, 55.9 bus. per acre. The average yield of grain per acre in 1905 was 56.7 bushels for the eighteen varieties of white wheat, and 51.7 bushels for the forty-three varieties of red wheat. Generally speaking, the white wheats yield more grain per acre, possess stronger straw, weigh a little less per measured bushel and are slightly softer in the grain than the red varieties.

SPRING WHEAT FOR FLOUR PRODUCTION. The area devoted to spring wheat for flour production throughout Ontario is decreasing from year to year. The average area for the past twenty-four years is upwards of 400,000, while the area devoted to this crop in 1905 was less than 200,000 acres, according to the report of the Bureau of Industries for Ontario.

In all thirty-two varieties of spring wheat were grown in the Experimental Department in 1905. Of these the greater number were varieties grown for flour production. Among the heaviest yielders were the following: Blue Democrat, 37.7 bus.; Minnesota No. 163, 37.7 bus.; Pringle's Champion, 36.9 bus.: Red Fife, 35.9 bus.; Saxonka, 35.4 bus.; Red Fern, 35 bus., and White Russian, 35 bus. per acre. In the average results for the last five years, the greatest yields were produced by the Pringle's Champion, 32.8; Saxonka, 32.3; Blue Democrat, 32.0; Wellman Fife, 31.9; and Red Fife, 31.5 bushels per acre.

Spring Wheat for the Production of Macaroni. Those varieties of spring wheat suitable for the production of macaroni mostly belong to type 3 (*Triticum durum*) and type 4 (*Triticum polonicum*). In 1905, seven varieties of macaroni wheats were grown in the Experimental Department. The most of these have been grown for at least five years in succession, the average yield per acre of those grown for five years being as follows: Wild Goose, 40.2 bus.; Sorentina, 36 bus.; Medeah, 35.7 bus.; Bart Tremenia, 33.8 bus.; Algiers, 33.1 bus., and Ontario, 25.6 bus. The Kubanka has been grown for the last two years. It has given a very good yield per acre, but has been surpassed by the Wild Goose variety. It will be seen that the Wild Goose spring wheat, which is decidedly the best known variety of macaroni wheat in Ontario, is a leader among all those tested at the Experimental Farm at Guelph. We have not yet been able to find any variety of macaroni wheat which we could recommend as being equal to the Wild Goose variety for growing in Ontario. The grain of this variety has been exported to a considerable extent to Southern Europe for the manufacture of macaroni. It has also been used to a limited extent for the production of flour to be mixed with that produced by some of the softer varieties. The Wild Goose spring wheat has also been used by a number of farmers in mixing with oats and barley in order to produce a good yield of grain of good quality for feeding to farm stock. For the last purpose, however, it is used only in a very limited way.

Spring Wheat for Feeding Purposes. It will be seen in the earlier part of this report on varieties of wheat that Emmer and Spelt are two distinct types. There are a number of varieties belonging to each. The grain of both the Emmer and the Spelt is tightly enclosed within the chaff, from which only a small portion is separated in the process of threshing. The heads of Emmer are short and compact, and are nearly always bearded; while those of Spelt are long, narrow, open, and are usually bald. The spikelets of Emmer overlap each other like shingles on a roof, which thus makes the head close, smooth and regular. The portion of the stem adhering to the spikelets after threshing is much smaller and more pointed in the Emmer than in the Spelt. The spikelets of the Emmer are flattened on the inner side, while those of the Spelt are arched. The grain of the former is much harder, and the chaff much softer, than that of the latter. Emmer is considered a very hardy plant, being much superior to Spelt in this respect. Three varieties of Emmer and ten varieties of Spelt have been grown in the Experimental Department of the College. The following table gives the average of four years' results of each of the three varieties of Emmer and four of the principal varieties of Spelt which were tested in each of the years 1902, 1903, 1904 and 1905:

Classes of Crop.	Varieties.	Percentage of			Pounds per bushel. 3 years.	Yield per acre.	
		Rust.	Crop lodged.	Hull with grain.		Tons of straw.	Pounds of grain.
Emmer	Common	3	32	21	38.8	2.4	3,246
	Iowa	2	31	21	39.1	2.2	3,083
	Russian	2	32	22	39.2	2.2	3.061
Spelt	Red	17	5	31	27.3	2.0	2,436
	Alstroum	23	4	32	27.5	1.9	2,355
	White	17	4	33	27.0	1.7	2,092
	Dasyanthum	20	20	32	26.4	2.0	1,789

The results here presented show very clearly the superiority of all of the varieties of Emmer over those of Spelt in yield of grain per acre, in weight of grain per measured bushel, in freedom from rust, and in thinness of hull. The only advantage which the Spelt seems to have over the Emmer is in strength of straw. In the co-operative experiments throughout Ontario in 1901, 1902, 1903, and 1904, Emmer produced a larger average yield of grain per acre than the best variety of oats or the best variety of barley which was distributed. In 1905, however, the Emmer did not do quite as well, comparatively speaking, either at the College or throughout Ontario, and was surpassed by a few of the varieties of oats and barley in yield of grain per acre. It is quite probable that the Emmer will be grown considerably throughout Ontario for the production of good, clean straw, and a large yield of grain to be used as feed for live stock. For feeding purposes, the grain and the surrounding chaff are usually ground together in the same manner as oats are ground into meal.

Many extravagant claims have been made for the Polish wheat (*Triticum polonicum*) in the Western States within the last three years. The straw of this variety is of medium length and is almost solid. The heads are large and the outer chaff projects beyond the inner chaff in a peculiar manner. The grains are very hard and are about one and a half times as large as those of the Wild Goose spring wheat. We first grew the Polish wheat at the College in 1889. Careful tests of its comparative results along with other varieties have been made for at least eleven years. In the average results, it is found that the Wild Goose spring wheat has given a yield of grain which is about sixty per cent. higher than that given by the Polish wheat. In 1905 the yield per acre was 41.5 bushels for the Wild Goose and 28.7 bushels for the Polish wheat.

Varieties of Rye.

Although rye is not grown nearly as extensively in Ontario as it is in Germany and in some of the other European countries in comparison with other crops, there is, however, an area of over 100,000 acres devoted to this crop annually in Ontario. The average yield of rye per acre throughout Ontario for the past twenty-four years has been 16.4 bushels. As in the case of winter wheat, the varieties were sown both in the spring and the autumn

of the year. The results will therefore be presented under two headings as follows:

SPRING RYE. Two varieties of spring rye have been under experiment at the College for eight years, one variety for six years, and one variety for four years. In the average results for eight years, the Dakota Mammoth has given an average of 37.9 bushels per acre, in comparison with 34.3 bushels per acre produced by the Prolific Spring variety. The Common Spring rye has given an average of 33 bushels per acre for six years, and the Saatroggen an average of 17.4 bushels per acre for four years. The last named rye is a very important variety in Germany, but gave exceedingly poor results when first introduced. Through careful selection, however, and by this variety becoming more acclimatized, it produced the highest yield per acre of the four varieties under experiment in 1905, the yields being as follows: Saatroggen, 34.9 bus.; Dakota Mammoth, 31.4 bus.; Common, 30.3 bus., and Prolific Spring, 29 bus. per acre. We feel in hopes that the introduction of this variety may in time prove serviceable to the Province.

WINTER RYE. The Mammoth variety of winter rye in the average of six years' experiments at the College has produced a yield of 60.4 bushels per acre and a weight per measured bushel of 56.5 pounds, in comparison with a yield of 57.5 bushels per acre and a weight per measured bushel of 55.7 pounds produced by the Common rye in the same period of time. In all, five varieties of winter rye were grown in the Experimental Department in 1904 and also in 1905. The Mammoth White variety gave the greatest yield of grain per acre in each of these years.

VARIETIES OF BUCKWHEAT.

Buckwheat thrives admirably in cold climates and frequently produces large crops on comparatively poor soils. It is mainly grown for the production of grain and occupies about 100,000 acres annually in Ontario. It will therefore be seen that the area devoted to rye and buckwheat in the Province is about equal. Eight varieties of buckwheat have been grown in the experimental grounds within the past few years. Of this number, the Silver Hull, the Common Grey, and the Japanese varieties have been grown for the greatest length of time. The average yields of the Japanese and the Silver Hull varieties are very close, but are slightly in favor of the latter in grain production. The Common Grey variety usually produces about three bushels per acre less than either of the other kinds here referred to. The last three or four years have been very unfavorable for the Japanese variety, and the season of 1905 was particularly unsuitable for the growth of all the varieties of buckwheat. The greatest yield in 1905 was produced by the Rye Buckwheat, which seems to be a hardy variety. As this variety has done so well in each of the last two years, its progress will be watched with interest.

VARIETIES OF FIELD PEAS.

Owing to the ravages of the pea weevil in Southwestern Ontario during the past few years, many farmers have discontinued the cultivation of this crop for a time. Believing this to be the best way to lessen the great numbers of the weevils, and wishing to co-operate with farmers in the eradication of this pest, we have not tested different varieties of field peas in the experimental plots during the last three years. A large percentage of the farmers in some of the districts in Southwestern Ontario discontinued the growing of

peas so generally that they have been instrumental in almost completely eradicating the weevil and are now starting to grow peas quite extensively again. The last two or three years have also been favorable towards the reduction of the weevils, and it is hoped that pea-growing may be taken up quite extensively in the spring of 1906 to good advantage.

Although no comparative experiments of different varieties of field peas have been conducted during the past three years, the Early Britain variety was grown and ripened in 1904 and the grain threshed and carefully confined, so that there could be no escape of the weevils after the grain was threshed. The average yield of this variety grown on two separate plots in 1905 was 32.7 bushels per acre. This is a brown pea which the College imported from England some years ago, and which has been distributed for co-operative experiments throughout Ontario up to the last three years, and in the northern part of Ontario in 1903, 1904 and 1905. In the co-operative experiments this variety has made a very high record, surpassing all other varieties in each of the years it has been distributed, with one exception, namely, in 1904, when another variety surpassed it slightly.

Whenever peas have been grown at the College within the past nine years, they have been treated immediately after threshing and the weevils have been all destroyed. At the time of threshing, the peas were put into cotton or jute bags. As soon as thirty bushels of peas were threshed, they were placed in a fumigation box for treatment. One pound of carbon bisulphide was poured into three flat pans, which were placed on the top of the peas: the cover was then put on the box and weighted with heavy stones. After forty-eight hours the cover was removed and the box ventilated. The pans had become dry, as the liquid had changed into a gas, which, being much heavier than the air, had sunk down amongst the peas, penetrating them and killing the weevils. The quantity of carbon bisulphide used by us was larger than that usually recommended, as a pound or a pound and a half is generally considered sufficient for one hundred bushels of peas, but we wished to be on the safe side. In practically all cases the weevils were destroyed at the first treatment, no matter whether they were in the larva form, in the pupa stage, or had become fully developed. The treatment can be made in comparatively air-tight receptacle, whether a barrel, box, or specially made fumigation house.

The carbon bisulphide is a colorless or slightly yellowish liquid, one-fourth heavier than water. It evaporates very rapidly when exposed to the air, and when pure will not injure or stain the finest goods. The commercial liquid has an acrid taste, and an odor like that of rotten eggs. The vapor is more than two and a half times heavier than air. Carbon bisulphide may be purchased in small quantities from any druggist at about thirty cents per pound, or forty cents per pint. For large quantities, better rates can be given by the druggist. The gas, or vapor, which comes from carbon bisulphide is not only combustible, but it is very explosive when mixed with air. Great care should therefore be taken to treat the peas in the daytime only, for a light or a flame of any kind brought near the liquid may cause a serious explosion; and smoking near it should be positively prohibited. Moreover, the vapor should not be inhaled, as it is very injurious, even a small portion causing headache, giddiness and nausea. The treatment with carbon bisulphide should be made in boxes, barrels, or "bug houses," located some distance from the insured buildings on the farm.

With the strict observance of the preceding precautions, no one should hesitate to use the carbon bisulphide. As a matter of fact, we have never heard of any bad results following its use in the treatment of peas. This

happy condition of things may be explained when we say that all who used the liquid were wise enough to be cautious. There is, moreover, no danger that the vapor will injure the peas or render them unsafe as a food. Experiments have shown that the liquid can even be poured upon articles of food, and, after thorough exposure to the air, not a trace of it will remain.

Varieties of Field Beans.

In the Counties of Essex and Kent, field beans are grown quite extensively. They are also grown in a small way in some of the other parts of the Province. The total area devoted to this crop is about 50,000 acres annually.

Eighteen varieties of field beans were planted in the experimental grounds in 1905. Of this number, fourteen varieties have been under test for nine years in succession. The greatest average yields for that period of time have been produced by the following varieties: Pearce's Improved Tree, 23.6 bus.; White Wonder, 21.9 bus.; Medium or Navy, 21.6 bus.; Burlingame Medium, 21.6 bus.; Schofield Pea, 21.5 bus.; and Day's Improved Leafless, 20.9 bus. per acre. The New Prize Winner, which has been grown for only three years, has given exceptionally fine results, producing the highest yield per acre in 1903 and again in 1904, and furnishing comparatively good results again in 1905. It is one of the earliest ripening beans, as the crop was matured about ten days earlier than the Medium or Navy, the Marrowfat, and the White Wonder varieties in 1905. The earliest variety to mature was the Day's Improved Leafless, which was ripe three days before the Prize Winner. The Yellow Eyed Marrowfat and the Red Kidney were grown in 1905 for the first time. The first named variety was surpassed in yield per acre by only three other varieties. Two varieties of field beans were imported from the Argentine Republic, but did not produce a crop, owing to poor germinating qualities.

Varieties of Vetches.

The common vetches have been grown more or less in Ontario, especially along with oats, for the production of green fodder or for hay, for many years. The Hairy vetches have not been cultivated for so long a time, being a newer introduction from Europe. It is difficult, however, to grow the seed of the Hairy vetches in Ontario, or even in America, and consequently nearly all the seed has been imported from Germany and usually costs from $5 to $6 per bushel. We have been trying to grow the seed of the Hairy vetches at the College in each of the past five years, by sowing the seed in the autumn about the first of September. It nearly always comes through the winter uninjured and gives fairly good results in seed production in the following year. In the last five years, the average yield of seed has been 7.6 bushels per acre. The greatest yield was produced in 1903, when 18.2 bushels per acre were realized; and the lowest yield in 1904, when less than 2 bushels per acre were obtained.

Varieties of Soy, Soja or Japanese Beans.

A large number of the Soy beans have been grown in an experimental way in the United States and in Ontario. Most of the varieties are entirely unsuited for this Province, as they require a long season of growth. As the results of experiments conducted for a series of years, however, we have found the Early Yellow variety to give good satisfaction as a grain producer

and the Medium Green variety as a fodder crop. It is quite probable that as the Medium Green variety becomes better known, it will be grown for the purpose of cutting green and mixing with corn when filling the silo. This variety usually produces about 10 or 11 tons per acre of crop which is exceedingly rich and contains those constituents which are most lacking in the corn. The two combined would make a much better balanced ration. The Early Yellow variety can be grown quite successfully for grain production on many farms of Ontario. The grain is exceedingly rich, containing more protein than any of the ordinary farm crops grown in the Province. The meal of this variety, when mixed with ground barley and oats, increases the quality considerably. The yields per acre of these two varieties in the experimental plots in 1905 were 15.4 bushels for the Early Yellow and 15.9 bushels for the Medium Green. The highest yield obtained from the Early Yellow variety within the past ten years was 25.3 bushels per acre, grown in 1901. The average yield per acre of this variety for ten years is 14.6 bushels per acre.

Varieties of Cow Peas.

No less than fourteen varieties of Cow peas were grown in the experimental grounds in 1905. None of these, however, produced any ripe seed. We have not yet found a variety of Cow peas which gives general satisfaction in Ontario, either as a producer of green fodder or of grain.

Varieties of Horse Beans.

Although Horse Beans were grown in the Experimental Department in 1905, no seed was obtained. As in the case of Cow peas, the Horse beans very seldom produce satisfactory results in the production of either green crop or grain.

Varieties of Field Corn for Grain.

Corn is grown in the Experimental department at Guelph for the production of both fodder and grain. The majority of the varieties do not ripen thoroughly in this climate. Thirty-one varieties, however, produced ripe grain in 1905. Of this number, the greatest yields of shelled grain were produced by the following varieties: White Cap Yellow Dent, obtained from Hammond of Essex County, 78.6 bus.; Red Blazed White Flint, obtained from Stevens of Chatham, 74.3 bus.; Red Blazed Yellow Flint, obtained from Roberts of Elgin County, 73.2 bus.; Longfellow, from Duke of Essex County, 71.9 bus.; Red Blazed Yellow Flint, from Duke of Essex County, 71.2 bus.; and Wessel Yellow Flint, 71.2 bus. Nine varieties of corn have been grown and ripened at the College in each of five years since 1900. The greatest average yields of grain per acre were produced by the King Phillip, 58.1 bus.; Genesee Valley, 55.5 bus.; Longfellow, 53.2 bus.; Farmers' Friend, 49.7 bus.; Red Blazed, 49.6 bus.; Canada Yellow, 49 bus.; Compton's Early, 44.3 bus.; Burlington Hybrid, 44 bus.; and Salzer's North Dakota, 44 bus.

Varieties of Sorghum for Seed.

Although a number of sorghums are grown at the College each year for the production of fodder, but few of them ripen sufficiently to produce seed. In 1900, 1901, and 1905, however, some of the varieties became

matured and produced fairly good yields of seed. The average yield of seed for the three years for each of four varieties was as follows: Early Japanese Broom Corn, 29 bus.; Improved Evergreen Broom Corn, 25.7 bus.; California Golden Broom Corn, 24 bus.; and Dwarf Broom Corn, 11.5 bus. In 1905 seven varieties in all were grown, the greatest yields of seed being obtained from the Australian Broom Corn, 53 bus.; Kenney's Improved Amber Sugar Cane, 37 bus.; California Golden Broom Corn, 28.7 bus.; Early Japanese Broom Corn, 25.8 bus.; Dwarf Broom Corn, 21.9 bus., and Earliest Black Sugar Cane, 20.3 bus. per acre.

Varieties of Millet for Seed.

In the average results for five years in testing fifteen varieties of millet for seed production, it is found that the following varieties produced the greatest average yields per acre, namely, Siberian, 57 bus.; Hungarian Grass, 49 bus.; German or Golden, 48 bus.; California, 45 bus.; Early Harvest, 45 bus., and Holy Terror Gold Mine, 36 bus. Among those varieties grown for a shorter length of time, some have given excellent yields as follows: Steel Trust, 55 bushels in the average for three years, and the Tamboy 41 bushels also in the average for three years.

Varieties of Flax.

The Common variety of flax has been under experiment at the College for ten years. In some seasons, the yield of seed has been good, and in others it has been poor. The average yield per acre for the whole period of ten years is 14.2 bushels of seed. In 1905, eight different varieties, or strains, of flax were grown in the Experimental Department. Four of the varieties were sown in each of six different plots, by using different amounts of seed. In averaging the results of the six different seedings, we obtained the following table:

Varieties.	Date of maturity.	Height.	Amount lodged.	Weight per measured bushel.	Yield per acre.	
					Straw.	Grain.
	August.	inches.	%	lbs.	tons.	bush.
Manitoba	14	29	3	54.9	2.3	22.2
Common	17	27	11	54.8	2.2	20.5
Russian	12	30	2	55.5	1.8	16.2
Holland	10	31	9	55.2	2.2	13.1

As each of these varieties was sown on six separate plots, the average results of the different strains should be serviceable in showing the characteristics of the different strains of flax in a season similar to that of 1905. In uniformity of crop and in general appearance, the crop produced from Manitoba seed was probably the best. This, however, was closely followed by that grown from the Russian seed. The crops of the Common and the Holland strains were not quite as uniform as the others.

Besides the four strains of flax above described, four other lots of seed were obtained from the Argentine Republic, one from the Central Province, another from the Northern Province, another under the name of Common, and still another which was supplied through the kindness of the Dominion

Linseed Oil Co., of Toronto. Only one plot of each of these was sown. The yield per acre of the first was 18.4 and the last 19.6 bushels per acre, and that of each of the other two strains was between 9 and 10 bushels per acre. We are grateful to Mr. Geo. McEwen, Hensall, Ontario, for the seed of the Holland flax, and to Mr. David Horn, Winnipeg, Man., for the seed of the Manitoba flax. The seed sown in 1905 of both the Common and the Russian varieties was produced in the experimental grounds at the College in 1904.

Varieties of Sunflowers for Seed.

No less than seven varieties of sunflowers have been tested in the Experimental Department in past years. Of this number, three have been grown for seven years in succession. Allowing twenty pounds per measured bushel, the average results for the seven years are as follows: Mammoth Russian, 69.6 bus.; White Beauty, 69.2 bus.; and Black Giant, 63.5 bus. per acre. These results show that sunflowers produce a very large amount of seed per acre. The Black Giant variety produced 97.8 bushels of seed per acre in 1905.

Varieties of Potatoes.

The Ontario Department of Agriculture, in the Crop Bulletin issued on November 16th, 1905, states as follows regarding the potato crop of Ontario during the past year: "Almost up to the time of digging, an immense yield of potatoes was promised, but rot set in and many correspondents report losses from this cause in both pit and cellar, ranging from 10 to 75 per cent. Reports of freedom from rot have been the exception and the most favorable accounts come from the newer northern districts. A number of correspondents used Bordeaux mixture for blight, or rot, with good results, but on low-lying lands even this remedy could not prevent loss."

