

Public Science Education in New Brunswick from 1900-1910

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Hypothesis

The New Brunswick public school's Science Curriculum of 1900-1910 was intended to serve the same motivations as today's Science Curriculum.

Discussion of Sources

In researching Science Education in New Brunswick from 1900-1910 we consulted a number of Primary and Secondary resources. We visited the New Brunswick Provincial Archives, the University of New Brunswick's Harriet Irving Library, Fredericton's School Days Museum, and consulted various web and secondary resources.

At the New Brunswick Provincial Archives we looked at a number of Primary Sources including:

- The notes from a teacher, Daisy B. Ramsay, that she took on nature studies while attending the normal school. These notes would have been used when teaching older grades in a one room school house. The notes featured material for lessons on Botany, Mineralogy, Agriculture and Zoology.
- Matriculating and leaving examinations from the New Brunswick Department of Education for junior and senior year from 1900-1910.
- A timetable from a rural school under one teacher c. 1900.
- Letters from district inspectors to the Chief Superintendent of Education on the status of school gardens and whether they should receive funding for the next year.
- Annual Reports from the New Brunswick Department of Education for the years 1900-1910.

At the University of New Brunswick's Harriet Irving Library we consulted Primary Sources including:

- An address given by James W. Robertson in St. John in 1908 entitled "Education for the Improvement of Agriculture in New Brunswick".
- A text book entitled, New Canadian Geography. This text was adapted for use in public and high schools and authorized for use by the Board of Education for schools in New Brunswick. First published in 1899. This text features Science and Geography information including chapters on: cultures, climates, astronomy, plant life, and Canadian studies, among many others.

At the Fredericton School Days museum we consulted Primary Sources including:

- A text book titled, The Elements of Structural Botany, published as part of the J.W. Gage and Co.'s Educational Series in Toronto in 1897. Hand written notes in the front of the text indicate that it was used throughout our decade of study as they were dated 1905, 1907, 1908, 1910. This text was created through an act by the Federal Minister of Agriculture and was used in schools in Ontario, Quebec, New Brunswick, Nova Scotia and Manitoba. The text book was full of all the information a teacher was required to pass onto their students about Botany.
- A text book titled, Elementary Natural History – An introduction to the study of Minerals, Plants and Animals with Special Reference to those of New Brunswick. The text was written by L.W. Bailey, a professor at the University of New Brunswick in 1887. Notes in the front of the text indicate that it was used at later dates making it appropriate for our decade of study. The text was stamped with approval by the Chief

Superintendent of Education. It was used for study of minerals, animals and plants in New Brunswick schools.

- A text book entitled, Beginner's Botany by L.H. Bailey published by the MacMillan Company of Canada in 1908. This text was authorized for use in the provinces of Nova Scotia, New Brunswick, and Saskatchewan. This text book looked at types of plants, how they grow and plant structure.
- A text book titled, Rural Science by J.J. Green published by MacMillan Company of Canada in Toronto in 1913. We looked at this text even though it is out of our decade of study, we felt it relevant to cite because, during our decade and the one following, the province lacked official curriculum documents. Text books were designed to give all the information necessary for teaching. As such, a text very similar to this one, at least in regards to content, was probably used during our time. This text looks at studies that were beneficial to boys who would take on rural occupations. The text covers information on soil, growing conditions and practices and crops.
- A primer and first reader, titled, Little Nature Studies, Volume 1 written by John Burroughs and edited by Mary E. Burrett for Ginn & Company in 1903. This text features short stories and reading guides that were all related to the natural world.