In all, one hundred and four different varieties of potatoes were grown in the Experimental Department in 1905. As the rot was also somewhat troublesome in 1905, as it had been in each of the two years previous, very careful determinations were made regarding the exact percentage of rot occurring in each of the varieties under test. The soil on which the potatoes were grown in 1905, as well as in each of the two previous years, might be termed an average clay loam. Three rows each four rods in length and three and one-third links (26 2-5 in.) apart were used for each variety. In 1905, the planting took place on May 23rd, while in 1904, owing to rainy weather, the potatoes were not planted until the 10th of June. Furrows were made with a double mould-board plow, and fifteen pounds of each variety were planted and covered to a depth of about four inches. Level cultivation was used throughout the season. Bug Death, which is claimed to be an insecticide and also a fungicide, was sprayed on the tops of all the varieties on three different dates during the summer. When the potatoes were dug in the autumn, all rotten tubers were carefully counted. After the sound potatoes had been stored in the cellar for two or three weeks, they were again examined and all the rotten potatoes were separated from the sound ones and were counted. The sound potatoes were then weighed, sorted, and counted. Owing to the prevalence of the rot, not only at the College but throughout Ontario, and owing to the fact that there is a marked difference in the different varieties of potatoes as to their susceptibility to the attacks of rot, the average results of the past three years of the percentage of rot, as well as of the yield of

sound potatoes and the number of days in reaching maturity, is presented for each variety in the following table:

Varieties.	Number of days in reaching maturity.	Yield of sound potatoes per acre.	Percentage of potatoes rotten.
		Bush.	
1 Robertson's Champion	114	225.1	3.1
2 Stray Beauty	91	228.9	3.2
3 Early Pinkeye	89	270.4	3.6
4 Holborn Abundance	115	305.4	4.1
5 Skerries	115	133.8	4.2
6 Green Bay	88	220.6	4.5
7 Seedling No. 230	97	316.4	4.7
8 Main Crop	116	245.1	6.0
9 Bliss Triumph	94	274.3	6.5
10 Salzer's Earliest	92	310.0	8.1
11 Gemmell's Seedling	111	178.2	8.2
12 Sensation	113	199.7	9.1
13 Always	101	240.3	9.7
14 Irish Cups	108	298.6	10.1
15 Tremendous	113	190.8	10.9
16 Up-to-date	114	219.3	13.1
17 Factor	114	181.3	13.8
18 Carman No. 2	105	208.8	14.9
19 Dewey	107	231.5	15.1
20 Howe's Premium	108	283.1	15.2
21 Carter's Royalty	106	149.0	15.9
22 Early Short Top	98	163.3	17.5
23 Lightning Express	95	276.0	17.9
24 Jersey Snowdrop	101	179.7	19.4
25 Burbank's Seedling	108	243.1	19.4
26 Early Michigan	94	236.4	21.5
27 Snowflake	101	233.6	21.5
28 Sir Walter Raleigh	105	206.5	22.3
29 Empire State	109	254.9	23.3
30 American Wonder	107	262.2	24.4
31 King of Michigan	101	215.0	24.6
32 Early Dawn	93	226.5	24.6
33 Steele's Earliest of All	100	245.1	24.7
34 Dempsey's Seedling	107	255.8	25.2
35 Rural New Yorker No. 2	109	226.1	25.5
36 Bovee	99	227.2	25.5
37 Early Ohio	92	214.9	25.8
38 Uncle Sam	106	197.5	26.3
39 Pearl of Savoy	107	256.1	26.6
40 Rural Blush	111	214.0	26.7
41 Six Weeks	94	215.6	27.4
42 Early Fortune	92	205.6	27.6
43 Early Andes	93	214.2	27.8
44 Early Rose	106	196.9	28.2
45 Woodhull	106	232.5	28.3
46 Early Market	96	214.7	28.5
47 Sunlit Star	106	220.8	28.5
48 Crown Jewel	107	247.4	29.2
49 Burpee's Extra Early	104	212.2	29.4
50 White Elephant	106	251.0	29.6
51 Rose of Quebec	107	207.4	31.4
52 Todd's White Monarch	111	205.4	31.4
53 Democrat	106	207.8	31.5
54 Adirondack	112	192.8	31.7
55 The Daisy	104	226.1	31.8
56 New White Beauty	108	182.1	31.8
57 Rose's New Invincible	106	217.5	31.9
58 Acme	94	189.6	32.5
59 Burnaby Mammoth	107	220.6	32.7

Varieties.	Number of days in reaching maturity.	Yield of sound potatoes per acre.	Percentage of potatoes rotten.
		Bush.	
60 Rose of the North	103	231.0	33.1
61 Carman No. 1	114	184.6	34.0
62 Leamington	106	193.2	34.7
63 Wonder of the World	104	212.2	34.7
64 New Queen	106	194.6	35.2
65 Morning Star	110	307.2	35.3
66 Surprise	107	182.2	35.7
67 Early Dominion	98	191.0	35.8
68 White Pinkeye	107	178.9	37.4
69 Hanlan Beauty	109	191.3	37.9
70 Beauty of Hebron	106	203.5	38.8
71 Montana Bluff	111	205.3	41.8

It will be observed that the potatoes have been arranged in the order of the percentage of rot, starting with those which had the least and finishing with those which had the greatest percentage of rot. The results here presented show that for the past three years those varieties which had the smallest amount of rot were the Robertson's Champion, Stray Beauty, Early Pinkeye, Holborn Abundance, Skerries, Green Bay, and Seedling No. 230. Each of these varieties had less than five per cent. of rot in the average crop. In comparison with these, we find the Montana Bluff had over forty per cent. and the Beauty of Hebron, White Pinkeye, and Hanlan Beauty each had between thirty-seven and forty per cent. of rot. It will be observed that forty-two varieties had more and twenty-eight varieties less rot than the Empire State variety. The Empire State is the variety which has given such good results in furnishing a large yield of potatoes of good size and of excellent table quality. In 1905, several of the varieties showed no rot, namely, Early Pinkeye, Stray Beauty, Early Andes, Seedling No. 230, Always, Jersey Snowdrop, and French Venere. The greatest amount of rot in 1905 was produced by the Carman No. 1, 35 per cent.; Up-to-date, 32 per cent.; Factor, 31 per cent.; Tremendous, 22 per cent.; New White Beauty, 22 per cent., and Adirondack, 20 per cent. The two highest yielding varieties of sound potatoes in 1905 were the Lightning Express, 427 bushels, and the Davies' Warrior, 420 bushels; and the two lowest yielding varieties were the Factor, 132 bushels, and Skerries, 162 bushels per acre.

It was found in 1904 that of the one hundred and four varieties of potatoes under experiment there was an average percentage of rot of 25.8 per cent. for the ten earliest, 33.8 per cent. for the ten medium, and 10.9 per cent. for the ten latest varieties in reaching maturity. The results for 1905 show the relative percentages of rot to be 15.9 for the ten earliest, 24.6 for the ten medium, and 13 for the ten latest ripening sorts. It will, therefore, be seen that the medium ripening potatoes had the most and the latest ripening varieties the least rot in each of the two years.

Varieties of Very Early Potatoes. It will be seen from the results presented in the table of varieties, that there is a marked difference between the date of maturity of the early and the late varieties. In order to glean more definite information in reference to the relative productiveness of early potatoes, six rows of each of the very earliest kinds have been planted in each of the last four years. Two rows of each kind were dug at the end

of nine weeks, two rows at the end of twelve weeks, and two rows at the end of fifteen weeks after the planting took place. In the average for the four years, the greatest yields produced at nine weeks after planting were by the following varieties: Early Andes, 174 bush.; Early Fortunate, 170 bush.; Six Weeks, 169 bush.; Early Dominion, 167 bush.; Early Pinkeye, 165 bush. and Early Dawn, 162 bush. per acre. The lowest average yields at the end of the period of nine weeks were produced by the Burpee's Extra Early, 113, and the Stray Beauty, 124 bushels per acre. The Stray Beauty variety, which gave excellent results in a similar experiment conducted for several years previous to 1902, has produced low yields per acre during the last three or four years. This is true, not only in the experiments at the College, but also in the co-operative experiments throughout Ontario. Although it gave comparatively low results in 1904, it was again distributed throughout the Province in 1905 and again produced decidedly the lowest yield per acre of all the varieties distributed. Evidently the best period of the life of this variety is past, and the Stray Beauty will probably be dropped from the list of co-operative experimental varieties in the future.

Bordeaux Mixture for the Potato Blight.

Until the last three years, the potatoes grown in the Experimental Department have been comparatively free from blight, although in some parts of the Province the rot has proven very troublesome in some seasons. In those sections where the blight has been serious, some farmers have had excellent results from the use of the Bordeaux mixture along with Paris green, the first spraying being done when the plants were about six inches in height and the second and third sprayings at intervals of ten to fifteen days. In some cases, five to six sprayings of Bordeaux mixture have been made in the same season. In 1903, 1904, and 1905, an experiment has been conducted in our experimental plots by spraying two varieties of potatoes with Paris green and Bordeaux mixture, and also the same varieties of potatoes with Paris green alone. The potatoes for this experiment were planted in 1903 on June 10th and the sprayings took place on July 11th, July 23rd, and August 6th; those in 1904 were planted on June 11th and the sprayings took place on July 16th, July 19th, and August 4th; and those in 1905 were planted on May 27th and the sprayings took place on July 8th, July 13th, and July 26th. The Bordeaux mixture was made in the same way and in the same proportions as described in the College bulletin No. 122, copies of which may be obtained from the Department of Agriculture, Toronto, Ontario. The average results show that there was less rot on the potatoes on which Bordeaux mixture and Paris green were used than on those on which the Paris green was applied alone. The three applications each year of the Bordeaux mixture, however, were not sufficient to prevent all of the rot in any one of the three years. It is probable that if five or six applications had been made, the Bordeaux mixture would have had a greater influence.

Treatment for the Potato Beetle.

For ten years in succession, an experiment has been conducted in duplicate by using different methods for destroying the potato beetle. The experiment consisted in spraying the potatoes with Paris green and water Paris green and plaster, and Potato Bug Finish. As a rule, three appli-

cations were made on each crop. For the sake of comparison, one plot was allowed to remain untreated.

In each of the past four years, six lots of each of two varieties of potatoes were carefully selected and planted on separate plots. After the potatoes had made sufficient growth and the potato beetles (bugs) had made their appearance, five plots of each variety were treated in different ways to destroy the beetle, and one plot of each variety was left untreated as a basis of comparison. The five treatments made in each of the years were as follows: (1) Paris green and water, by using one pound of Paris green and 96 gallons of water per acre; (2) Paris green and plaster, by using one pound of Paris green and 38 pounds of plaster per acre and applying the mixture to the potatoes in the dry condition; (3) Potato Bug Finish, which was applied dry at the rate of 20 pounds per acre; (4) Bug Death and water, by using on an average 32 pounds of Bug Death and 96 gallons of water per acre; and (5) Bug Death used in the same proportion as No. 4, but in the dry condition. Three applications of each of the five treatments were made with each of the two varieties of potatoes. In the autumn, the potatoes from each of the twelve plots were dug and weighed. The following are the average results of the smaller experiment conducted for ten years, and of the larger experiment conducted for four years in succession, showing yields in bushels per acre:

Treatments.	Average number of bushels of potatoes per acre.	
	10 Years.	4 Years.
Nothing	87.9	105.9
Potato Bug Finish	132.8	151.3
Paris Green and Plaster	148.5	183.7
Paris Green and Water	157.7	191.9
Bug Death (Dry)	.....	208.7
Bug Death and Water	.....	213.2

In eight out of the ten years, those potatoes which were sprayed with Paris green and water surpassed those which were dusted with Paris green and plaster, in yield of crop per acre. It is also quite noticeable that in each of the ten years the untreated gave decidedly the lowest yield of tubers. The Bug Death, which has only been tested in our trial grounds for the past four years, has been instrumental in producing the greatest yield of tubers. The Bug Death with water has given slightly better results than that which was used in the dry condition. The usual prices of these insecticides, when bought in quantity, are about as follows: Paris green, 20 cents; Bug Death, 7 cents; and Potato Bug Finish, 1 2-3 cents per pound. The cost, therefore, for the material used in the experiments conducted in the last four years was about as follows: Paris green and water, 60 cents; Paris green and plaster, 88½ cents; Bug Death, $6.72; and Potato Bug Finish, $1.00 per acre.

Treatment for the Potato Scab.

An experiment was again conducted in 1905 by immersing scabby potatoes in a solution of corrosive sublimate for one and a half hours, after

which they were spread out to dry; they were then cut and planted in the usual way. The treatment was made with each of two varieties. Both the treated and the untreated potatoes were planted at the same time and in the usual manner. The corrosive sublimate solution was made by dissolving corrosive sublimate in hot water in the proportion of 2¼ ozs. of the former to two gallons of the latter. The solution was allowed to stand twelve hours after which it was diluted with 13 gallons of water. As the corrosive sublimate is very poisonous, the material itself should be looked after very carefully and no potatoes which have been treated should be left unplanted. As none of the potatoes had more than one per cent. of scab in the crop of 1905, as was also the case with the crop of 1904, the results of this experiment do not furnish much information for either of these seasons. This treatment has been used with good satisfaction in some places where there is usually a considerable amount of scabby potatoes.

Selection of Seed Potatoes.

As can be seen in the early part of this report, seven varieties of potatoes have been grown at the College for sixteen years in succession without introducing seed from any other farm or locality. The yield per acre, instead of decreasing, has been gradually increasing as the time has advanced, owing, largely, to the selection of the best tubers for planting.

For eleven years in succession, an experiment has been conducted by selecting large, medium-sized, small, and very small potatoes for planting. It will be understood that in each year the selections were made from the crops produced from similar selections of the year previous. The crop of 1905 shows that 204 bushels of potatoes were obtained from large whole potatoes, 183 bushels from the medium-sized whole potatoes, 142 bushels from the small whole potatoes, and 105 bushels per acre from the very small whole potatoes. During the last few years, not only have the small potatoes produced decidedly the lowest pield per acre but the crops produced have actually contained a greater percentage of small potatoes than those obtained from the large and medium-sized seed.

Planting One, Two and Four Potato Sets Per Hill.

For six years in succession, an experiment has been conducted by planting one, two, and four pieces of potatoes per hill, using the same amount of seed throughout. The average results for the six years are as follows: One two-ounce piece in a hill, 211.9 bus.; two one-ounce pieces in a hill, 203.7 bus.; and four one-half-ounce pieces in a hill, 182.5 bushels per acre. Not only is there a difference in total yield per acre, but there is also a decided difference in the percentage of marketable potatoes in the crop produced from each of the methods, there being an average of 81 per cent. of marketable from the use of one piece per hill, of 76 per cent. from the use of two pieces per hill, and of 72 per cent. from the use of four pieces per hill. The cutting of the potatoes tends to increase the number of stems produced, and when from two to four potato sets are planted in one place there is a greater number of stems produced than where one large piece is used. Evidently a few, large, vigorous stems give better results than a large number of small, weakly stems, which are almost sure to grow where more than one piece is planted in each hill.

Influence of Lime and Plaster on Cut Potatoes for Seed.

In each of eleven years, an experiment has been conducted by coating over freshly cut seed potatoes with plaster and with lime, in comparison with untreated freshly cut potatoes for seed purposes. In 1905, those potatoes which were cut and immediately sprinkled over with finely ground land plaster gave an average of 313.5 bushels per acre; while those which were sprinkled with lime gave 292.9 bushels per acre, and those which were planted without the use of either lime or plaster, 276 bushels per acre. In the average of the eleven years, the plaster treated potatoes gave 214, the lime treated potatoes 211, and the untreated potatoes 196 bushels per acre. The results of the co-operative experiments over Ontario for five years also show a marked advantage from the use of land plaster on freshly cut tubers when used for seed purposes.

Planting Different Sized Potato Sets at Different Distances Apart in the Rows.

For four years in succession, an experiment has been conducted by planting one, one and a half, and two ounce pieces of potatoes. The potato sets of each of these sizes were planted twelve, eighteen, and twenty-four inches apart in the row. The average results show that, generally speaking, the yield per acre increased in the order of the increase of the size of the pieces and of the decrease in the distance between the pieces in the row, the plots which were planted with two ounce pieces producing decidedly larger yields than those planted with ounce pieces; and those which received potato sets every foot in the row producing considerably larger yields than those which received sets at two feet apart in the row.

Methods of Planting Potatoes.

There seems to be a great variety of opinion as to the best method of planting potatoes. Some farmers favor planting the tubers in rows twenty-five to thirty inches apart; while others favor planting in squares, or hills, from thirty to forty inches apart both ways.

Rows vs. Squares or Hills. An experiment has been conducted in our experimental grounds for seven years in succession, in order to compare the results of planting potatoes in rows three and one-third links (26-2-5 inches) apart and having the potato sets one foot apart in the rows in comparison with planting the potato sets in squares thirty-three inches apart both ways. The same amount of seed was used in the two methods. The experiment was conducted in duplicate each year. The average results for the years 1896, 1897, 1898, 1899, 1901, 1904, and 1905, show that the potatoes which were planted in rows gave 194.6 bushels, and those planted in squares, or hills, 156.3 bushels per acre. In six out of the seven years, the rows surpassed the squares.

Hilling Up vs. Level Cultivation. An experiment has been conducted for seven years by hilling up potatoes in comparison with growing potatoes on the level. During the first three years of this experiment, the best results were obtained from level cultivation, and during the past four years the highest yields have been obtained from the potatoes which were hilled up. The variation in the results is quite likely due to the weather conditions of the different years. During the past four seasons, we have

had rains frequently during the summer, and in some of them especially the land has been comparatively wet. In the other seasons during which this experiment was conducted, the showers were less frequent and the land was much drier. Taking the average for the whole seven years, the results rather favor the hilling. Evidently the hilling process gives rather the best results on an average clay soil in the wet seasons, and the level cultivation in those years when the rainfall is not so great.

The Use of Fresh Hen Manure in Potato Growing.

In each of two years, fresh hen manure has been obtained from the Poultry department of the College. This has been dried and pulverized and applied to land previous to the preparation of the seed bed in which to plant potatoes. The experiment was conducted in duplicate each year. The average results of the four tests conducted in the two years show the following number of bushels of potatoes per acre obtained from an application of the following quantities of dried and pulverized poultry manure per acre: 500 lbs., 118 bus.; 2,000 lbs., 152 bus.; 4,000 lbs., 176 bus.; and 10,000 lbs., 161 bushels. It will be seen that the greatest yield of potatoes was obtained from an application of two tons of poultry manure per acre. This application increased the yield of potatoes 56 bushels per acre.

Varieties of Swede Turnips.

A few years ago the area devoted to the growing of turnips in Ontario was two or three times greater than that devoted to the mangel crop. During the last few years, however, the area used for mangels has been gradually increasing, while that used for turnips has kept barely constant. In 1905, we observe that there were 135,348 acres of turnips and 69,035 acres of mangels in Ontario. Within the past fifteen or sixteen years, fully eighty varieties of swede turnips have been grown at the Agricultural College. After five years' careful tests, all the poor varieties have been dropped from the list and the most successful ones have been retained for future experiments. In 1905, twenty-seven varieties were under test. The yields were not as large as usual, the greatest being produced by the following varieties: Rennie's Queen, 22.8 tons; Cropwell, 22.5 tons; Good Luck, 21.3 tons; Sutton's Queen, 21.3 tons; Keepwell, 21.1 tons; Defiance, 20.6 tons; Hall's Westbury, 20.5 tons; and Westbury Improved, Rennie's Prize Purple Top, and Rennie's Improved Elephant, each 20 tons per acre. The most of these are comparatively new varieties, three of the highest yielding kinds being grown in 1905 for the first time. In the average results for 1904 and 1905 of twenty-four varieties, we find that the greatest yields were produced by the Sutton's Queen, 26.9 tons; Rennie's Queen, 26.6 tons; Hall's Westbury, 26.4 tons; and Carter's Invicta Bronze Top, 26.2 tons per acre, The Rennie's Queen, which headed the list in yield per acre in 1905, is a root of good appearance and one which seems very well suited for shipping purposes. Other varieties which were selected as good shippers in 1905 by men who have been shipping turnips for the last few years were the New Century, Cropwell, Rennie's Prize Purple Top, and Empress. The Carter's Invicta Bronze Top, which gave excellent results in 1904, both as a cropper and as a root suitable for shipping purposes, did not make quite as high a record in the past year.

Thinning Swede Turnips at Different Stages of Growth.

An experiment was conducted in duplicate in 1905 by thinning turnip plants when one-half inch, two, five and eight inches in height. The average results of the two tests show that the plants which were thinned when very small gave 14.6 tons, and those which were thinned when two inches in height produced 14.2 tons per acre. When the turnips were allowed to grow to a height of five inches before thinning, the yield was only 12.2 tons, and when grown to a height of eight inches before thinning took place the yield was only 8.9 tons per acre. The results of this experiment suggest the importance of thinning the plants of swede turnips when they are quite small.

Commercial Fertilizers with Swede Turnips.

For six years, duplicate experiments have been conducted in using four different fertilizers with turnips. For the sake of comparison, two unfertilized plots were also used in each of the six years. Each test consisted in the application of nitrate of soda at the rate of 160 pounds per acre, muriate of potash at the rate of 160 pounds per acre, superphosphate at the rate of 320 pounds per acre, and a mixture of 213 pounds per acre made up by using one-third of the above amounts of each fertilizer here indicated. The muriate of potash and the superphosphate were applied broadcast at the time of planting the turnips, and the nitrate of soda when the young plants were about three inches in height. The average results of the twelve tests conducted in the six years in tons of roots per acre are as follows: Mixed fertilizer, 18.5; superphosphate, 16.9; nitrate of soda, 16.7; muriate of potash, 16.2; and no fertilizer, 14.8. It will be seen that the mixed fertilizer increased the crop 3.7 tons, or 122 bushels, per acre. This increase was made at a cost of about $4.60 for the fertilizer used, or nearly 4 cents per bushel, leaving out of consideration the cost of transportation, and the application of the fertilizer and its influence on the soil in the following years. In each of the past three years, an application of fresh cow manure at the rate of 20 tons per acre has been applied in comparison with the commercial fertilizers. The yield of roots per acre from the cow manure and from the mixed fertilizer has been almost exactly the same, the difference being only about three bushels per acre.

Varieties of Fall Turnips.

Fall turnips, or, as they are frequently called, soft or yellow-fleshed turnips, are not grown as extensively in Ontario as swede turnips. The fall turnips give heavier yields per acre, but they do not keep very late into the winter and hence must be fed in the autumn of the year. Sixteen different varieties of fall turnips were grown in 1905, those producing the greatest yields per acre being as follows: Red Top White Globe, 30.7 tons; Early American Purple Top, 25.1 tons; White Egg, 22.9 tons; Sutton's Imperial Green Globe, 22.9 tons; Cow Horn, 21.1 tons; and Sutton's Purple Top Mammoth, 20.6 tons per acre.

As four of these varieties have been grown for five years and the results carefully recorded, we present the average yields for this period of time, which are as follows:

Varieties.	Percentage of rot.	Yield in tons per acre.	
		Tops	Roots.
Red Top White Globe	22	4.2	27.9
White Egg	9	5.3	23.1
Early American Purple Top	5	4.8	22.1
Cow Horn	5	6.5	20.3

It will be seen from these results that although the Red Top White Globe has given the greatest yield of roots per acre, it is more subject to rot than the other varieties here mentioned, as in the average of four years' experiments, fully one-fifth of the turnips were rotten at the time of harvesting the crop in the autumn of the year. The Cow Horn and the Early American Purple Top varieties were among the freest from rot of all the different varieties which we have grown. In 1905, some of the varieties were rotted very badly, as will be seen from the fact that the percentage of the whole crop rotten was 29.2 of the Sutton's Favorite Purple Top Hybrid, 25.9 of the Carter's Champion Purple Top Hybrid, and 24.9 of the Early White Flat Dutch Strap Leaf. The varieties freest from the rot in 1905 were Hunter's Purple Top White, 1.1 per cent.; Sutton's Centenary Green Top Hybrid, 1.3 per cent.; Sutton's Imperial Green Globe, 1.5 per cent.; Sutton's Perfection Green Top Hybrid, 3.5 per cent.; Cow Horn, 4.2 per cent.; and White Egg, 5.2 per cent.

Varieties of Kohl Rabi.

Kohl Rabi resembles cabbage in the growth of its root, and the swede turnips in the character of its leaf. The valuable part of the plant, however, grows about three inches above the level of the ground in the form of a bulb. The crop is sometimes grown as feed for stock and sometimes as a vegetable for the table. It makes a very nice food for domestic use and is prepared for culinary purposes in much the same way as swede turnips. The seed of Kohl Rabi resembles very closely that of swede and fall turnips and the crop is grown in much the same manner as turnips.

In 1905, four varieties of Kohl Rabi were under test at the College, the yields in tons per acre being as follows: Earliest Erfurt, 19.1; Early White Vienna, 17.3; and Goliath Purple and Garton's Improved Large Green Short Top, each 16.5. Two of these varieties have now been grown for seven years in succession and during that period of time the average yield per acre has been 20.2 tons for the Early White Vienna and 18.4 tons for the Earliest Erfurt. The Goliath Purple has been grown for four years, with an average of 16.6 tons per acre.

Varieties of Parsnips for Field Culture.

Occasionally enquiries have been received regarding the comparative productiveness of parsnips with other field roots when grown under similar conditions as feed for farm stock. In order to glean some information as to the value of this root, four varieties have now been grown for five years in succession by sowing one one-hundredth of an acre of each variety each year. The seed was sown in rows about twenty-seven inches apart, and the plants were thinned to a distance of seven inches apart in the rows. The

yields in tons per acre for 1905 and for the average of five years are as follows: New Ideal Hollow Crown, 15.4 and 11.4; Buckbee's New Sugar, 12 and 11.2; Sutton's Cattle, 13.4 and 10.9; and Improved Half Long, 13.9 and 10.7. It will therefore be seen that the New Ideal Hollow Crown has given the greatest yield both in 1905 and in the average results for the past five years. It will be observed that the parsnips have yielded considerably less per acre than the leading varieties of turnips.

Varieties of Mangels.

In 1893, there were only 21,519 acres used for the growing of mangels in Ontario. The acreage has been increased from year to year until in 1903, when no less than 80,918 acres were sown with this crop. During the last two years, however, there has been a slight decrease, owing, possibly, to the unfavorable weather at the time when this crop should be sown in the spring of the year. The average yield of mangels per acre over Ontario for the past twenty-four years has been 461 bushels, or about 14 tons.

In the spring of the present year, twenty-seven varieties of mangels were sown in the experimental grounds. Each variety occupied three rows four rods in length and about twenty-seven inches apart. The seeding took place on the 8th and 9th of May, and the thinning when the plants were about two inches in height. Of the twenty-seven varieties under test in 1905, seven produced upwards of 30 tons of roots per acre and were as follows: Yellow Leviathan, 32.9; Carter's Windsor Prize Taker Yellow Globe, 32.1; Sutton's Mammoth Long Red, 31.9; Steele-Briggs' Giant Yellow Intermediate, 31.3; Long White, 31; Evans' Improved Mammoth Sawleg, 30.9; and Carter's Mammoth Prize Long Red, 30.6.

Fifteen varieties of mangels have been grown under exactly similar conditions in each of the past five years. As there is much interest being taken in this crop over Ontario, and as there is a variation of about 8 tons per acre in the different varieties, we here present the average results for the five years as follows:

Varieties.	Yield of tops per acre.	Yield of roots per acre.
	Tons.	Tons.
Yellow Leviathan	5.4	33.0
Steele-Briggs' Giant Yellow Inter.	5.3	31.6
Sutton's Mammoth Long Red	5.4	31.1
Mammoth Golden Giant	5.4	31.0
Evans' Improved Mammoth Sawlog	6.4	30.9
Carter's Windsor Prize Taker Yellow Globe	2.1	30.2
Rennie's Perfection Mammoth Long Red	6.0	30.0
Cornish Giant Yellow Globe	2.1	29.9
Carter's Mammoth Prize Long Red	5.9	29.8
Long White	5.8	29.1
Simmers' Improved Mammoth Long Red	6.1	28.8
Steele's Long Red Selected	5.7	28.0
Norbitan Giant	5.6	27.4
Red Globe	3.9	25.6
Mammoth Red Intermediate	3.1	25.2

It will be seen that there is not only a marked difference in the yield of roots but there is also a great variation in the yields of the tops per acre, the lowest being 2.1 and the highest 6.4 tons. The Yellow Leviathan, which occupied the highest place in yield per acre for five years previous to 1905, again occupied the highest place in yield of roots per acre in the past season and for the average of the five years from 1901 to 1905, inclusive. This is a yellow intermediate mangel, the seed of which has been sold by D. M. Ferry & Co., Windsor, Ontario, for the last few years. The roots are generally quite uniform and of excellent shape. This variety has been distributed throughout Ontario in connection with the work of the Experimental Union, and it also occupied highest place in yield per acre in the co-operative experiments of 1905. We have also had excellent reports from farmers who are growing this variety as a general field crop.

Soaking Mangel Seed Before Sowing.

In each of four years, a duplicate experiment has been conducted by sowing mangel seed which had not been soaked in comparison with that which had been soaked for twelve, twenty-four, and thirty-six hours. The average results for the four years show that the largest yield of roots was obtained from the seed which was soaked twelve hours, the yields being 23.5 tons per acre. In comparison with this, the yields were 21.5 for the seed which was soaked twenty-four hours, 21.5 from the seed which was soaked thirty-six hours, and 19.8 from the seed which was not soaked before sowing. In three out of the four years, the seed which was soaked for twelve hours gave the greatest yield per acre.

Varieties of Sugar Beets.

In the November report of the Ontario Bureau of Industries for 1905, we find the following quotation regarding sugar beets: "This class of roots is increasing in favor as food for live stock. Correspondents claim that they are of good quality this year, both for sugar making purposes and for feeding." Although we have no definite records as to the area devoted to sugar beet growing in Ontario, we believe that it is increasing from year to year. Besides the crop which is grown for sugar production, a number of farmers are growing the larger varieties for the production of roots to be fed to farm stock. The larger growing varieties of sugar beets produce fairly high yields, are of good keeping quality, and furnish a food for farm stock which is of good quality and which is relished by nearly all classes of domesticated animals.

In our experimental work, we have made a comparative test of thirty-four varieties of sugar beets within the past six years. These included some of the leading varieties as grown for feeding purposes and also some of the leading kinds which have been specially bred in Germany for many years for the production of sugar. In 1901, the sugar beet seed was planted in rows 26 inches apart, and the plants were thinned to a distance of 7.9 inches apart in the rows, but in 1902, 1903, 1904, and again in 1905, all the varieties were planted in rows 21 inches apart and a distance of 7 inches was left between the plants. In each of the years, the thinning took place when the plants were quite small. Level cultivation was practised throughout. The following table gives the average yield of roots per acre of duplicate experiments conducted with fifteen varieties in 1901, twenty varieties in 1902, twenty-two varieties in 1903 and in 1904, and twenty-four varieties in 1905, as well as the average for the number of years that each variety was grown:

Varieties.	1901.	1902.	1903.	1904.	1905.	Average.
	tons.	tons.	tons.	tons.	tons.	tons.
1 Giant White Feeding	17.22	25.38	31.53	38.44	30.36	**28.59**
2 Royal Giant	19.29	29.63	26.55	33.14	26.66	**27.05**
3 Giant Rose Feeding	17.67	25.38	31.11	32.84	25.27	**26.45**
4 New Danish Improved	18.60	27.88	27.44	29.08	23.38	**25.28**
5 Red Top	19.63	26.81	20.83	30.38	25.92	**24.71**
6 Red Skinned	20.60	22.38	22.36	28.39	22.47	**23.24**
7 Green Top White	18.91	26.56	20.47	25.73	21.06	**22.55**
8 White Silesian	18.15	25.94	21.23	22.28	20.58	**21.64**
9 Lane's Improved	16.28	22.75	22.08	24.30	22.34	**21.55**
10 Kleinwanzlebener	16.81	23.06	20.97	24.89	20.23	**21.19**
11 Champion	17.18	22.38	21.00	20.28	21.25	**20.42**
12 Pitzscheke's Elite	14.61	20.63	20.70	21.20	18.67	**19.16**
13 French Yellow	15.14	23.19	19.48	19.25	15.94	**18.60**
14 Improved Imperial	14.22	21.31	19.83	16.66	20.63	**18.53**
15 Mangel Sugar Beet	13.01	20.50	21.27	19.08	17.56	**18.28**
16 Tankard Cream	.....	28.56	28.75	34.31	30.69	**30.58**
17 Rennie's Giant Sugar	.....	33.00	26.50	29.14	23.73	**28.09**
18 Rubensamen (Rimpau)	.....	21.06	19.67	21.02	18.53	**20.07**
19 Jaensch's Victrix	.....	21.44	21.23	17.83	19.55	**20.01**
20 Kleinwanzlebener (Mette)	.....	21.50	22.44	17.22	18.72	**19.97**
21 Hybrid Sugar Beet Mangel	.....	.....	25.23	24.22	24.28	**24.58**
22 Imperial Giant Half Sugar	.....	.....	25.02	21.06	24.98	**23.69**
23 Braune	.....	.....	.....	.....	18.59	**18.59**
24 Improved Kleinwanzlebener	.....	.....	.....	.....	17.52	**17.52**

Of the fifteen varieties grown for five years in succession, it will be seen that there was a variation from 18.3 to 28.6 tons of roots per acre. The Giant White Feeding has produced the highest and the Royal Giant the second highest yield of roots for the purpose of feeding. These two varieties were distributed throughout Ontario in the spring of 1905 for co-operative experiments. The average results of seven successfully conducted tests show that the Giant White Feeding gave about 2.9 tons per acre more than the Royal Giant variety. The Kleinwanzlebener variety, which is so extensively used in the United States and Canada for sugar production, has given an average of 21.2 tons per acre for five years. This is considerably larger than is usually obtained in general practice, 15 tons being considered a satisfactory crop in general field cultivation. For the results of the chemical analyses of these beets, the reader is referred to the report of the Chemical Department, written by Prof. Harcourt, and which can be found in another part of this volume.

Seven varieties of sugar beets have now been grown for twelve years in succession. The average results for this length of time should form a very excellent basis of comparison for these varieties. The following table gives the average yields per acre for the twelve years:

Varieties.	Yield of roots per acre 12 years.
Red Top	21.2 tons.
Lane's Improved	20.2 "
White Silesian	19.8 "
Champion	19.1 "
Red Skinned	18.4 "
Kleinwanzlebener	17 7 "
Improved Imperial	15.5 "

The New Danish Improved, which has been grown for ten years, gave an average yield of 22.7 tons per acre.

Soaking Sugar Beet Seed Before Sowing.

In the years 1903, 1904, and 1905, an experiment was conducted in duplicate each year by sowing sugar beet seed which was soaked twelve, twenty-four, and thirty-six hours, in comparison with that which had not been soaked. As in the case of mangels, the seed which was soaked gave the highest average yield of roots per acre. In the average results for the three years, the unsoaked seed produced 13.1 tons; that which was soaked twelve hours, 15.8 tons; that which was soaked twenty-four hours, 16.3 tons; and that which was soaked thirty-six hours, 15.7 tons per acre. It will therefore be seen from the results here presented and from those previously given for the mangels, that the best average results were obtained from sugar beet seed which was soaked for twenty-four, and from mangel seed which was soaked twelve hours before sowing.

Planting Sugar Beets at Different Distances Between the Drills.

For four years in succession, an interesting experiment has been conducted in planting sugar beets at different distances in the rows. A comparison of nine different distances between the rows was made. Seven rows were sown at each distance apart. At the time of harvesting, however, the two outside rows of each plot were discarded and only the five inner rows were used in determining the comparative yields. The plants were thinned when very young and were allowed to remain seven inches apart in the rows. Flat cultivation was used throughout. The experiment was conducted in duplicate each year, the Kleinwanzlebener variety being used in each of the tests. The average results of four years' tests in average weight per root, yield of tops per acre, and yield of roots per acre are as follows:

No.	Distances.	Average weight per root 1902-3-4-5.	Yield of tops per acre 1902-3-4-5.	Yield of roots per acre 1902-3-4-5.
		lbs.	tons.	tons.
1	Rows 12 inches apart.....	.67	10.18	21.94
2	" 14 "	.70	8.42	20.64
3	" 16 "	.78	8.84	20.57
4	" 18 "	.85	8.84	20.04
5	" 20 "	.93	8.59	19.76
6	" 22 "	.99	9.00	19.45
7	" 24 "	1.05	9.00	19.21
8	" 26 "	1.12	8.86	18.87
9	" 28 "	1.18	8.78	17.89

From the table here presented, it will be observed that, without a single exception, as the distance between the rows increased, the average size of the roots increased and the average yield of roots per acre decreased. The roots which were grown in rows 18 inches apart, which is the usual distance recommended for growing beets for sugar production, produced an average of 20 tons per acre. The average results of the eight tests conducted within the past four years show an increase of more than two tons of roots per acre from the rows 18 inches apart as compared with those which were 28 inches

apart. Samples from the various parts of this experiment were taken to the chemical laboratory and were analysed by Prof. Harcourt, in order to ascertain the percentage of sugar from beets grown at different distances apart. For the results of these analyses, the reader is referred to the report of the Chemical Department, to be found in the previous portion of this volume.

Thinning Sugar Beets at Different Distances in the Drills.

An experiment has been conducted for three years in succession by thinning sugar beets to two, four, six, eight, and ten inches apart in the rows. The experiment was conducted in duplicate each year. Each test was composed of five plots and each plot consisted of six rows. The rows were fifty links (2 rods) in length and eighteen inches apart. The Kleinwanzlebener variety was used throughout. The average results of the six tests in the three years were as follows:

Distances between plants.	Average weight per root.	Average yield of roots per acre.
	Pounds.	Tons.
2 inches	.48	19.11
4 inches	.77	17.04
6 inches	.95	16.96
8 inches	1.13	15.99
10 inches	1.33	15.01

The results show, that as the distance between the plants increased, the average weight per root increased, but the yield of roots per acre decreased. These figures assist in determining the best distance to thin the roots. By having the roots close together, there is an increase of both the yield of roots and the labor involved.

Thinning Sugar Beets at Different Stages of Growth.

In 1903, 1904, and again in 1905, a duplicate experiment was conducted by thinning sugar beets when the plants were one-half inch, and when they were two, five, and eight inches in height. The average results for the three years furnish us with the following yields per acre for each of the thinnings: One-half inch, 18 tons; two inches, 18.4 tons; five inches, 17.8 tons; and eight inches, 17.4 tons. Although there is not very much difference between the first and second thinnings, there is quite a marked difference between the results from thinning when the plants were two inches in height as compared with those which were thinned when five or eight inches tall. The plants which were not thinned until they were eight inches in height produced one ton per acre less than those which were thinned when they had grown to a height of only two inches.

Growing Sugar Beets on the Level and on Ridges.

Sugar beets have been grown on the flat and on ridges in an experimental way in each of four years. The experiment in each year was conducted in duplicate. Each plot consisted of six rows, each row being fifty links in length. The Kleinwanzlebener variety was used throughout. The

average results for the eight tests conducted in the four years gave 18.7 tons per acre from the flat cultivation and 18.3 tons per acre from the ridged cultivation. These results, therefore, show that for the four past years about two-fifths of a ton more of sugar beets per acre have been obtained from the flat as compared with the ridged cultivation.

Varieties of Field Carrots.

A few years ago, the large White Belgian variety of carrot was quite extensively grown throughout Ontario. This variety produced long, slender roots, which were often irregular in growth and were very difficult to harvest. In recent years, varieties have been introduced which yield more heavily and furnish more compact roots, and which are much easier to harvest and more satisfactory to handle. In 1905, twenty-one varieties of field carrots were grown in the Experimental Department. Of this number, the greatest yields of roots were produced by the Iverson's Champion White Intermediate, 28.9 tons; Mastadon White Intermediate, 28.3 tons; Sutton's Matchless White, 28.1 tons; and Carter's Hundred Ton, 27.9 tons per acre.

Seventeen varieties have been grown for five years in succession. The six varieties which have given the greatest average yield of roots per acre during this period are as follows: Mastadon White Intermediate, 30.5 tons; Mammoth Intermediate Smooth White, 30.4 tons; Steele's Improved Short White, 30.3 tons; Iverson's Champion White Intermediate, 29.7 tons; Sutton's Matchless White, 29.6 tons; and Carter's Hundred Ton, 29.5 tons per acre. In comparison with these, we find that the average yield of the Large White Belgian is only 26.9 and the Danver's Orange 22 tons per acre.

Storage of Roots.

In the autumn of 1903, and again in 1904, roots of mangels, sugar beets, swede turnips, carrots, and kohl rabi were stored in different ways. A certain number of roots of each of several varieties of the different classes of roots were counted out. One collection was pitted in the field, a similar collection was piled in the root cellar in the barn, and another similar collection was stored in sand, which was placed in boxes and kept in the root cellar. An examination of the roots stored in the different ways in each of the two years furnishes us with information, the following of which is a brief summary: Roots which were stored in the sand in the root cellar had the lowest percentage of rotten specimens, the smallest amount of mould, and were the least sprouted of the roots under test.

Varieties of Fodder or Silage Corn.

The area devoted to corn for the production of fodder or silage was slightly less in 1905 than it was in 1904. The area of fodder corn, however, has been slightly increasing during the last few years; while that for corn for husking purposes has not varied to any great extent. In 1905, there were 184,784 acres devoted to corn for the silo and for fodder purposes. Experiments with different varieties of fodder corns are among the most difficult to conduct at the College, in such a way that the information might be applicable to the various districts of Ontario. Corn growers will clearly understand that varieties which are most suitable for some localities would be entirely unsuited for others. Generally speaking, the corns which ripen early are small, and those which require a long time to reach maturity are large growing sorts. We find, however, that this does not hold uniformly

true with all varieties. Those which are large producers do not require exactly the same length of time to produce crops suitable for green or dry fodder or for the production of silage. It is owing to this variation that the results of experiments are valuable. We are after the exceptions rather than those which comply with the general rule. For fodder purposes, we are anxious to secure those varieties of corn which will not only produce a large total yield per acre, but which will also give large yields of ears and will reach the proper stage of maturity for fodder or silage production in the locality where the corn is grown before the frosts appear in the autumn sufficient to injure the crop. Taking all these things into consideration we have felt justified in conducting experiments quite extensively with varieties of corn for the production of fodder or silage.

In 1905, no less than one hundred and twenty-eight varieties and different strains of dent, flint, and sweet corns were grown in the Experimental Department. Taking the results of the last five years, as well as those for 1905, into consideration, we find that such varieties as the Henderson's Eureka, the Mastadon Dent, and the best strains of Leaming, have given very good satisfaction and possess qualities which should make them leading varieties on the warm, sharp soils in the southern part of Ontario, especially along the shore of Lake Erie. For the heavier and colder soils in the southern part of Ontario, and for the lighter and earlier or even medium soils of central Ontario, the White Cap Yellow Dent and the Wisconsin Earliest White Dent have given excellent satisfaction. For the northern part of Ontario, it seems advisable to use the flint corns almost entirely. Of the flint corns which have given good results, both as general croppers and as producers of grain, the King Phillip, Compton's Early, and Salzer's North Dakota possess good qualities.

As the White Cap Yellow Dent has proven itself to be one of the best general purpose corns for southern Ontario, and as some men have been growing this variety for a longer or shorter period of time, carefully selecting ears from year to year, we thought it advisable to make a comparison in 1905 of the different strains of this important variety. We, therefore, secured seed from different sources, some of it from the growers themselves and some of it through the kindness of Mr. J. O. Duke, Ruthven, Ontario. In 1905, we conducted an experiment in duplicate with the White Cap Yellow Dent corn obtained from ten different growers. The following table gives the average results of the duplicate test, indicating in each case the grower of the seed in 1904 and the county in which the seed was produced:

County and Grower.	Average height of plants.	Stage of maturity.	Yield of ears per acre.	Total yield per acre.
	Inches.		Tons.	Tons.
Elgin (D. Carmichael)	112	Dough	5.09	24.10
Essex (A. Bruner)	111	Late milk	5.17	23.48
Essex (A. Dawson)	110	Dough	4.60	23.15
Essex (W. Hutchens)	113	Dough	4.45	22.45
Essex (C. Wigle)	116	Dough	4.82	22.05
Elgin (H. Smith)	114	Late milk	5.11	21.90
Essex (C. F. Knight)	110	Milk	5.29	21.73
Essex (W. E. Atkin)	114	Late milk	5.10	21.52
Essex (W. Bryham)	111	Dough	4.50	19.35
Essex (J. Hammond)	105	Dough	3.31	15.23

It will be seen from the foregoing table that there was a variation from 15.2 to 24.1 tons of total crop per acre between the lowest and the highest yielding strains of the White Cap Yellow Dent variety. There was also a considerable difference in the yield of ears and of height of crop. As the different strains of corn were planted at the same time and as they were also harvested at a uniform date, it is interesting to note the difference in the strains regarding the stage of maturity which the corn had reached at the time it was cut, which was about the middle of September. Five of these same strains were grown in the larger list of corn previously referred to and which were sown at a somewhat earlier date. In the regular variety test, we find the yields of total crop per acre to be as follows: White Cap Yellow Dent from Atkin, 21.4 tons; from Smith, 20.8 tons; from Knight, 20.4 tons; from Bryham, 18.2 tons; and from Hammond, 17.2 tons per acre. In this case, the strain of Hammond's corn had reached the firm dough stage, and, in fact, was nearly ripe, while that from Knight had only reached the late milk to the dough condition.

Methods of Cultivating Corn.

In each of the past four years, an experiment has been conducted by cultivating corn in four different ways. The North Star Yellow Dent variety of corn was used in the experiment of 1902 and 1903, the White Cap Yellow Dent and the King Phillip varieties in 1904, and the Red Blazed Yellow Flint and King Phillip varieties in 1905. The experiment was conducted in duplicate each year. Each test consisted of four plots. The average results of the eight tests conducted during the four years are as follows: (1) Deep cultivation at first, gradually getting shallower as the season advanced, 21.9 tons; (2) Shallow cultivation throughout the season, 21.2 tons; (3) Deep cultivation throughout the season, 20.9 tons; and (4) Shallow cultivation at first gradually getting deeper as the season advanced, 20.9 tons per acre. From these results, it will be seen that in seasons such as we have had during the past four years, the corn which was cultivated deeply immediately after it was planted and in which the cultivation was made shallower as the season advanced produced the greatest yield per acre. This experiment will likely be conductd again in 1906.

Planting Corn in Rows and in Squares.

In the average of five years' experiments in growing corn in rows 40 inches apart and the plants 10 inches apart in the rows, in comparison with planting corn in squares 40 inches apart both ways and with four plants in each hill, we learn that in three out of the five years the squares gave the best results, and in the other two years the rows produced the largest yield per acre. In a similar experiment conducted throughout Ontario in connection with the Experimental Union in each of six years, the results have been favorable to the hills or squares in each of the six seasons. The average results for the whole period were in favor of the squares by about seven-eighths of a ton of total crop per annum, of which more than one-quarter of a ton of the increased yield was in the form of ear. As each plot consisted of one-tenth of an acre, being four rods square, the results, which should be quite reliable, are very interesting and suggestive.

Varieties of Sorghum for Fodder, etc.

Sorghum includes several classes as well as varieties of crops. They are all of eastern origin and have probably arisen from a common stock through ages of cultivation. They include the different varieties of broom corn, sugar cane, kaffir corn, millo maize, etc.

In all, eighteen varieties of sorghum were grown at the College in 1905. The greatest yields during the past season were produced by the following varieties: Early Amber Sugar Cane, 33.8 tons; Fodder Cane, 28.4 tons; Orange Sugar Cane, 27.8 tons; Early Minnesota Sugar Cane, 25.2 tons; Earliest Black Sugar Cane and Folger Cane, each 19.1 tons per acre.

Twelve varieties of sorghum have now been grown at the College for seven years in succession. The following table gives the average height, the average yield of heads and the average yield of total crop per acre of each variety for the seven years:

Varieties.	Height.	Heads.	Total crop.
	Inches.	Tons.	Tons.
Orange Sugar Cane	85	.28	18.06
Early Minnesota Sugar Cane	97	.66	17.83
Early Amber Sugar Cane	88	.41	16.25
Fodder Cane	86	.54	15.66
Kaffir Corn	59	.37	12.25
California Golden Broom Corn	100	1.30	11.71
Black Rice Corn	60	.31	10.33
Improved Evergreen Broom Corn	103	1.10	9.93
Early Japanese Broom Corn	97	1.18	9.02
Yellow Millo Maize	64	.54	8.69
Dwarf Broom Corn	83	1.08	8.58
Brown Dhoura Corn	64	.58	7.30

The Early Amber Sugar Cane is perhaps the best known of the varieties here reported. This is the variety which has been grown to a limited extent in some sections of Ontario for the production of syrup. This variety has also been grown by a number of farmers to furnish feed for farm stock. Although not very extensively grown, it is highly appreciated by individual farmers here and there throughout the southern part of the Province. Broom corn has also been grown in some localities for the production of heads for the manufacture of brushes and brooms. The information given in the table regarding the comparative results of different varieties may prove serviceable in showing the comparative yields of heads as well as of total crop per acre.

Varieties of Millet for Green Fodder and for Hay.

Twenty-three varieties of millet were grown in the Experimental Department in 1905, and determinations were made regarding the relative yields of green fodder and of hay. The greatest yields per acre in 1905 were produced by the following varieties: Japanese Barnyard, 16.1 tons; Japanese Panicle, 15.6 tons; Golden Wonder, 13.4 tons; and Magic and Holy Terror Gold Mine, each 13.2 tons of green crop per acre. Of cured hay, the Japanese Panicle produced 6.2; the Golden Wonder, 4.6, and the Japanese Common and Holy Terror Gold Mine, each 4.4 tons per acre.

As a number of the varieties of millet have now been grown at the College in each of eleven years for the production of hay and of green fodder, the average results for the whole period are here presented:

Varieties.	Green Fodder (11 years.)	Hay. (10 years.)
	Tons.	Tons.
Holy Terror Gold Mine	10.98	4.72
Japanese Panicle	10.62	4.67
Golden Wonder	11.38	4.54
Magic	10.20	4.19
Japanese Barnyard	10.11	4.01
German or Golden	9.57	3.75
Hungarian Grass	8.87	3.59
Common	8.60	3.54
California	7.81	3.16
White French	6.16	2.49
Red French	4.98	2.10

It will be seen that the Golden Wonder, Holy Terror Gold Mine, Japanese Panicle, Magic, and Japanese Barnyard varieties have each produced an average for eleven years of over 10 tons of green crop per acre. It will also be seen that each of six of the varieties produced upwards of 4 tons of cured hay per acre per annum.

Leguminous Crops for Green Fodder.

For five years in succession, experiments have been conducted with fourteen varieties of leguminous crops for the production of green fodder. Some of these crops have been tested for a very much longer period of time, but, for the sake of comparison, the results here presented, are for the five years in which all of the varieties were grown under uniform conditions. As much interest has been taken in recent years in some of these crops, a table giving the results of all the different crops which were grown under similar conditions furnishes both interesting and valuable information.

Varieties.	Length of plants.	Yield of green crop per acre.
	Inches.	Tons.
Medium Green Soy Beans	32	9.74
Hairy Vetches	35	9.49
Grass Peas	38	8.08
Early Yellow Soy Beans	27	7.79
Common Vetches	.....	7.69
American Coffee Berry	23	5.89
Horse Beans	28	5.67
Wonderful Cow Peas	17	5.58
Taylor Cow Peas	14	4.97
New Era Cow Peas	14	4.53
Whip-poor-will Cow Peas	14	4.49
Extra Early Blackeye Cow Peas	17	4.13
Warren's Extra Early Cow Peas	13	3.96
Extra Early Dwarf Soy Beans	20	2.84

In the average results for five years, the Medium Green Soy bean heads the list in the production of green fodder. This variety produces large plants which have a large leaf development. It is probable that the Medium Green variety of Soy beans may be grown considerably in some parts of Ontario in the near future for the purpose of mixing with corn when filling the silo. The Soy bean furnishes a plant which is very rich in albuminoids, or flesh-forming constituents, which are so deficient in the corn plant. The Soy beans and the corn combined should make a fairly well balanced ration. The Hairy vetches, which come second on the list in total yield of green crop per acre, have been grown to a limited extent in the United States and Ontario during the last few years. They have given very good results, but the seed, which is nearly all imported from Germany, is very expensive, and usually costs from $5 to $6 per bushel, and it is necessary to sow about one bushel of the Hairy vetch seed per acre when used as a farm crop.

Varieties of Rape, Kale, Cabbage, etc.

The Dwarf Essex rape has been grown considerably in some parts of Ontario for many years past. It has been used principally as a pasture crop for sheep, but has also been used for feeding, both in the field and in the stable, to young and growing cattle and to hogs. As there are quite a large number of other plants somewhat similar to rape in method of growth and in the crop produced, it has been thought wise to make a comparative test of these different varieties and classes of crop in order that information may be gleaned as to their relative value for the farmers of Ontario. Therefore, seed of different varieties of rape, kale, Brussels sprouts, and those varieties of cabbage which are grown to a certain extent in Great Britain for feeding purposes, was imported principally from England and other European countries for experimental purposes. These have been introduced from time to time, and we now have the results of tests conducted with fifteen different varieties in each of the past six years. The seed of these varieties has been sown at the rate of about two pounds per acre, in rows nearly twenty-seven inches apart. The crop has been cultivated in much the same way as turnips. The following table gives the average yield of green crop per acre produced by each of fifteen varieties for a period of six years.

Sutton's Earliest Drumhead Cabbage	21.7 tons per acre.
Thousand Headed Kale	19.1 "
Dwarf Victoria Rape	18.4 "
Dwarf Essex Rape	18.4 "
Purple Sprouting Broccoli	18.3 "
Sutton's Earliest Sheepfold Cabbage	18.0 "
Marrow Collards	17.5 "
Marrow Stem Kale	17.3 "
Hardy Curled Kale	17.1 "
Sutton's Best of All Savoy Cabbage	16.8 "
Swiss Chard	16.7 "
Jersey Kale	16.3 "
Tall Green Curled Scotch Kale	13.8 "
Brussels Sprouts	13.2 "
Sutton's Latest Drumhead Cabbage	12.7 "

In 1905 no less than thirty-two varieties of rape, kale, etc., were grown in the experimental grounds. The results of the past year show that in yield of green crop per acre, the following varieties produced the greatest amounts: Sutton's Earliest Drumhead cabbage, 25.9 tons; Sutton's Earliest Sheepfold

No. 1.—A general view of the Experimental Grounds as seen from the "Main College Building."

No. 2.—The above picture represents a crop of Mandscheuri Barley which was the product of one seed sown in the spring of 1903, and which produced over forty bushels of grain in 1905.

No. 3—The above picture shows a crop of the Guy Mayle variety of Hulless Barley which has given the highest average yield of grain of all the hulless Barleys grown in the Experimental Grounds for five years in succession.

cabbage, 23.8 tons; Thousand Headed kale, 23.7 tons; Sutton's Giant Drumhead cabbage, 23.3 tons; and Sutton's Best of All Savoy cabbage, 22.9 tons per acre.

Fertilizers with Rape.

In each of eight years, nitrate of soda at the rate of 160 pounds, muriate of potash at the rate of 160 pounds, superphosphate at the rate of 320 pounds, and mixed fertilizer at the rate of 213 pounds per acre, have been used with rape. The mixed fertilizer was composed of one-third of the amount above indicated of each of the three distinct fertilizers. The muriate of potash and the superphosphate were applied at the time when the plants were sown, and the nitrate of soda when the plants were about three inches in height. One plot was left unfertilized in each test. The experiment was conducted in duplicate each year. In the average of the sixteen tests made in the eight years, we have obtained the following number of tons of green crop per acre from each of the fertilizers as follows: Nitrate of soda, 12.1; mixed fertilizer, 11.1; muriate of potash, 10; and superphosphate, 9.8. In comparison with these, we obtained an average of 9.1 tons of green crop per acre from the land which received no fertilizer. The commercial fertilizers in each case cost an average of about $4.60 per acre.

Sunflowers for Fodder.

In each of ten years, two varieties of sunflowers have been grown under similar conditions in the experimental plots. The Giant Black has given an average yield per acre of 20.6 tons of total crop and 6 tons of heads, and the Mammoth Russian an average of 16.4 tons of total crop and 5.5 tons of heads per acre. The White Beauty variety, which has been grown for eight years, has given an average of 15.9 tons of total crop and 5.7 tons of heads per acre. Of these three varieties, the Black Giant grows the tallest and the White Beauty the shortest plants. As the heads of sunflowers are used for putting into the silo by a few farmers in Ontario, the comparative results of some of the varieties as here presented may prove serviceable.

Pasture Crops.

The area of cleared land devoted to pasture in Ontario amounts to nearly three million acres, and that devoted to hay and clover to about two and one-half million acres annually. A large number of varieties of grasses and clovers have been grown in the Experimental Department of the Ontario Agricultural College, both singly and in combination, for pasture and for hay. The mixture of seed now used for the production of pasture for a two years' stand in the short rotation on the College farm is as follows: Red Clover, 7 lbs.; Alsike Clover, 2 lbs.; Timothy, 4 lbs.; and Orchard Grass, 5 lbs., making a total of 18 pounds per acre. This mixture can also be used for hay, but when the chief aim is the production of hay, the Orchard Grass is not included and only 13 pounds of seed per acre are sown.

Farmers frequently write in the spring of the year, stating that through lack of germination of the grass and clover seed, the killing of the plants by the hot dry weather of the summer, or the heaving of the clover in the early spring, the pasture crop is likely to be deficient in the coming season, and asking what they can sow in the spring of the year that will furnish the best pasture in the same season. In each of four years, we conducted an experi-

No. 4.—This view represents an improved strain of the Chevalier variety of Two-Rowed Barley on the right and of the Siberian variety of Oats on the left.

No. 5.—In the front can be seen young Soy Bean plants and in the distance plots of Winter Wheat to the right and rows of Spring grain hybrids to the left.

No. 6.—This represents a view taken from the central road in the Experimental Grounds and looking across the plots of Barley. Starting from the front, the first plot shows the Guy Mayle hulless, the second the California Brewing six-rowed and the third the Mandscheuri variety.

ment in testing fourteen different kinds of crops for the production of pasture in the same season in which the seed was sown. As a result of these experiments, we find that we can get better returns from a combination of varieties than from any one variety sown by itself. The following mixture, when sown in the spring, is likely to be ready for use at about six weeks after the seed is sown and to give good satisfaction in furnishing pasture throughout the summer: Oats, one and one-half bushels; Early Amber Sugar Cane, thirty pounds; and Common Red Clover, seven pounds, thus making a total of eighty-eight pounds of seed per acre.

Sometimes a farm contains a considerable amount of comparatively rough land, or fields which lie at a long distance from the buildings, and the owner is anxious to use a mixture of grasses and clovers which will make a permanent pasture. From twenty years' results in testing different varieties of grasses and clovers, both singly and in combination, we would suggest the following mixture, for permanent pasture on an average soil: Orchard Grass, 4 lbs.; Meadow Fescue, 4 lbs.; Tall Oat Grass, 3 lbs.; Timothy, 2 lbs.; Meadow Foxtail, 2 lbs.; Lucerne, 5 lbs.; Alsike Clover, 2 lbs., and White Clover, 2 lbs., thus making a total of 24 pounds of seed per acre. Some of these varieties produce grass very early in the spring, while others are later and furnish a good bite during the hot, dry weather which occurs frequently in the months of July and August. The seed can be sown in early spring either with or without a grain crop. Such a mixture as this, when once well established on suitable land, should form a pasture abundant in growth, excellent in quality and permanent in character.

I wish to thank both yourself and the Minister of Agriculture for the kindly support given me in the work of the Department of Field Husbandry during the past year.

Respectfully submitted,

C. A. ZAVITZ.

No. 7.—The plot to the right represents the Common six-rowed and that to the left the Mandscheuri variety of Barley.

No. 8.—A view in the Experimental Grounds showing a few of the plots with Potatoes to the right and with Soy Beans and spring grains to the left.

No. 9.—A view of a portion of each of two plots of Swede Turnips with fertilizers in the front, and of tests of Clover and of Spring grains a little farther away.

PART XIII.

LECTURER IN FORESTRY.

To the President of the Ontario Agricultural College:

SIR,—I beg to submit herewith my first annual report. I came to the College in the spring of 1904 to take charge of a proposed nursery, and to carry on work for the advancement of farm forestry. This work received my attention until the end of October, when I left Guelph to finish my college training. Upon my appointment, this spring, to the College staff as Lecturer in Forestry, I resumed the work begun the previous season. It is my hope that this undertaking may be so organized and carried on that practical results will accrue to the country. Unlike most agricultural and allied subjects, the forestry problem is not solved in a short period of time.

Waste sand land in Durham County planted with white pine in the spring of 1905.

Results in tree planting are only to be had through the patience of years. Clumps and plantations of trees which were planted on this farm about twenty years ago, have and are giving definite and valuable results. It is of interest to quote from William Brown, then Professor of Agriculture and Farm Superintendent, in the College Report of 1879. Mr. Brown, who had his forestry training in Scotland, says: "The science and art of tree culture is no common, every-day work of anybody, but is an established branch of rural economy, demanding sound, practical acquaintance in details, upon a knowledge of vegetable physiology. How important, then, that our youth—our future tree planters—should now acquire such knowledge, as well as that the Government should at once take steps to encourage the re-planting of our over-cleared country."

I need scarcely draw attention to the condition of the remnants of woodlots and the amount of non-agricultural land in the older parts of the Province. "Old Ontario," which is distinctly an agricultural country, has various reasons for being deeply interested in forestry. There is considerable land which cannot be used for field crops and which would produce trees. Sandy or gravelly knolls, rocky fields, steep hillsides, broken portions of the farm cut off by railroad or stream, swamp lands, banks of streams, all of which are both available and suitable for tree planting. The production of trees, in agricultural districts, is necessary for the wood product as fuel, building material, fencing material, etc.; for the protection of the soil; for the protection to buildings, crops and animals; for the protection to streams; and for the aesthetic requirements, which form no small part of our needs. These requirements are so closely related to our public welfare that it becomes a matter of state interest to make provision for them. It is only by systematic state encouragement that the forestry conditions of older Ontario may be improved and developed along rational lines.

College nursery grounds, showing beds of one-year-old hardwood seedlings.

A course of forestry lectures is being given the Fourth Year students during the fall term. In this course I am endeavoring to teach the relation of Forestry to our national economy, the sylvicultural problems in caring for the woodlot, reforesting wasteland, and such other problems in tree culture as directly affect the agriculturist.

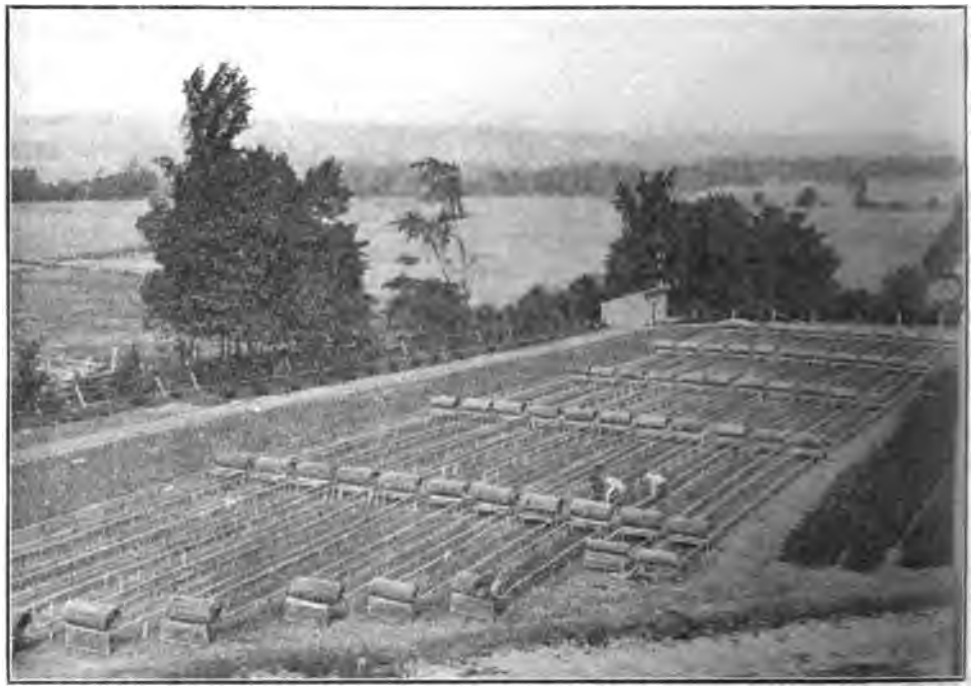
College Woodlots.

There are four woodlots on the College property, only one of which is near normal condition. The other three are in a very bad state, owing to pasturage and lack of protection. In these woodlots there is practically no reproduction, and the stand is composed of over-mature and defective trees,

with considerable undergrowth of iron wood. Sugar maple, cherry, basswood, rock elm, and soft elm compose the greater part of the stand in these woods.

The fourth woodlot, which lies at the northern end of the farm, is in better condition than the others. The soil has a good cover of leaf litter and vegetable mould upon it, and reproduction will take care of itself wherever allowed to enter. This stand is composed of soft elm, soft maple, white cedar or arbor vitae, yellow birch, hemlock, white pine, balsam fir, beech, sugar maple, and cherry.

Improvement work is being done in these woodlots along practical lines. Spruce hedges are being placed about the boundaries, to give protection from winds, thus approaching more nearly forest conditions. Such conditions are very hard to obtain in hardwood areas of such small extent as the average woodlot. It is hoped by this border protection to obtain good tree



White pine seedbeds containing about 75,000 one-year-old seedlings.

growth over the entire area, whereas the usual woodlot has its borders full of grass and is in very poor condition for reproduction. A very large percentage of the trees in these woodlots are defective or overmature. These trees are being gradually removed and will be utilized as firewood and lumber by the other departments at the College.

College Plantations.

There are four plantations and a few clumps of trees, which were planted about twenty-five years ago. The nursery stock used in making these plantations was to a large extent composed of exotic species, and are of value in showing their adaptability to this climate and location.

A small plantation of Black Walnut, made in 1880, has acquired a height growth of about twenty-five feet and a diameter growth of about six inches. This plantation illustrates the mistake of planting black walnut in pure stands, without the protection of more densely foliaged trees. It is subject to winds and so much light reaches the soil that grass has taken full possession. According to the College Report for 1880 this planting was made to give protection to stock. It has not fulfilled this purpose, but I would not consider black walnut the most suitable species for such work.

In 1887, a plantation of European Larch was made to hide an old gravel pit from public view. These trees were planted in coarse gravel containing very little mineral soil and a spot which would be of small value for field crops. The trees are from thirty-five to forty feet in height and run from six to eight inches in diameter. This plantation shows a splendid development, considering the poor site, and also the fact that the larch saw-fly has retarded the growth for several years by defoliation.

In 1887, a plantation of mixed hardwood, with a border of conifers, was made to hide another gravel pit. The coniferous border is composed of Norway Spruce, larch, and Austrian pine, the greatest part being of Norway spruce.

Plantation of Austrian pine, showing the bad effect of wide planting. The large dead limbs will not drop for years, and it requires considerable labor to prune them. These trees were planted eight feet apart.

In connection with the above plantations, it might be well to mention one made about the same time and located on the brow of the hill to the southwest of the College buildings. I mention these as a whole, because they are of about the same age, and are chiefly composed of exotic species. These two plantations are composed of the following species: Norway spruce (Pieca excelsa), scotch pine (Pinus sylvestris), Austrian pine (Pinus austriaca), European larch (Larix europea), Norway maple (Acer platanoides), sycamore (Acer pseudo-platanus), sugar maple (Acer saccharum), Scotch elm (Ulmus montana), English oak (Quercus pedunculata), burr oak (Quercus macrocarpa), Catalpa speciosa, and Catalpa catalpa, black cherry

(Prunus serotina), European ash (Fraxinus excelsior), black walnut (Juglans nigra), butternut (Juglans cinerea).

These plantations cannot be considered of great value from the standpoint of wood production. Wide planting has given low scrubby trees and exotic species are in most cases inferior to our native trees. However, these plantations are of value from the experimental and educational standpoint.

The only exotic species that seem to rank with our native trees, in general development, on this site, which is for the most part gravel formation, are Norway spruce, European larch, and perhaps Scotch pine. This last species would probably have made better growth if closer planting had been followed. The larch has thus far made the best growth, and it is to be hoped that the enemies of the saw-fly will soon end its destructive work. Of the exotic broad-leaved species, none have shown results that would make them preferable to our native hardwoods. However, these conclusions are only for this soil and location and would not warrant a final opinion..

Plantation of Larch, showing the effect of close planting. The lower limbs died from shading while yet very small, and were easily cleaned off, thus giving a tree with a long, clean stem.

White pine three years old, and one year old. The one year seedling is a very delicate structure. The larger specimen is a transplant, and shows a well-developed root system.

A clump of trees composed of American or soft elm and ash-leaved maple (Acer negundo) was planted about 1882 in a low lying part of one of the fields and is worthy of mention. They have made a splendid growth of from thirty to thirty-five feet in height and afford good shelter for the stock. This past summer the surrounding field has been pastured, and during the hottest part of the day the cattle invariably sought the shade of the clump. Such planting made on dairy farms and in permanent pastures would undoubtedly pay for time and space given them.

College Nursery.

In the spring of 1904, a Forest Nursery was established at the College on ground north of the Macdonald Buildings. This land was underdrained and nursery plots and beds at once commenced. The soil of this vicinity was not suitable for coniferous nursery work, but the location was used until a more suitable situation could be found. This spring extensive seed beds were made for white pine, white ash, locust, red oak, hickory, elm, and black cherry. There is in the nursery at present, one year old seedlings, about seventy-five thousand white pine, fifty-thousand soft or American elm, ten thousand white ash, six thousand red oak, ten thousand black locust, twenty thousand white wood, ten thousand red maple, and five thousand of species as black cherry, shag-bark hickory, white maple, and English elm. Of two year old material, there is about eight thousand transplants of white ash, eight thousand transplants of soft elm, two thousand seedlings of Norway spruce, and five thousand seedlings of European larch. Besides the above, there is a mixture composed of three hundred white pine five years old, four thousand Norway spruce five year old, and other species in nursery lines, which are to be used in experimental and decorative work on the College property. This ground is suitable for hardwoods, but we have lost many white pine seedlings through a "damping off" fungus, which is usually more troublesome on heavy soils. Another nursery site has been secured on the Holmwood property, northwest of the city of Guelph. This location is within easy access of the city and College. It is also well protected from northerly winds by a slight ridge, has a soil of sandy loam, with a sandy subsoil, and is on the bank of a small stream, which ensures a water supply.

This spring a first attempt was made in redeeming waste land by two plantations being made, one in Durham and the other in Norfolk County. The plantation in Durham County, which was made on waste sand land, was visited in October and showed ninety-five per cent. of the white pines living. These plantations will be more definitely reported on at a later date, as there has not been time to form a judgment in respect to them. Preparations are being made to enlarge this part of the work, which can only be accomplished by organized effort.

Correspondence received from various parts of the Province, and enquiries made regarding this work, lead me to believe that there is considerable public sentiment in favor of reforestation. Indeed, in many cases the small landowner is prepared to go to greater expense and trouble in replanting than the forester would expect of him.

Respectfully submitted,

E. J. ZAVITZ.

PART XIV.

THE MANAGER OF THE POULTRY DEPARTMENT.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to present herewith the report of Poultry Department for the year 1905:

CLASS ROOM WORK.

The usual course of lectures and practical instruction has been given to the regular college students. The aim in the lectures has been to teach the practical growing of fowls on the farm. Very little attention has been given to the breeding of fancy exhibition stock. The methods advocated have been such as can be adopted on almost any Ontario farm.

Colony houses used for rearing chicks. Artichokes growing as shade for the chickens

Lectures have also been given to the ladies from Macdonald Institute who desired instruction in poultry raising.

The Poultry School was well attended during the year. The students in this course were given instruction in practically every branch of the business. We had several successful breeders from outside points to give lectures to this class.

This branch of my work has been far more popular than was even expected; in fact, the course for January, 1906, has already as many applicants as we can accommodate.

GENERAL TREATMENT OF BREEDING STOCK.

The system followed in 1905, as far as the management of the houses is concerned, is practically the same as in 1902, '03 and '04, that is to say, we have depended entirely, for ventilating the house, upon the opening of doors and windows. We aim not to close the doors until the water freezes

in the drinking pans; *i.e.*, after the young birds are brought into the houses in the fall, the houses are not closed at night until the water freezes in the drinking tins; this would usually be about the beginning of November.

We have slightly changed the method of feeding from previous years, in that we feed practically no mash feed, using sprouted grains instead, or if not sprouted grains, either feed dry, whole grain at night, or else oats which have been previously soaked in hot water for some five or six hours.

During the months of October and November, we have made it a practice to feed a little mash food at noon, this would not amount to more than one pint for fifteen birds. The reason this is fed is largely owing to the fact that we have considerable stale bread and we wish to feed it to the birds in some form.

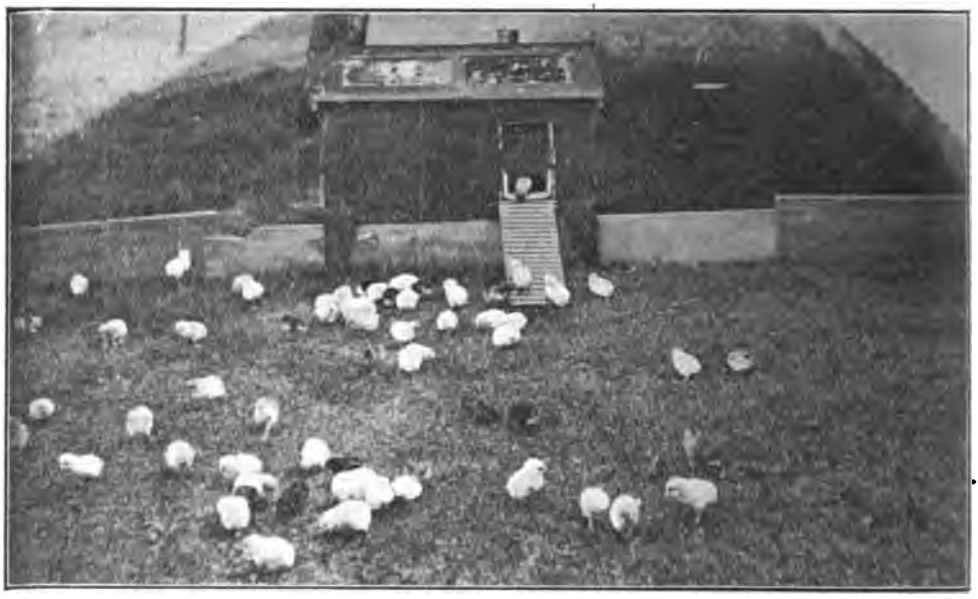
The egg production during the last year has not been equal to previous years. As near as we can figure at this date of writing (Nov. 22) the average egg production per bird will not be much more than 100 eggs, while for years it has been practically 120 eggs. In talking with some poultrymen in this vicinity, who keep accurate records, their experience has been the same. I believe the severe weather of the last two winters has had considerable influence, as the stock this year, as compared with previous years, was much of the same breeding and in practically the same condition. The slight difference in feeding I do not think would make the difference in egg production. The number of chickens hatched from eggs during 1905 has been more satisfactory than in any year since I have had charge of the department. The mortality among young chicks has been considerably less, especially during the natural hatching season, than in past years. The chickens have grown better and larger and are also of a much higher quality than in previous years. Much of this I attribute to the free use of beef scrap, and by keeping the chickens on fresh ground.

New Breeds added during 1904. Of the new breeds spoken of in last year's report we have found the Black Hamburgs to be good layers. The Black Orpingtons have been somewhat of a disappointment in regard to the number of eggs produced. The chickens grow very rapidly and have every appearance of being first-class market chickens other than their color, which is a very serious objection. We have also found the Black Orpington chickens disappointing so far as crate feeding is concerned; in fact, where chickens are wanted for killing purposes, before the feathers mature, the black pin feathers are such a serious objection that I would not recommend this breed for average farm conditions, when there are other varieties of the same breed available, which are much better in color of feathers for market purposes. The Favorelle proved to be a good chicken as did also the Jubilee Orpingtons, but as was said in last year's report, the color does not suit many. We have grown a number of Rhode Island Reds during the last season, much larger than in previous years. They are a breed that deserve favorable mention, and for people who care for chickens of their color and want a quick maturing bird of what might be called a medium sized chicken, they are worthy of consideration.

Geese. So far as the experiments with geese are concerned, during the year, I regret to report that the geese failed to breed. However, this may have been our fault as we have great difficulty in keeping them from getting over-fat.

Ducks. We have grown a number of ducks during the last season and I have paid strict attention to the amount of grain that it takes to produce a duck to a marketable age, or until the duck weighs in the neighborhood of five pounds. We find that it takes practically 3½ lbs. of grain ration

to produce a pound of duck's flesh; *i.e.*, when the ration consists of equal parts of bran, oats and corn-meal to which has been added 25 per cent. of animal meal or tankage. To those who are interested in duck growing, it has been found that by increasing the percentage of animal meal in the ration, one can hasten the maturity of the ducks. Whether this would be a paying proposition or not would depend much upon the market conditions. If one was feeding against a declining market, it might be advisable to use a higher percentage of animal meal than 25 per cent. in order to get their ducks on the market a week or ten days earlier and receive a higher price. For those who are desirous of having ducks for private use, we would recommend the Cayuga, which is black in color. This of course is a serious objection for market purposes, but we have found this duck to carry a higher percentage of breast meat than most other breeds. For commercial purposes, we have not as yet found anything superior to the Pekin.



A brooder and chicks. Early in the season the brooders are placed in the colony houses.

Incubator Experiments.

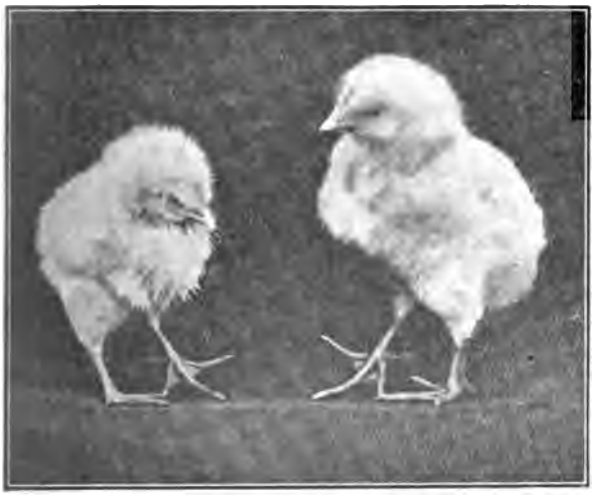
During the past season there has been an unusually large number of incubator-hatched chickens die. The majority of these chickens are troubled with looseness of the bowels, or what is known to poultrymen as white diarrhoea.

The exact causes or conditions which are favorable to the development of this trouble are not known. Nearly every grower has his own views; some say the feed, others the temperature, while others claim the cause is in the lack of ventilation of the incubator room.

During the last week of May and the first week of June Mr. L. H. Baldwin, of Toronto, Mr. F. C. Elford, of the Poultry Division, Department of Agriculture, Ottawa, and myself visited several poultrymen in Ontario and New York State to see if we could locate the cause of the trouble. We found, with one or two exceptions, that where incubators were operated in poorly ventilated rooms the chickens hatched were often affected with

the trouble. This was especially so where there was no outlet for the foul air at or near the bottom of the room. There were a few exceptions to this. In most instances where there was absolutely no smell of coal oil, etc., in the room, or where the air was fresh and pure, good chickens were hatched. There was one notable exception to this at a farm in Quebec.

Experiments were conducted at this department during July, August and September with the object of seeing if our observations were correct. Two machines were run for three hatches in a small room seven feet by eight feet and six and one-half feet high. There was an opening in the ceiling about two feet square which opened into a loft about one hundred and fifty feet long and sixteen feet wide; this in turn had two doors about two and one-half feet square opening to the north, one door situated near each end of the building. This room had a strong odor of coal oil, and the air, especially during the warm weather, was very bad, but was much improved during the cooler weather of September; in fact, the air inside the incubator during the warm weather contained about sixteen parts carbonic acid gas to 10,000 parts of air, while during September there were but eight parts carbonic acid gas in 10,000 parts of air.



After first symptoms of white diarrhœa.

A healthy chick.

A bad case of white diarrhœa.

One incubator was operated in the regular incubator room which is large airy and well ventilated, especially during warm weather when the door and one window is left open constantly. The air inside the machine in this room never had more than seven parts of carbonic acid gas in 10,000 parts air at any time it was tested. There was no smell in the room, and the air appeared to be as pure as that out of doors.

The machines were all of the same make, and of equal capacity; the eggs used were laid by the same pens of hens. The eggs laid each day were divided among the machines as nearly equal as possible.

The machine operated in the pure air hatched slightly more chickens. Some of the chickens developed the trouble, especially the last hatch, in which fully seventy per cent. were effected. The first hatch from the machine in the ill-ventilated room practically all died before they were ten days of age. The second hatch about fifty per cent. developed the

trouble, and the balance never grew well, and were practically useless. The third hatch, or the one coming off in September, were good chickens.

I would not venture to state that feeding, lack of exercise, unevenness of temperature in the brooder, and brooders run in poorly ventilated houses are not causes; in fact, I attribute much of the mortality in the last hatch of chickens from the fresh air room to a lack of exercise when the chicks were small.

The following suggestions are offered to growers of artificially hatched chickens:

1. Operate the machines in a well ventilated room.
2. Run the machine at an even temperature.
3. Induce the chickens to exercise in the *fresh air* from the *first* day of their lives in the brooder.
4. Do not feed sloppy foods.
5. Use eggs from healthy, vigorous stock.
6. Brooders should be kept clean and run at as even a temperature as possible.
7. Avoid running machine in very moist locations.

Scalded milk, boiled rice, and rice water are *at times* excellent preventives of the trouble.

Several chickens were examined in the Bacteriological Laboratory. So far as the test has been conducted the trouble does not appear to be a germ disease.

If the sick chickens are opened the yolk is usually found to be unabsorbed, the caeca are usually clogged, and the liver is frequently very light in color. The yolk in ten-day-old chickens is often nearly as large as when the chicks are hatched.

Further experiments are required on the subject.

NO. 4. NO. 3. NO. 2. NO. 1.

DIFFERENT STYLES OF POULTRY HOUSES SUITABLE FOR AN ORDINARY FARM.

EXPERIMENTAL POULTRY HOUSES.

The following description of these houses is given as in the report of last year:

Various styles of poultry houses have been discussed at length in the poultry press during the past two or three years.

In years gone by it was considered absolutely necessary to have a warm house in order to get eggs in winter. After many years' experience with this kind of house poultrymen have found that they were not all that could

be desired. There was a tendency for the air in the house to become foul, or what is known by some as "stuffy." The walls in many cases were damp, due to the moisture condensing. Some poultrymen have been of the opinion that these houses lessen the general vitality of fowls, and are in a measure the cause of many poor hatches.

In the past three or four years the fresh-air houses have been strongly advocated. Some writers have gone so far as to say that all fowl needs is protection from the wind, and to be kept out of direct draughts, and that the temperature has no influence at all upon egg-production. There are also a few who claim that fowls eat no more in a cold house than they do in a warm one. This, of course, appears to be absurd. It is claimed by the advocates of the fresh-air houses that fowls are healthier, more eggs are laid during the winter, and better hatches of stronger chicks are secured during the spring.

With the object of solving some of these problems, there have been constructed at this Department four poultry houses. One of these is what might be termed the "warm house," (Fig. 3), and is built of matched lumber, lined with paper. There is a dead air space between the inside wall and the outside wall. The building is made tight. The plan adopted to do away with the moisture in the inside of the building is the use of straw as a ceiling. This straw is, of course, placed on boards, which are some six inches apart. It is expected that the straw will absorb the moisture and keep the house dry.

Another house is what is known as the "Maine State" house (Fig. 2). This house is practically open to the weather on the front or south side. There are canvas curtains which can be dropped as a protection against wind and snow on stormy days. On other days these canvas curtains are to be kept rolled up, and the fowls allowed to exercise in the fresh air. The ends of the house are single-ply matched lumber; the back wall of the house is matched lumber lined with paper, and is sheeted again on the inside. This is done in order to make a warm roosting coup, which is protected at night in front by canvas curtains.

The third house is known as the "Closed Pen" style (Fig. 1). This house is built much the same as the second house mentioned, but in place of the front side being entirely open to the weather it has adjustable windows; these windows can be opened or closed according to the weather conditions. This house is considered by many poultrymen to be one of the best styles that have been introduced.

The fourth house is one of the extremely airy ones (Fig. 4), being made of boards that are dressed on one side and the cracks battened; about half of the front is open to the weather, but may be closed in on stormy days by large doors. There is not any special protection for the roost, the chickens roosting in this house in exactly the same temperature as they worked in during the day. This house, needless to mention, is much cheaper than the other styles.

We hope to experiment with these houses long enough to be able to give definite information as to which is the most favorable for the production of eggs in winter, also in which house the fowls consume the least feed. We hope also to give sufficient data to state whether the fresh-air houses are more conducive of good health and the production of eggs which hatch large numbers of strong chickens, or whether the warm house is equally as good.

Each house is divided into two pens. In one pen are twenty Buff Orpington females and two males, in the other pen twenty White Wyandotte females and two males. These birds were selected as much alike as possible; that is to say, the same number of hens and pullets of the same strain. were put in each house, also the birds were of the same age. We found much difficulty in getting the pens exactly alike, and were forced to use hens varying in age from one year to three years. We could not get pullets alike, with the exception of those that were hatched late in May and early in June. We would have preferred to use younger hens and more mature pullets.

The pens for 1906 contain many more pullets, hatched during April and May. These should be more satisfactory, as the birds in the pens in 1905 were of so many different ages that to feed them to advantage was difficult owing to the fact that a hen gets over-fat on the food that is required to develop a late hatched pullet.

Notes.

It is not wise to draw definite conclusions from one year's work, hence, I shall deal in a general way as to this year's results.

1. The use of straw over-head was effectual in keeping the houses dry.

2. The coldest house, or the fourth house in the illustration, proved to be the most satisfactory in both the number of eggs produced, the fertility of the eggs, and also in the general health of the birds.

3. The warm house was not very satisfactory. The birds do not appear to be as thrifty, there is not much gloss to the plumage, the egg production was not good, and the strength of the germs in the eggs was poor.

4. There are many points in the second house and the first that are satisfactory. These houses were very much alike in results, and were much better than the third house, but inferior to the fourth house.

5. A record was kept of the minimum temperature in each house. The fourth house went as low as seven degrees below zero. This temperature slightly frosted the combs on the Orpington males. The first and second houses were, respectively, four and three degrees below zero. The third or warm house was 11 degrees above zero.

6. Grass runs at the north of the houses are not equal to runs on the south, especially in the late autumn when the wind blows in one door and out of the opposite.

Fattening Chickens.

We receive a number of inquiries as to how we feed the birds that are being fattened. Most inquirers wish to know the exact amounts fed each day. Below is given a copy of two feeding charts, one with crated birds, the other with birds fed in an ordinary pen.

It will be noticed that we fed very lightly at the beginning—a very important point—and that the amount was gradually increased until such times as the birds refused to eat all that was given them. No feed was left in front of them longer than ten minutes after it was placed in the trough. Any food left after such time was removed.

Whether it is better to fatten birds in crates or pens depends largely upon surrounding conditions and upon who is feeding the birds.

We have had, during the last six years, plenty of opportunities of testing many feeders, and, from careful observations, I think more do better work with crates than when feeding birds in pens.

Crate N.

Ration:—Equal parts of oat meal, corn meal, and barley meal mixed with sour milk.

	Lbs.	Ozs.
Weight at Commencement	53	4
Weight at First Week	55	0
Weight at Second Week	66	4
Weight at Third Week	70	2

Date.	Morning.		Night.	
	Meal.	Milk.	Meal.	Milk.
	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.
Oct. 17	12	1 8	12	1 10
" 18	14	1 8	12	1 8
" 19	1 0	1 12	1 0	1 12
" 20	1 2	2 2	1 2	2 4
" 21	1 4	2 8	1 4	2 8
" 22	1 6	2 12	1 6	2 12
" 23	14	1 12	1 8	3 0
" 24	1 10	3 0	1 12	3 4
" 25	2 0	4 0	2 0	4 0
" 26	2 5	4 8	2 8	4 8
" 27	2 0	4 0	2 0	4 0
" 28	2 8	4 8	2 12	5 0
" 29	2 8	4 8	2 8	4 8
" 30	1 4	2 8	2 12	5 0
" 31	2 0	3 8	2 0	3 8
Nov. 1	2 4	4 0	2 8	4 8
" 2	2 0	3 8	2 4	4 0
" 3	2 4	4 0	2 4	4 0
" 4	1 12	3 8	1 12	3 8
" 5	1 12	3 8	1 12	3 8
" 6	1 12	3 8	....	....

The following are the individual weights of each bird for the three weeks' feeding in Crate N.

Ration: ⅓ oatmeal, ⅓ cornmeal, ⅓ barley meal.

Breed.	Com.	1st week.	2nd week.	3rd week.
	lbs.	lbs.	lbs.	lbs.
1. Wyandotte cockerel	3¾	4	4¼	4¾
2. Wyandotte cockerel	4¾	5	5¾	6
3. Wyandotte cockerel	4¼	4¼	5	5¼
4. Wyandotte cockerel	3½	3¾	4½	4¾
5. Wyandotte cockerel	5	5¼	6¼	6¾
6. Wyandotte cockerel	4¼	4¼	5¼	5¾
7. Wyandotte cockerel	5¼	5¼	6¼	7
8. Wyandotte cockerel	5	4¾	5¾	6
9. Buff Orpington cockerel	4¼	4¼	5¾	6
10. Buff Orpington cockerel	4½	4¾	5¼	6
11. Buff Orpington cockerel	4	4¼	5¼	6
12. Barred Rock cockerel	4¾	5	6	6¼

Brooder House Pen 7 x 12 ft.

Ration:—Equal parts oatmeal, barley meal, and corn meal mixed with sour milk.

	Lbs.	Ozs.
Weight at Commencement	54	4
Weight at First Week	55	0
Weight at Second Week	62¾	..
Weight at Third Week	71¼	..

Date.	Morning.		Night.	
	Meal.	Milk.	Meal.	Milk.
	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.
Oct. 17	12	1 8	12	1 10
" 19	14	1 8	12	1 8
" 20	1 0	1 12	1 0	1 12
" 21	1 2	2 2	1 2	2 4
" 22	1 4	2 8	1 4	2 8
" 23	1 6	2 12	1 6	2 12
" 24	14	1 12	1 8	3 0
" 25	1 10	3 0	1 12	3 4
" 26	2 0	4 0	2 0	4 0
" 27	2 8	4 8	2 8	4 8
" 28	2 0	4 0	2 0	4 0
" 29	2 8	4 8	2 12	5 0
" 30	2 8	4 8	2 4	4 0
" 31	1 4	2 8	2 12	5 0
Nov. 1	2 0	3 8	2 0	3 8
" 2	2 4	4 0	2 8	4 8
" 3	2 0	3 8	2 4	4 0
" 4	2 4	4 0	2 0	3 8
" 5	1 12	3 8	1 12	3 8
" 6	1 12	3 8	1 12	3 8
" 7	1 12	3 8	....	....

The following are the individual weights of each bird in the Brooder House Pen, 7 x 12 ft.

Ration : ⅓ oatmeal, ⅓ barley meal, ⅓ cornmeal.

Breed of chicken.	Com.	1st week.	2nd week.	3rd week.
	lbs.	lbs.	lbs.	lbs.
1. Wyandotte cockerel	4	4	4¼	5¼
2. Wyandotte cockerel	4¾	4¾	5¾	6¼
3. Wyandotte cockerel	5	4¼	5	6
4. Wyandotte cockerel	5¼	5¼	6	6¾
5. Wyandotte cockerel	5¼	5	5¾	6¼
6. Wyandotte cockerel	4	4¼	5	5¼
7. Barred Rock cockerel	4½	4½	5	5¼
8. Wyandotte cockerel	4	4½	5¼	6
9. Buff Orpington cockerel	4¼	4½	5¼	5¾
10. Buff Orpington cockerel	4½	4¾	5¼	6¼
11. Buff Orpington cockerel	4¼	4¼	4¾	5¾
12. Buff Orpington cockerel	4½	4¾	5¼	6

Rations.	Number of birds.	Date of feeding.	Weight at beginning of experiment.	Weight at end of first week's feeding.	Weight at end of second week's feeding.	Weight at end of third week's feeding.	Pounds of grain consumed.	Pounds of grain to make one pound of gain.	Pounds of milk or milk substitute.	Cost of milk or milk substitute.	Cost of grain.	Total cost.	Cost of one pound of gain.
			lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs.	lbs. oz.	cts.	cts.	cts.	cts.
Equal parts of shorts, oatmeal, cornmeal, and sweet skim milk .....$1.15 per cwt.	12	Aug. 26	38 0	42 8	46 12	50 12	48 4	3.8	64 4	6.4 10c. per 100 lbs.	55.48	62.32	4.88
Equal parts of barleymeal, cornmeal, shorts, and sweet skim milk .....$1.15 per cwt.	12	Oct. 7	54 0	59 4	63 8	69 4	68 0	4.46	126 12	12.67	78.2	90.87	5.95+
Equal parts barleymeal, oatmeal, cornmeal, and sweet skim milk...	12	Oct. 22	55 8	56 0	66 8	.....	43 0	3.9+	76 0	7.6	49.45	57.05	5.2—
Equal parts of shorts, cornmeal, and oatmeal mixed with sour skim milk	12	Aug. 26	37 12	43 12	47 3	50 3	44 12	3.6	74 0	7.4	51.46	58.86	4.7+
Equal parts of shorts, cornmeal and oatmeal mixed with sour skim milk	12	Aug. 30	48 4	53 8	61 0	67 0	62 8	3.3	100 0	10	71.875	81.875	4.36
Equal parts of shorts, cornmeal and oatmeal mixed with sour skim milk	12	Sept. 5	40 0	48 8	53 8	58 12	62 12	3.34	103 8	10.35	72.16	82.5	4.4
Equal parts of shorts, cornmeal and oatmeal mixed with sour skim milk.....	12	Sept. 23	48 4	49 4	56 12	66 8	62 8	3.38	112 0	11.2	71.875	83.775	4.49—
Equal parts of cornmeal, barleymeal and oatmeal mixed with sour skim milk.....	12	Oct. 22	48 8	49 12	60 4	.....	42 14	3.65	75 8	7.5	49.3	56.8	4.8

Rations.	Number of birds.	Date of feeding.	Weight at beginning of experiment.	Weight at end of first week's feeding.	Weight at end of second week's feeding.	Weight at end of third week's feeding.	Pounds of grain consumed.	Pounds of grain to make one pound of gain.	Pounds of milk or milk substitute.	Cost of milk or milk substitute.	Cost of grain.	Total cost.	Cost of one pound of gain.
			lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs.	lbs. oz.	cts.	cts.	cts.	c
Equal parts cornmeal, oatmeal and shorts mixed with whey	12	Sept. 30	46 8	52 4	56 12	63 4	59 8	3.55	86 8	3.46	68.425	71.885	4.
Equal parts shorts, oatmeal and cornmeal mixed with whey	12	Sept. 23	50 12	50 12	55 12	64 0	63 14	4.8	106 14	4.275	73.45	77.73	4.8
Equal parts barleymeal, cornmeal and oatmeal mixed with whey	12	Oct. 22	50 12	51 8	60 12	.....	43 12	4.375	72 4	3.05	50.31	53.36	5.33
Equal parts barleymeal, cornmeal and oatmeal mixed with whey	12	Nov. 9	53 4	60 8	64 0	.....	41 5	3.846	71 4	2.85	47.5	50.35	4.68
Equal parts shorts, cornmeal and oatmeal, and 10 per cent. pork scrap mixed with whey	12	Oct. 7	53 0	58 0	62 4	68 4	55 9	3.65	5.57 lbs. pork scrap, 121 lbs. whey	16.58	64.	80.58	5.2+
Equal parts barleymeal, cornmeal and oatmeal, and 10 per cent. pork scrap mixed with whey	12	Oct. 22	54 8	54 8	64 0	.....	39 8	4.16	3.95 lbs. pork scrap, 74 lbs. whey	10.86	45.48	56.34	5.9+
Equal parts cornmeal, shorts and oatmeal, 30 per cent. pork scrap, mixed with water	12	Sept. 30	54 12	61 0	68 12	.....	48 8	3.46	Pork scrap 14.53 lbs.	29.06	55.7	84.76	6
Equal parts cornmeal, barleymeal and oatmeal, 25 per cent. pork scrap, mixed with water	12	Oct. 22	54 8	54 12	65 12	.....	34 4	3+	Pork scrap 8.625 lbs.	17.25	39.675	56.925	5+
Equal parts shorts, cornmeal and oatmeal, 25 per cent. beef scrap, mixed with water	12	Oct. 25	52 8	59 12	68 4	.....	39 6	2.5	Beef scrap 9.9 lbs.	29.7	45.54	75.24	4.77
Equal parts shorts, cornmeal and oatmeal, 25 per cent. beef scrap, mixed with water	12	Oct. 25	59 0	63 8	71 8	.....	39 4	3.15	Beef scrap 9.85 lbs.	29.55	45.31	74.86	5.98
Equal parts cornmeal, oatmeal and barleymeal mixed with water	12	Nov. 12	61 0	64 0	65 0	.....	42 15	10.73	.....	.....	.....	49.36	12.34

Testing Rations.

For a number of years we have been testing grain mixtures wet with skim milk, and grain mixtures containing various animal meals wet with water. We have been trying to find a feed equal to milk for fattening chickens. In this year's tests we have, in addition to the above foods, tested whey. The whey was taken from an out-door tank, and would be a fair sample. All grains are figured at $1.15 per hundred.

Skim milk at 10 cents per hundred.
Whey at 4 cents per hundred.
Beef Scrap at 3 cents per pound.
Pork Scrap at 2 cents per pound.
The foregoing table gives the results of this season's tests.

Notes on the Above Table.

Sour skim milk, i. e., milk that is thickened, is without doubt, the best liquid to mix with grain rations where a uniform product is wanted, and more so where white fleshed chickens are in demand.

Sweet skim milk has not a feeding value for grown chickens equal to sour milk

Whey is a better food than is generally considered. The results appear to indicate that it aids digestion.

Whey and pork scrap have not given the results expected, and I would not recommend this combination.

Where pork scrap and beef scrap can be procured at reasonable cost, say two cents or less per pound, they are good value, especially where a yellowish flesh is in demand.

Grain mixtures only, mixed with water, are not economical considering this test.

Respectfully submitted.

W. R. GRAHAM.

PART XV.

REPORT OF THE LECTURER IN APICULTURE.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to submit herewith my Annual Report in Apiculture.

The usual instruction was given to the students of the First Year, and the following experiments were made:

1. Simmins in his work "A Modern Bee Farm" advocates and explains a non-swarming system of keeping bees, that was highly commended by Cheshire.

In brief, the plan is: Only young queens are kept; besides supers large hives are used with brood combs running across or at right angles to the entrance. The first four or five frames from the entrance contain starters only, and on no account are full sized combs allowed there, the frames being removed as fast as the combs are built to any size, and their place supplied with frames and starters. The rest of the brood chamber is filled with enough ordinary brood combs to keep the queen supplied with enough room for brood. The inference is that a colony (the queen being young)

will not swarm when the parent colony cannot be easily protected against robbing, and a colony cannot be easily defended when there is a large empty space at the entrance of a hive, as is the case when the first four or five frames contain starters merely and not combs.

I set aside in the middle of June four colonies containing queens one year old, and one colony with a queen hatched but a month before. These colonies with their brood were placed in hives containing twelve brood combs and five frames with starters near the entrance. The entrance was 60 sq. inches in area. On top of each hive was a queen excluder and a super containing fourteen extracting combs.

All five colonies swarmed. It must be said, however, that swarming was abnormally frequent this last summer.

2. A method of taking comb and extracted honey at the same time in the extracting super, thus curtailing swarming and getting over the reluctance of colonies to going up into the comb supers, was described in this year's "Gleanings," page 594, and many references to this plan have been made since.

Six colonies were set aside, in order to test this method. In the middle of each extracting super were placed two section holders containing two tiers of four sections, containing full sheets of foundation. The remaining space in the super was filled up with five extracting combs. In three hives there were no separators and in the other three, the sections were divided from each other and from the extracting combs by separators.

The honey flow was exremely good. Where there were no separators some sections were not touched at all, the sections and combs on either side of them being built out into these sections. Those sections that were built out unduly were apparently nearly two and a half inches thick in the middle and were badly filled at the edges. The bees were very slow in working on the sections, doing so only when they had filled the extracting combs.

In those hives where separators were used, the bees did not work on the sections until the extracting combs were full. This was true in a little less degree with another colony whose sections contained comb drawn out the previous season. The sections were not well filled. There were no first-class sections and only half could be called second class. To force the bees into the sections the hives became honey bound when the extracting combs were filled. The six colonies swarmed.

3. A great many attempts have been made to improve the appearance of travel stained comb honey, such as, bleaching by sulphur fumes, without any great success.

I had hopes that a very thin coating of wax applied to the surface of dirty comb honey would improve its appearance. I tried painting hot wax with a varnish brush upon comb honey, but the wax, instead of leaving an equal coat upon all the indentations of the cappings filled up the hollows and left a smooth surface, which also looked mussy and more unmarketable, but it certainly did cover up the travel stains.

Respectfully submitted,

H. R. ROWSOME.

PART XVI.

THE DIRECTOR OF HOME ECONOMICS.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit to you my second annual report on the work of the Home Economics Department for the year 1905.

THE YEAR'S WORK.

The Home Economics Department has been entirely occupied during the past year with the instruction of students. Two main objects have been held in view—the one, by means of the Homemaker Course, Short Course in Domestic Science and Optional Courses to help the young women of our country in their business of homemaking, as the College is helping the young men in the business of farming; the other is to further the interests of Canadian homes by training teachers in the Normal Course, that they may develop and deepen our school girls' interest in the work and problems of their homes. An effort is also being made to provide an adequate Housekeeper Course for women who desire training for professional housekeeping.

THE COURSES OF STUDY.

The different courses are fairly well outlined in the Institute Calendar and in my first report. It will therefore be unnecessary to specify each subject studied.

1. *The Normal Course* continues two years. The Junior class devotes its time chiefly to acquiring accurate and practical knowledge of household affairs, to the study of elementary chemistry and physiology, psychology, history of education, and general methods of teaching.

Seventeen students entered this class in September, 1904. Sixteen passed the examinations last June, and fifteen are now in attendance as Senior Normal students. Twelve students entered the Junior Normal class last September.

The Senior Normal class studies further science work and household affairs, but the major portion of their time is devoted to careful study of the problems of teaching Domestic Science and to the observation and practice of teaching. Each student is required to plan and give three demonstration lectures in Cookery, and to observe and report on many others. Each is required to observe and report on many domestic science lessons taught to public school classes, and must also teach a certain number of public school lessons. This class is fortunate in having actual public and high school classes to teach, and also in being permitted to observe the domestic science teaching which is carried on in the Macdonald Consolidated School and in the Guelph Central School. The practice-teaching is carefully supervised,

and is probably the most valuable part of the Normal students' training. Last year we had for this, four classes from Guelph public schools, but we felt more were needed, so this year two additional classes from the high school have been arranged for. Eight students passed to class in September, 1904; seven passed the final examinations in June, 1905, and have received the Macdonald Institute Teacher's Certificate in Domestic Science. Fifteen students entered the class last September.

At the request of Principal Pakenham, five students of the Toronto Technical School, who passed its Junior Normal examinations, were admitted to this class in September, 1904. Three passed the final examinations and received the Institute Teacher's Certificate in Domestic Science.

Certain experienced public school teachers are admitted to the Senior Normal class. They are given credit for previous science and methods work, and their classes arranged to allow them to make up the remaining Junior year subjects. They are called One-year Normal students, and their course is a heavy one. For experienced public school teachers who have studied elementary chemistry, and have had a good deal of practical experience in household affairs, the course is very satisfactory. Many of our best Domestic Science teachers are of this class, but a large measure of their success is due to the home training which opened their eyes to the difficulties and the resources of the homemaker. The teacher who has spent most of her life between school and the teacher's desk, is apt to find one year much too short a time in which to gain the necessary practical experience. We would not unduly discourage applicants for this course, but they should be warned of possible disappointment. Seven teachers entered this class in September, 1904. All passed the final examinations, and secured the Institute Teacher's Certificate in Domestic Science. The Normal course instruction and practice-teaching available limits the number of Normal students, and we found ourselves unable to accept all the applications for this one-year course, which opened last September. Eight were chosen, and form an exceptionally strong class.

Every effort is made to train each Normal student to study the problems of her chosen work, to use the subject as a means of developing intellectual power in children, and to teach good elementary Domestic Science.

2. *The Homemaker Course* continues one year, but may be broadened and extended over two years. It is planned for girls who look forward to living at home and desire to be well equipped for the homemaker's duties. It is especially planned for girls who have had little experience in practical household affairs. From the very nature of the work, the homemaker is thrown largely upon her own resources, and should be capable of dealing intelligently with difficulties as they arise. One short year will not transform the girl just out of her teens into an expert housekeeper, or develop abnormal wisdom, but the earnest girls certainly benefit greatly. Older students also find the systematic study of familiar things very profitable. We try to give the girls, by means of many lessons and much individual practice work, a good elementary knowledge of the different branches of ordinary household work: to develop their interest in some of the housekeeper's administrative problems; and above all to induce them to think about the greater questions of sound bodies, wholesome dwellings and real homes. The average student in this class is inexperienced in the ordinary work of a household. We therefore try to teach them the best methods and processes of elementary sewing, laundry, cookery, housework, etc., and each student is required to do a great deal of practical work. The required sewing work includes plain sewing, undergarment and shirt waist making, but students proficient in any or all of them before entrance are permitted to substitute a more advanced sewing

class, or another optional subject. The lecture work on Sanitation, Foods, Household Administration, and Home Ethics has been strengthened, and the interest in them is steadily increasing. After a certain amount of instruction in the class rooms, each student is required to keep house in the Apartment for one week. She enters and works with her predecessor one whole day before assuming full responsibility. She is given a certain sum of money and is expected to do the marketing, to cook, and serve the meals for two people who live in the apartment, to wash the dishes and keep the rooms clean, and finally to render account of the expenditure. This was begun first as an experiment, but gives the girls such valuable training and satisfactory practice in household administration that it has become a permanent feature of their work.

We have been trying to develop a lecture course which should lead to a keener appreciation of the beauty in the world about us, and also lead to the application of the laws of beauty to clothing and to furniture and decoration of our homes. Some lectures have been given in connection with the sewing classes and we are convinced that the influence of a strong course of lectures aided by much illustrative material, will be far reaching, and is needed to round out our Homemaker course.

It may be necessary to explain that no attempt is made to teach fancy cookery or elaborate processes in any branch of work, but every effort is made to give each girl a thorough foundation which she may develop into skill in her own home.

It is gratifying to report the rapid extension of this work. The course mapped out is still largely experimental, but each year should find it fitting more closely the needs of the young Homemaker. Perhaps in the near future it will develop into a two year course leading to the Associate Diploma of the College.

Sixteen entered this class in September, 1904. Eight passed the final examinations and received the Institute diploma in Domestic Science. The present class numbers twenty-five, one of whom is taking additional work and spreading it over two years.

3. *The Short Course* in Domestic Science, continues three months and is an abbreviation of the Homemaker course. The work is chiefly practical, is thorough as far as it goes, and is proving very popular. No examinations are held in connection with this course, but the students taking it have done faithful work. A steadily increasing number come from country homes: they appreciate the value of the money expended and come prepared to make the most of the opportunities of the College. Many of them would take the long course, but cannot be spared long enough from home. Some cannot be away from home during the busy autumn and spring months. So many of these came for the last winter course that we were obliged to open a second class, and shall have to do it again this winter. Each student is allowed to choose one optional subject in addition to the required work, and she usually finds something to her taste in varied list of Sewing, Millinery, English, Horticulture, Dairying, Poultry Raising, Woodcarving, etc.

There were in attendance this year:

Winter term—January to March	36
Spring term—April to June	17
Autumn term—September to December	18

The Autumn class would have been larger but for the withdrawal of several accepted applicants when they found they would have to board in Guelph, as every room in Macdonald Hall was occupied.

4. *The Housekeeper Course* continues two years. The first one opened was a course of non-professional training which included the Science work

of the Normal course, and extended the practical work of the present Homemaker course. Many members of the class entered in order to secure training for positions as matrons or Institute housekeepers. Five members of the class completed the course last June, and received the Institute Diploma in Domestic Science. As four of the five desired professional training, we arranged last winter and spring a series of special lectures on Institutional Housekeeping by Miss Kennedy, the housekeeper of Macdonald Hall. She gave them every opportunity to investigate the working of Macdonald Hall, and as much special practice as possible. The lecture series was not completed, but the few given were valuable. The special practice consisted of the Institute marketing, taking charge of the stock room, and actual service in the dining room, and kitchens of Macdonald Hall. Upon the resignation of Miss Kennedy, one of the graduates of this class, Miss Tennant, was appointed housekeeper of Macdonald Hall, and is giving excellent service.

The above two year non-professional course has been replaced by the present Homemaker course, which has been described, and the present professional Housekeeper course, which opened in September, 1904, with a class of four members. Students entering this class must be mature women, who have already had a good deal of housekeeping experience, and are possessed of executive ability. They are required to take the same science and practical work as the Normal students, but instead of studying school equipments and methods of teaching, they study large kitchen equipments and methods of administration for large buildings, such as our own residences for men and for women. Four students entered the Junior class in September, 1904, and three are continuing in this year's Senior class. Each in turn is required to take charge of all requisitions for supplies, the marketing, and stockroom, doing most of the clerical work in connection with them. They will be required to supervise the apartment housekeepers, and to investigate, with Miss Tennant's assistance, the working of Macdonald Hall. Part of this investigation will consist of becoming a dining-room maid, a house-maid, and a kitchen-maid, for a short time in order to gain accurate and intimate knowledge of the duties and difficulties of each position. The present course is the outcome of a demand both from students, and institutions, and we hope that each year will see it greatly improved. Judging from the letters we receive asking us to recommend housekeepers, there are many institutions in need of well trained women.

5. *Optional Courses* are made up of subjects chosen from the regular courses or from the list of optional subjects. The number of optional students has greatly diminished, owing to the rule that optional students could not be sure of securing room in Macdonald Hall until the opening day of the term. As several regular course students could not be taken into the Hall this term, we have at present few optional students, and most of them are Guelph girls living at home. In the past year several optional students have taken full time work for two or more terms, some have taken partial time work for one or more courses, and many have taken but one or two subjects. There were in the winter term, twenty optional students; in the spring term, eight; and the autumn term, eight.

Optional Subjects.

The optional classes are Millinery, Dressmaking, Shirtwaists, Undergarments, Woodcarving, Horticulture, Poultry Raising, Home Dairying, and English Literature, but may of the regular course subjects may be chosen.

In the beginning the sewing classes were most popular, but interest in the others is growing steadily. The very satisfactory course in flower and vegetable culture, provided for us by the Horticulture Department, secures a class each term; there are always a few in woodcarving classes; and we have this term a small but enthusiastic poultry class. The English option was offered for the first time this term, by Professor Reynolds, and a large class is in attendance.

Special Lectures.

The series of lectures on Home Ethics last winter was not completed, owing to the serious illness of the lecturer, Mrs. Hoodless, but are being given this term, and will continue through the next.

The following series of special lectures on marketing was carried out with great success:—

Poultry and Eggs, Mr. Graham; Meat, Professor Day; Milk, Professor Dean; Cereals, Professor Harcourt; Fresh Vegetables, Professor Zavitz; Canned Food, Professor Harrison; Fruit, Professor Hutt.

Recipients of the Teacher's Certificate in Domestic Science.

A. Graduates of the Two-year Normal Course:

1. Bell, Adna Mary .....Tavistock, Ontario.
2. Culham, Lorna C. .....Hamilton, Ontario.
3. Deike, Hilda .....Guelph, Ontario.
4. Ferguson, Edna M. .....Stratford, Ontario.
5. Howitt, Felicia .....Guelph, Ontario.
6. McCrimmon, Rachel .....Vankleek Hill, Ontario.
7. Powell, Muriel .....Guelph, Ontario.

B. Graduates of the One-year Normal Course:

1. Armstrong, Mildred K. .....Mitchell, Ontario.
2. Berry, Elizabeth .....Mildmay, Ontario.
3. Johnston, Margaret .....Islington, Ontario.
4. Kent, Charlotte G. .....Toronto, Ontario.
5. Livens, Mae M. .....Seaforth, Ontario.
6. Rath, Martha .....South Augusta, Ontario.
7. Ross, Lottie Louis .....Ross Corner, P. E. I.
8. Sheffield, Lillian .....Toronto, Ontario.
9. Smillie, Agnes E. .....Bluevale, Ontario.
10. Williamson, Frankie G. E....Burlington, Ontario.

Recipients of the Non-Professional Diplomas in Domestic Science.

A. Graduates of the Two-year Housekeeper Course:

1. Allan, Jean G. .....Hamilton, Ontario.
2. Harcourt, Nellie .....Guelph, Ontario.
3. McCallum, Jessie .....Guelph, Ontario.
4. McPhee, Jean .....Vankleek Hill, Ontario.
5. Tennant, Ethel.....Toronto, Ontario.

B. Graduates of the One-year Housekeeper Course:

1. Brown, Isabelle .....Woodstock, Ontario.
2. Butchart, Agnes .....Guelph, Ontario.
3. McIntosh, Katie F. .....Arkona, Ontario.

4. Monk, Helen .....Montreal, Quebec.
5. Powell, Winnifred .....Guelph, Ontario.
6. Shand, Sarah .....Port Dover, Ontario.
7. Watson, Bertha E.....Eden Mills, Ontario.
8. Watt, Marion I. .....Brantford, Ontario.

Summary of Attendance.

January to June, completing the College Year of 1904-1905.

Senior Normal students:	
Enrolled September, 1903	8
Enrolled September, 1904	12
Junior Normal students	17
Senior Housekeeper students	5
Junior Housekeeper students	4
One Year Housekeeper students	17
Short course in Domestic Science:	
Winter term students	36
Spring term students	17
Optional students	28
Public School classes	91

September to December, opening the College Year of 1905-1906

Senior Normal students:	
Enrolled in 1904	15
Enrolled in 1905	8
Junior Normal students	12
Senior Housekeeper students	3
Junior Housekeeper students	5
Homemaker students	25
Short Course in Domestic Science	18
Optional students	8
Public School classes	105
	434
Students counted in both of above lists:	
In two-year courses	18
Short Course students of last spring now in Homemaker Course	2
Optional students	3
Public Schools classes, about	45
	68
Total number of students during 1905	366

Staff Changes.

Two members of the staff resigned last June, Miss Pierce, who had charge of the normal methods work, and Miss Robarts, who had charge of the advanced sewing work.

No Canadian School is training teachers for the work expected of our normal methods teachers, and no Canadian trained in other schools was available. We found it difficult to secure any one, but finally Miss Grace

Greenwood, an experienced teacher and a graduate of Teachers' College, Columbia University was engaged. She began work in September and is doing excellent work. Miss Muriel Speller, a Canadian and recent graduate in Domestic Art of Pratt Institute, Brooklyn, is now in charge of the sewing classes.

Miss Holland, one of the Domestic Science instructors, seeks leave of absence for three months on account of ill-health, and a substitute will have to be provided in January.

Equipment.

Our equipment in many respects is excellent, but in others is inadequate. We are greatly in need of pictures, charts, and other illustrative material for use in the Domestic Art branches. We have added a number of books to the library, but more should be added next year.

Many visitors inspect our class-kitchens, and they frequently remark that such an equipment is impossible in country or village schools, where gas and plumbing are out of the question. I would therefore suggest that after the Manual Training Department moves to its new building, one of the rooms left vacant be fitted up with movable tables, etc., and an effort made to work out a suitable equipment for small schools.

If the attendance in this department increases, the most urgent necessity will be another instructor, as the present staff has its time very fully occupied.

The majority of the students have worked faithfully and enthusiastically. We have been glad to find the number of students from country homes increasing each term. Altogether this year we have had nearly seventy.

Believing that a woman's best field of work is in her own home, we are also glad to know that many of our students go out with that prospect in the near future.

In conclusion, I wish to express my appreciation of the generous assistance given me by yourself and many members of the College staff.

Respectfully submitted,

MARY URIE WATSON.

PART XVII.

THE PROFESSOR OF MANUAL TRAINING.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith my second annual report on the Manual Training Department of the College, for the year ending December 31st, 1905.

The work of this department may be conveniently arranged into four divisions, each differing in its aim and direction.

1. A course for agricultural students in woodworking, attended by 88 first year, and in metal working, by 59 second year students.

2. A normal course attended by 12 students.

3. A correlated course for nature study students, attended by 74 students.

4. Optional courses in woorkcarving, art metal work, basketry, etc., attended by 28 students.

The staff of the Department has been strengthened by the appointment of Mr. E. W. Kendall, who brings large and varied experience to our aid gained in the schools of Ottawa, Chicago, and at the Institute of Technology, Boston, U.S.A. He entered on his duties on the 2nd of October.

1. AGRICULTURAL STUDENTS. My first report gave in a general way, the character, scope, and aims of this department. We attempt to lay a general foundation of practical industrial knowledge in its most rudimentary and primary form, and of such a character as will best serve the purpose of the students attending the various courses. The traditional method of education which has hitherto been practised in our schools and colleges and considered efficient and satisfactory does not meet the requirements of this very practical age which demands methods of instruction bearing more directly upon work-a-day life. Education must keep pace with the material progress of the nation, and the up-to-date school or college no longer reaps in its field with the rude sickle of pioneering days, but aims to send into the world able men of matured intelligence and ripened powers, good for all the vocations of life, and prepared to enter upon its duties with sound bodies, developed ability, and formed character. This department originated in the desire to give our young men such a training as would not only enable each individual in his own special occupation to know more thoroughly the fundamental principles of his calling, to wield more adroitly its special weapons, and be able to apply more skilfully its refined artifices, but to achieve more quickly, proficiently and economically the aims of his life whether it be agricultural, professional or commercial. It is organized so that combined with the other departments of the College it gives the students a general knowledge of what constitutes the bases of technical training.

The new building now in course of erection will be largely devoted to this kind of instruction and will supply much needed accommodation for carrying on operations of detaching, erecting, and adjusting various farm machinery and implements, for studying their construction, slinging and lifting and for workshop practice in wood and metal. With the inauguration of this new department, the College offers the most practical instruction in agriculture and will maintain its unique distinction and its world-wide reputation as the foremost institution of agricultural education on this continent. To avoid the formation of erroneous conclusion it must be stated at the outset that our courses as briefly outlined here are a general type

and not a specified form, believing that freedom, but no laxity, is an important educational factor in developing self-reliance and character which a hard and fast course could not possibly cultivate. It is not infrequently asserted that Manual Training is not mental training, but simply the development of skill in the use of tools and implements. This assertion is bad common sense and worse psychology, for Manual Training is a mental training through the hand and eye, just as the study of Greek or History is mental training through memory and other powers. It is now pretty generally conceded, even by the most sceptical, that manual activity based on educational lines is essential to mental growth. As the seat of the sense of touch and the more delicate phases of the muscular sense, the hand is man's chief means by which he is enabled to judge and compare the data of experience, and sense-perception can be lifted into ideas only with the aid of manual activity in work. This is emphasized during the formative period of life. Nature's law is that of correlating mind and body in the process of knowledge-getting and mind-building. This is the first distinct, valuable and far reaching correlation in education. If we look out on the world, we must see that it has become what it is because of this profound principle of correlation. No other conculsion is possible. Society was not created as it is; it has been made. Mind was not created as it is; it was built. "We build the ladder by which we rise" applies to mind as well as to character. Brain and hand have worked parallel in co-operation for building of self and for the making of society. The effects of hand are seen in the structure of society and its history as much as are the effects of brain, so that there is no issue out of the difficulty unless scientific education and manual handiwork are combined together. There is, so to say, a philosophy of all possible machinery. Each machine, however complicated, can be reduced to a few simple elements—plates, discs, cylinders, etc.—and its movements, however complicated, may be decomposed into a few modifications of motion, such as the transformation of circular motion into a rectilinear and the like, with a number of intermediate links or contrivances. The thousands of tools used in the arts and crafts are but modifications of a few simple elements. They differ in degree more than in kind, and in the extent to which different kinds of tools are embodied into the same complete machine. The universal tools are scarcely more than half a dozen in number—the axe, saw, plane, square, hammer, file. Just as there are in science some notions and methods which are preparatory to the study of all sciences, so there are also some fundamental notions and methods preparatory to the special study of any handicraft. Each handicraft can be reduced to a number of elements as simple and as like each other as the elements of all sciences are simple and like each other, and without teaching any one particular trade we can impart the essential mechanical principles of all. It seems reasonable, then, to ask why hand skill should not precede trade training as much as mental training a literary or a scientific career. Is it, therefore, of any use to the young farmer or not to know something of the mechanical construction of a gate; its balance on its hinges; the mechanical action on the gate post? Should he understand the true mechanical principles on which a good plow is made and worked, as distinguished from a bad one?—a good cart or a good steam thresher? Ought he to know how to select the right grain in, and kind of wood for, a fork handle or a butter print? Would it be an advantage to him to know how to forge a bolt and thread it? We conclude, then, that in connection with the many sciences he has to learn, the farmer will be the better throughout life for knowing, than for not knowing these "nearly nothings" which can be learned in the workshop only; and none but he who knows the

machine, not in its drawings and models only, but in its breathing and throbbings, can really get the best out of it, or, improve it. We may, therefore, safely say that the young farmer had better learn something of this technical knowledge which would render his talents more directly useful to the society in which he is destined to pass his life, for the aim of our national life should be to do the work of the world better, more ably, more honestly, more skilfully and less wastefully than those of other countries. To the national welfare of success, it is necessary that the young race of men who are to do the work should have passed through a better training than their fathers, and possess superior skill to the youth of other nations.

The following is a brief outline of the course:—

First Year Shopwork—Wood. This course comprises mechanical and freehand drawing—sketching of parts of machinery, implements, joints, and simple objects. Geometric figures and problems; isometric projections; working drawings of objects made—lettering.

Benchwork—The use, care, sharpening, grinding and adjustment of the jack, smoothing, block and jointer planes; chisels, gouges, brace and bits; saws—rip, cross cut, tenon, and turning.

Joints—their construction and application.

Timber—its preservation, principal varieties of wood, and their leading uses.

Second Year Shopwork—Metal. Forging—the forge, the fire, the heat, height, and position of anvil. Tools—hammer, chisel, fuller, and swedge, their care and use. Making of simple objects containing drawing, welding, bending, forming, twisting—gate hook, spike, ring, staples, welded eye, etc.

Hardening and tempering steel—cold chisel—chipping, filing, fitting, thread cutting,, bolts and nuts, hinges, latches, and snecks or catches.

Sheet metal—soldering, forming, wiring, riveting—funnel, tin cup, etc.

Practice in detaching all parts of farm machinery and implements; assembling and fixing the parts, testing and getting machines into working order.

2. Normal Course. This course is arranged to give teachers, holding at least a second-class certificate from the Normal Schools, desirous to become teachers of Manual Training, adequate instruction in the various subjects comprised in the term "Manual Training". Its object is to familiarize the students as far as possible with materials, tools, and processes commonly used in the mechanical arts. It is not intended to impart skill, which can only be acquired by extended practical experience, but to provide a medium of expression in the form of constructive work, and to call into use ethical influences that bring a sense of enhanced value to the worker with the result that he feels he contributes something to the life around him. In connection with this course of study, a very large and varied field of work has to be covered, and much inconvenience is experienced from lack of storage room for the various materials used, cupboards and drawers for drawings and finished work. This much needed accommodation involves valuable time fritted away and considerable dissipation of energy expended in arranging and transferring material from room to room as different subjects are taken up day by day. We are, however, patiently awaiting the completion of the new building to end most of our vexations due to inadequate space and cupboards, and to render working conditions more felicitous and agreeable. This course is divided into—

Primary Construction work, which includes paper folding, cutting and mounting, clay modelling, thin and thick cardboard work, basketry.

Art—crayon, blob, black and white, and water color. This branch is usually taken during the fall term.

Woodworking, practical plane and solid geometry, drafting of working drawings, construction and constructive design.

Tools, their construction, care, use, and sharpening.

Timber, its structure, growth, diseases, seasoning, etc.

Theory and Practice of Manual Training.

Thesis on a given subject, taken in the Winter term.

Metal working—materials, tools, and processes. Common workshop materials—cast and malleable cast iron, wrought iron and steel, copper and brass, zinc, tin, and lead.

Tools, Machines, etc. The ordinary tools—hammer, files, callipers, chisels, fuller, swedge, the forge, the fire, the heat, etc. The lathe—chuck and chucking; centres and centring; drills and drilling, carriers, adjusting the lathe, hand turning, turning irregular forms, screw cutting, boring.

Sheet metal work. Processes—(a) without heat, chipping, filing, riveting, drifting, planishing, burnishing, bending, straightening wire, tapping and threading, surfacing, seaming, grooving, repousse work. (b) Aided by heat—drawing out, bending, forming, twisting, scarfing, welding, upsetting, brazing, annealing, hardening, and tempering. (c) By surface fusion —soft soldering with copper bit, bunsen burner, blowpipe, silver soldering. The uses of fluxes—tallow, resin, zinc chloride, borax. Assembling finished parts. Visits to foundries, and factories. This work is carried on during the Spring term.

During the year eight professionally trained teachers have been admitted to this course for training in one or other of the subjects included in the term "Manual Training." Four entered for the full course, two of whom, Mr. W. W. Snider and Mr. J. E. Runions, completed their course in June last, and successfully passed all the examinations in the Theory and Practice of Manual Training. Mr. Snider was awarded certificate as Specialist in Manual Training and Mr. Runions a Teacher's Certificate in Manual Training by the Department of Education for the Province of Ontario. Soon after their graduation they were engaged as instructors, Mr. Snider entering the services of the Board of Education for Ottawa, and Mr. Runions appointed to a similar position under the Board of Education for Calgary, Alta. Mr. Chas. T. Yeo completes his terms at Christmas and Mrs. J. E. Lyon in June, 1906. Mr. H. B. MacLean completed the Primary and Art cardboard and woodwork courses, but left at the end of the Winter term to take up the post of Manual Training instructor at Macdonald Consolidated School, Hillsborough, P.E.I. Of those staying six months and under, the majority of them are teachers from the Eastern Provinces sent by the Macdonald Rural Schools Fund to obtain an insight into the various phases of the Manual Training movement.

To fulfil our obligations to the Education Department as laid down in Order-in-Council of March, 1904, respecting provision for adequate and sufficient accommodation and equipment for the training of instructors in Manual Training, involved an outlay of $650 on tools, machinery, and appliances for Metal-working. A room in the basement of the Institute was fitted up and instruction in metal work was given to the Normal students during the Spring term. This equipment is now utilized for instruction in metal working to fifty-nine agricultural students.

3. Correlated Course for Nature Study Students. This course comprises largely the making of such objects as are useful in connection with Nature Study and School Gardening: Plant label, needle holders, flower

sticks, garden reel, stand for lense, seed collecting tray, windmill, germinating box, hanging basket, spread board, dibble, press board, birds' nest box, window box, thermometer hood, observation bee hive, wind guage, hen's nest, sun dial, insect cages, and boxes, etc. It also includes exercises in paper folding, cutting and mounting, cardboard and clay modelling. Drawing: Pencil and brush, black and white, sketching, designing and color work. Examples are worked out showing treatment of various

Basketry part of Manual Training Course—an optional course.

forms in outline, relieved by lines expressive of shadow and tint, as well as of structure and the function of the brush in defining forms by their masses. Color schemes were worked out from the color view point, illusrating various harmonies. During this short course we endeavour to make the course as practical as possible so as to lead the students to see and to realize the close relation between the hand and the head, doing and knowing.

That this kind of work secures most valuable results in many directions, as it furnishes new field for perception, for when the child represents with pencil or brush or by construction, he learns to observe closely and to discriminate values which are involved in correct observation; it trains his hand and eye to co-operate with judgment, and learns to observe, to test values in symbols; and trains his eyes and interpreting judgment to cooperate with hand and will in obedience. Form making of cardboard requires the projecting of plan, a judgment in the use of material, laying

out work, cutting it, fitting it, and putting it together. This work involves the exercises or application of arithmetic. It is the handmaid of Geography, of History, of Literature. In them lay the satisfying activities for the child. These exercises give the utmost pleasure and prevent exhaustion by creating energy in accomplishing a result, getting the thing done. The child's interest is not restricted to the world of objects by means of which he makes his start in feeling, knowing and doing, but he has perhaps a greater interest in institutions of the social world of which he forms a part. The start in knowing and doing is made here as in the object world by contact with experience in participating and interest in the forms or parts whose construction satisfies him, gives him pleasure, and whose purposes affect him. The adjustment of a block to a specific place for a specific purpose is training definite and valuable. The folding, creasing, and cutting of a piece of paper making definite form of a definite size for a definite end is Manual Training as valuable as the making of a pattern for a piece of machinery.

Optional courses in woodworking, basketry and art metal work, are offered to those who do not desire to take full regular courses and upwards of 28 students from the other departments as well as outside students avail themselves of one or other of these subjects.

Reviewing the year's work of this department, we have reason to feel much gratified with the progress of every student in each of the branches taken up, especially when the circumstances under which some of the work has been done, are taken into consideration.

I have the honor to be, sir,

Your obedient servant,

JOHN EVANS.

PART XVIII.

THE PROFESSOR OF NATURE STUDY.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to present herewith my first report as the head of the Nature Study department.

My appointment to the position was made on March 1st of this year, and my actual duties with classes commenced on April 4th. In the intervening time I visited Chicago and spent three weeks examining the College of Education at the University of Chicago, the University High School, the University Elementary School, and other institutions in the city, in order to acquaint myself with the methods and ideas that prevail in what is considered one of America's most progressive educational centres.

In taking up my work here, I early recognized the fact that the whole College had been for years an institution in which work had been carried on with the students on Nature Study principles; that is, that students had had their studies made practical in field and workshop, and with things that concerned their daily lives and occupations on the farm. I have tried to follow this general College policy with our students.

I also recognized that the pioneer work of organization in this department had been well and truly outlined by the late, lamented Dr. Muldrew and his co-worker, Professor Lochhead, and that my duty lay in the direction of carrying out these outlines to the best of my ability. I do not need to here refer to the Courses of Study, as they have been included in Professor Lochhead's report for 1904, and our Institute Calendar for 1905-1906.

MY FIRST CLASS.

My first class was composed of fifty-one teachers from the five Eastern Provinces of Canada; forty-six of these teachers were appointed to the Macdonald scholarships, and the remaining five entered the class as regular students without financial aid. Three of the teachers from Nova Scotia,—Miss Carter, Messrs. MacInnis and d'Entremont—were appointed while in attendance at the Normal School at Truro, and their three months' course here was accepted as part of their Normal training. Two of the teachers, Messrs. Klinck and MacKay, were third year students of the Agricultural College. Mr. Matthews was an Inspector in Prince Edward Island. All the students, with one exception, were selected teachers of experience. Our work, therefore, did not take the form of regular Normal work, except in so far as the needs of the "New Education," as aimed at in the Macdonald movement required an adjustment of ideals and methods. It was found that most of the teachers on coming to us felt the need for the acquirement of knowledge regarding the common things of out-of-doors, rather than the methods of using such matter in the training of the child mind and life. At the same time every opportunity was seized on for discussing and testing the pedagogical value of the knowledge acquired here.

This is the list of the scholarship students of the spring class:

Prince Edward Island:

Miss Alice Fyfe, Stanley Bridge.
Miss Maud MacCannell, Charlottetown.
Miss Aucilla Stewart, Charlottetown.
Mr. A. H. Matthews, Alberton.

Nova Scotia:

Miss Harriett Carter, Truro.
Miss Sadie J. Gordon, Lansdowne.
Miss Ethel M. Hiltz, Dartmouth.
Miss Josephine H. Stevens, Ellershouse.
Miss Cassie Whitman, East Inglisville.
Mr. Louis A. d'Entremont, West Pubnico.
Mr. Mayhew C. Foster, Port Lorne.
Mr. Duncan MacInnis, St. George's Channel.

New Brunswick:

Miss Minnie Colpitts, Forest Glen.
Miss Maud Curren, Fairville.
Miss Madge Ricketson, Hatfield Point.
Mr. Arthur E. Floyd, Titusville.
Mr. William C. Jonah, Hillsboro.
Mr. F. S. Small, Apohoqui.
Mr. Stanley K. Smith, Blissville.

Quebec:

Miss Annie Arkley, Leeds Village.
Miss Mary E. Armstrong, Aylmer East.
Miss Muriel S. Belknap, Montreal.
Miss Lena Doddridge, Little Cascapedia.
Miss Louise A. MacCrae, Black Cape.
Miss Grace Miller, Brome.
Miss Lillian Nelson, Melboro.
Miss Margaret Nugent, Leeds Village.
Miss Lydia Shaw, Kingsey.
Miss Winnifred M. Watson, Mystic.
Miss Grace Whitehead, Waterloo.
Miss Maud Whitehead, Foster.

Ontario:

Miss Lissa Clark, Cherry Valley.
Miss Susie L. Fotheringham, Toronto.
Miss Evaline A. Hockey, Welland.
Miss Lottie E. Legge, Gananoque.
Miss Jennie Mowbray, Eagle.
Miss Edith M. Phillips, Cedar Dale.
Miss Annie Sheppard, Toronto.
Miss M. Catherine Straith, Sault Ste. Marie.
Miss Amy Spankie, Wolfe Island.
Miss Lettie M. Thompson, Charing Cross.
Miss Ida May York, Ottawa.
Mr. William J. Blakeston, Dundalk.
Mr. P. H. Buchanan, Marden.
Mr. C. A. Clayton, Arkell.

Following are the students without scholarships:

Mrs. E. B. Palmer, Toronto, Ontario.
Miss Anna Powell, Woodstock, Ontario.
Miss Lillian Rankin, Toronto, Ontario.
Miss Lydia M. Sinclair, Guelph, Ontario.
Mr. A. H. McKay, Halifax, N. S.

One of the pleasant and profitable features of the work with this class was in the visits and addresses we had from prominent educators. These included:

Professor J. W. Robertson, of St. Anne de Bellevue, Que.

Dr. Hodge, author of "Nature Study and Life," from Clark University, Worcester, Mass.

Dr. J. W. MacKay, Superintendent of Education for Nova Scotia.

Dr. Peterson, Principal of McGill University, Montreal, Que.

Mrs. Hoodless, Inspector of Domestic Science Schools for Ontario, Hamilton, Ontario.

Mr. J. Studholme, of Hinds, New Zealand, who was visiting this country in the interests of the Agricultural Educational Association of New Zealand.

Mr. Hudson, Director of Manual Training, Borough of Hornsey, London, England.

Dr. Fletcher, Dominion Entomologist, Ottawa.

Dr. Bethune, Editor *Canadian Entomologist*, London.

Mr. David Boyle, Curator of Museum, Normal School, Toronto, Ont.

Mr. Wallace Butterick, Secretary Educational Trust Fund, New York.

All of our students speak highly of the advantages they receive in thus meeting people from different parts of the world, who possess large and liberal views in educational matters. For the entertainment of such guests, need of guest-rooms in the Hall or Institute is felt.

Another important feature of the class work was the visits paid to Rockwood, Elora, Puslinch Lake, and Niagara Falls. At Niagara, besides making a general study of the river and falls, we visited the Ontario Power Company's plant, and botanized along the river at Foster's Flats. Perhaps the most important incidents of the visit were the trips to Lundy's Lane and Queenston Heights; here a new realization of Canadian history and patriotism was received by many; there is no doubt that the effect of such an experience will be felt in the teaching of history in the schools afterwards presided over by these teachers.

Another of the pleasant duties connected with the work during this term was in receiving teachers' conventions to our Institute. It is quite evident that the teachers of the Province at large realize as they never did before the need of broadening their outlook by going away from home to visit places where new methods are being tried. We had the teachers from North York, and South York; from Brantford, and Brant County; from Perth County and Stratford; from South Wellington; from Hamilton and Wentworth; from West, North, and South Grey; and from Middlesex, and the Normal School, London. In some of these cases our class had the advantage of hearing addresses which were given before these conventions in Massey Hall.

Several other teachers' associations have signified their intention of visiting us next spring; it is advisable for them to spend two days here in such cases, as they find too much for one day's observation; in such cases too, they can have the advantage of using Massey Hall for business or other meetings, and of having the help of members of the College staff in illustrated lectures in the evening sessions.

The class received its instruction in Manual Training from three of the Normal class in Manual Training, Messrs. Yeo, Runions and Snider, under the direction of Prof. Evans. Mr. Jarvis had charge of field work in Botany, and Entomology; Mr. A. B. Klugh in Ornithology; Prof. Lochhead helped in our general work. Miss Grace Robarts of the Domestic Art Department, on account of Professor Evans being busy with the Normal and College work, took charge of the Art work, and helped very materially to the proper interpretation of Nature in teaching us how to express our observations and feelings with pencil and brush.

On May 26th, I gave an address on the Macdonald Institute to the teachers of the counties of Stormont, Carleton, Prescott, Russell, Grenville, Glengarry, and the towns of Perth, Smith's Falls, Brockville, and Cornwall at a well attended joint-convention in Ottawa.

Summer School.

On July 4th, a four weeks' Summer Course opened. It was devised to accommodate the Ontario teachers who could not attend for longer courses in school term. That an interest in Nature Study is not confined to teachers, however, is to be seen in the fact of this class having in it one trained nurse, one Women's Institute lecturer, and two house-workers. Four of the gentlemen were principals of large schools, and took the course in order to better instruct the teachers on their staff. Three of the teachers had been in the spring class and wished to continue the work.

On account of Macdonald Hall being closed, the teachers-in-training had to find boarding houses in the city. In the hot weather, this interfered greatly with the pleasure and success of the work, and so about twenty of the teachers organized into a Noon Lunch Club, and succeeded in changing a

tiresome noon hour into a very pleasant and profitable social hour. The basement was fitted up; vegetables were taken from the school gardens; milk, cream, butter and bread were bought at the College, and the teachers took turns in preparing the lunch and washing dishes. At the end of the term they gave a banquet to their instructors and the remainder of the class, and carried out a toast list of exceptional merit. It was agreed by all that we had worked out a very real Nature Study lesson in the matter of the Noon Lunch. Including the banquet and the entertainment of many visitors, the cost to each teacher was only about ten cents for each meal. I would recommend, however, that in future Summer Courses, arrangements be made for the partial occupancy, at least, of Macdonald Hall. Teachers who are progressive enough to spend their hard earned holiday in improving themselves for the sake of their pupils, deserve our best consideration of their comfort.

Special thanks is due Miss Grace Robarts of the Domestic Art Department for the unstinted help she gave in all our undertakings, and especially in the Art work. Many of the teachers feel quite as helpless in handling this branch of the newly introduced studies as they do in teaching the biological or scientific side of the work; the art work cannot be separated from any real Nature Study work.

This is a list of the students:

Miss Edith H. Allan, New York, U.S.A.
Miss Emma J. Aldridge, Peterborough.
Miss Jean Binney, Hamilton.
Miss Annie Consitt, Hills Green.
Miss Lena A. Downs, Hamilton.
Miss Annie Elliott, Toronto.
Miss Jennie Grier, Port Arthur.
Miss Janet James, Hamilton.
Miss Rose Jackson, Courtland.
Miss Carrie Jackson, Hamilton.
Miss Lottie E. Legge, Gananoque.
Mrs. Jennie Lyon, Guelph.
Mr. James Shaw, Owen Sound.
Miss Caroline Waters, Guelph.
Mr. Wilbert W. Snider, Guelph.
Mr Jeremiah Suddaby, Berlin.
Miss F. J. Twohy, Hamilton.
Miss Mary G. Tunnah, Toronto Junction.
Miss Marion Hill, Guelph.
Miss Grace Robarts, Guelph.
Miss Mable Harley, Harley.
Miss Ella Kelly, Wilsonville.
Miss Kate Kennedy, Acton.
Miss Muriel I. Speller, Toronto.
Miss Eliza McQueen, Rockwood.
Miss Margaret McQueen, Guelph.
Miss Bessie McKenzie, Hamilton.
Miss Florence May, Oshawa.
Miss Blanch Maddock, Guelph.
Miss Lizzie Murray, Holyrood.
Miss L. P. Rankin, Toronto.
Miss Lulu Stiven, Cumnock.
Miss Lizzie Swanston, Mosboro.
Miss Catherine Straith, Sault Ste. Marie.
Mr. S. Y. Taylor, Paris.
Mr. N. Willison, Gravenhurst.

We had during this course a visit from Dr. A. H. Abbott, of the Department of Psychology, University of Toronto. He gave us enjoyable lectures on Psychology and Color. We hope to have him next year in a series of lectures on Experimental Psychology.

In August, I visited Columbia University, New York; Cornell University, Ithaca, N. Y.; and Chatauqua, N. Y., and investigated the Nature Study problems at those centres.

The Fall Term, 1905.

The Fall class entered on September 19th, and finished its course on December 21st. Following is a list of the forty-four students attending:

Ontario:

Miss Rachael E. Barnes, Toronto Junction.
Miss Annie Consitt, Hillsgreen.
Miss Jean Davidson, Peterborough.
Miss Anna B. Ellis, Fenelon Falls.
Miss Jennie Grier, Port Arthur.
Miss Florence Gundry, Aylmer.
Miss Kate Kennedy, Acton.
Miss Annie M. McKenzie, Listowel.
Mr. W. Wallace Pettapiece, North Gower.
Miss Annie L. Robson, Lindsay.
Miss Annie Ryan, Georgetown.
Miss Margaret A. Smillie, Hensall.
Miss Fanny E. Suttaby, Gravenhurst.
Mr. Charles Wesley Webb, Ancaster.
Miss H. G. Wells, Murray.
Miss Fraser, Westmeath.
Miss Whiteside, Metcalfe.

Quebec:

Miss Ida Fair, Black Cape.
Miss Jessie Godfray, Black Cape.
Miss Nora E. Lay, Lorne.
Miss Gladys Watson, Mistic.
Miss King, Windsor Mills.
Miss Theo. I. McNaughton, Quebec.

New Brunswick:

Miss Annetta A. Bradley, Pioneer.
Miss Melissa J. Cock, Campbellton.
Miss Estella M. Hartt, Kingsclear.
Mr. C. G. Lawrence, Lr. Dumfries.
Miss Gertrude T. Morrell, Belleisle Creek.
Mr. F. Peacock, Murray Corner.
Mr. William R. Shanklin, Shanklin.
Miss Jennie R. Smith, Blissville.
Miss M. Eloise Steeves, Sussex.

Nova Scotia:

Miss Alice Bligh, Lakeville.
Miss Laura F. Evans, Dartmouth.
Miss Mary FitzRandolph, Round Hill.
Miss Josephine Lavers, Parrsboro.
Miss M. Ruth McCurdy, Truro.
Miss Mary C. Macdonald, Antigonish.
Miss Vera M. Smith, Chester.
Mr. Perry Foote, Lawrencetown

Prince Edward Island:

Mr. Allison Campbell, Charlottetown.
Miss Mary C. Hunt, Summerside.
Miss Annie McLeod, Georgetown.
Miss Gertrude Phillips, Murray Harbor South.

While the fall months did not permit of as much out-door study as the spring and summer months, we succeeded in making a fair survey of the biological and geological features of our immediate vicinity, before the inclement weather interfered. We made valuable use of the gardens that had been planted by the students of the two previous classes. These having been in most cases left to grow wild, furnished us with many lessons in results of lack of care during the holidays, besides yielding material for lessons on weeds, grains, flowers, vegetables, etc. We had along side of these gardens, those of the children of the Consolidated School, which had been cared for through the holdiays, and learned through them the other aspect of this school garden question—the value of constant care in gardening. As soon as the weather prevented outside work, we prepared new beds in our large greenhouse; here each student had a plot $2\frac{3}{4}$ ft. x 5 ft., and undertook many simple experiments with common plants, such as children would have in their own school gardens; in the small greenhouse, experiments with buds, seeds, and slips were carried on.

Short courses of lectures or demonstrations were given this term as follows: Bacteriology, Prof. Edwards; Entomology, Prof. Sherman; Geology, Prof. Lochhead; Meteorology, Prof. Reynolds; Horticulture, Prof. Hutt; Astronomy, Mr. W. H. Day; Seeds, Mr. Buchanan; Art and Manual Training, Prof. Evans and Mr. Kendall; Birds, Mr. A. B. Klugh. In all this work the immediate need of the public school teacher and the ultimate needs of the public school pupil and the community behind him have been kept in view and emphasized. Conferences were also held with the teachers in the Consolidated School and the benefit of their experiences in Nature Study methods shared; visits were also made to the schools in the City of Guelph, and to some of the manufacturing establishments.

The class spent a day in Berlin visiting the sugar, button, rubber, and shirt factories and the Made-in-Berlin Exhibition; for our entertainment there, our thanks are due to the Berlin Board of Trade and the Principals of the schools, who went to no little trouble to make our visit pleasant and profitable.

The opportunities of the Winter Fair and Experimental Union were taken advantage of and our teachers stimulated by contact with prominent leaders of the thought and activities of our rural population. A real history

lesson was learned in our visit to a conference held in the city by Hon. Messrs. Paterson, Fielding, and Brodeur, regarding tariff revision.

On October 20th I addressed the teachers of Oxford, at their convention in Ingersoll, on "How to Introduce Nature Study."

This term we had visits from the teachers of North Grey and Owen Sound; East Grey; South Grey; City of London; in this connection I would recommend that the Associations arrange for a definite programme before hand and adhere closely to it; when the visitors get broken up into small parties many valuable points of interest are missed.

We had a visit this term from Mr. C. J. Atkinson, Superintendent of the Broadview Boys' Institute, Toronto, and a talk from him on the self-help plans used with the boys there.

All our teachers go away feeling that the time has been too short to accomplish what they wish. No doubt more satisfactory work could be done in a longer term. But the chief thing accomplished here, is not in the finishing of studies, but the opening of the eyes to the largeness of the field of study to be cultivated with the school children in the years to come.

The Nature Study classes are undoubtedly the most unique classes in Canada. Who can measure the largeness of the educational good done to the children of our country through the association of public school teachers of the different provinces in the intimacy of field and class work, or of life in Macdonald Hall! It has been an important educational experiment; it will be a loss to Canada if it, or some similar experiment, is not continued even on a larger scale. It has been a matter of regret that the Western Provinces did not have representatives.

Although our students are with very few exceptions experienced teachers, and concerned chiefly with the subject matter of Nature Study, the need of observing methods in actual classes of children and of facilities for practising methods is felt. While we endeavour at all times in our instruction to keep the child in view, it is difficult in dealing with scientific studies with grown-ups to properly do so; we need more contact with the child; we are in danger of forgetting his attitude and his capacities. Our equipment is sufficient, our library is well supplied, our laboratories are well enough; we would be the better of seeing more of the methods we preach in actual operation with children. This is perhaps the Nature Study Department's great need. In this connection we wish to express our thanks to Mr. Hotson and his teachers in the Consolidated school for their help; and to the teachers in the Guelph schools as well.

In the matter of equipment, we have added a work bench and set of common tools during the year. It stands as an example of the kind of outfit for manual training which the ordinary one-master rural school may hope to acquire. It is the school's recognition of the fact that, as in the home, children should be brought up in the school, learning incidentally and in the actual concerns of their lives to "do things." The outfit is in a room just off our Nature Study class room, and is in charge of a teacher who acts as Mechanical Superintendent. It is of great use in our work for repairing things, or making simple apparatus.

Some of the Eastern Provinces are encouraging this one-bench plan by offering special grants for providing an outfit, and a special grant to teachers who will give satisfactory instruction by means of it. Our own Education Department might consider it in a scheme for improving schools that can not hope to get complete Manual Training outfits and special teachers.

From observation of the awakening that has come to our teacher-students, to the many teachers who came on excursions, to visiting school inspectors, and to educational experts from other countries, to the possibilities for useful instruction that can not be so well secured in any other educational institutions in Canada, I can not refrain from expressing the hope that when the Government considers the matter of improving the education in the Public Schools in Ontario, the place of the Ontario Agricultural College in the scheme of improvement, will be inquired into and properly r ognized. For the training of teachers for the coming Agricultural High Schools, Consolidated Rural Schools, or for the improved rural school which every one wishes for, no institution in the Province is so well situated, or equipped; and none is so intelligently interested in the problem as this College is.

Class of Nature Study teachers at work in the School gardens.

In closing this report, acknowledgment must be made to the members of the staff of the College for helping to furnish our students with up-to-date and reliable information on the work and interests of the farming community. Each realized the importance of having the teachers in the public schools equipped with this information, now that the common things and operations of our lives have found a legitimate place in our school studies. It is realized that the welfare, progress, and happiness of our rural population can be most efficiently secured through proper care of the instruction of the children in the schools; and that while the country school is thus being wisely served, the urban school is being no less benefited by similar studies or similar methods. The whole College is a large field of observation for Nature Study students in the broad sense of the term.

Respectfully submitted,

S. B. McCREADY.

PART XIX.

THE LIBRARIAN.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith a brief report of the library for 1905.

During the year we have added 1,018 books to the library, making the total number of books on our shelves 14,089. These new books are classified as follows:

Agriculture	108	Physics	24
Horticulture	74	Forestry	10
Dairying	11	General Science	33
Poultry	16	History	43
Veterinary Science	17	Economics	22
Apiculture	6	Literature	94
Chemistry	36	Hygiene	6
Bacteriology	25	Nature Study	10
Entomology	21	Agricultural Reports	37
Botany	30	Horticultural Reports	7
Geology	12	General Science Reports	43
Biology	52		

We have purchased back numbers of the following periodicals in order to complete sets:—

Proceedings of the American Association for the Advancement of Science. Vols. 1-37, 46-49.

American Naturalist. Vols. 1-25.

Country Life. Vols. 1-10.

American Journal of Science. Vols. 1-10 (Fourth Series).

Psyche. Vols. 1-8.

Correct English. Vols. 1-5.

Zoological Record. Vols. 1-25.

By the kindness of the Department of Agriculture of the Cape of Good Hope we have obtained volumes 1-11 of the Agricultural Journal of the Cape of Good Hope, completing our set to date.

We have had 240 volumes bound and have purchased 100 theses on agricultural chemistry and the following works of general reference:

The University Encyclopaedia. 10 volumes.

Makers of Canada. 20 volumes.

Great Events by Famous Historians. 20 volumes.

Library of Literary Criticism. 8 volumes.

The World's Great Classics. 30 volumes.

The Windsor Shakespeare. 20 volumes.

Encyclopaedia Britannica, Tenth Edition. 35 volumes.

The reading-room has been improved by laying some heavy cork matting on the floor to deaden the sound of footsteps and has been beautified by the addition of twelve pictures, good mezzo-tint reproductions of old masters such as Van Dyck, Romney, Gainsborough, Holbein, Ghirlandajo and Dürer.

We desire to take this opportunity of expressing our appreciation of all our exchanges, especially of the United States Department of Agriculture, the Experiment Stations of America, Australia, Cape Colony, India, Japan, South America and Europe.

I would respectfully draw your attention to the fact that, another department being formed by the division of the Department of Biology into two, Botany and Entomology, the greater amount of research work made possible by the larger staff and division of work will create a demand for new books to facilitate that research work.

I have the honor to be, sir,

Your obedient servant,

ALICE G. ROWSOME,
Acting Librarian.

PART XX.

REPORT OF COLLEGE PHYSICIAN.

To the President of the Ontario Agricultural College:

SIR,—I have the honor of presenting to you my report for the year now closing.

You will be glad to remember that neither the College Residence nor Macdonald Hall has been invaded by any serious outbreak of infectious disease since my last report, although in April a young lady residing in the Hall was taken ill with measles a few days after her arrival from Nova Scotia. The infection had taken place before she left home, and I am pleased to say that, thanks to strict quarantine, etc., no other cases occurred. The health in the Hall has been, on the whole, perhaps better than last year.

It will be unnecessary for me to enumerate to you all the minor ailments and casualties occurring during the year, as all matters relating to the health and comfort of the students are kept constantly before you. I shall, therefore, mention only some of the more important cases that have received my attention.

From the beginning of the present year until March the 24th, I was called upon to render almost daily attendance upon a student who in December of last year had undergone an operation for appendicitis, and whose condition, owing to grave sequels of the disease, caused much anxiety. I am happy to say that he is now well and was able to resume his course in the college in September. From February 19th until April 13th, I had under my care in the hospital a student who had received a severe scald.

I have to report also two rather severe cases of typhoid fever in students of the Fourth Year. Both had received infection before entering the College for the term, and were taken ill soon after admission. They were removed to the Guelph General Hospital, where they have progressed very favorably, and I expect will be able, in a few days, to leave for their homes.

During the vacation the dormitories received their usual thorough renovation, and in many rooms new beds and bedding replaced the old articles in use. The general sanitary conditions of the College are excellent, but I should like to see a number of warm shower baths placed about the swimming bath in the gymnasium. These, in my opinion, are a real need.

Respectfully submitted,

W. O. STEWART,
College Physician.

Dec. 7th, 1905.

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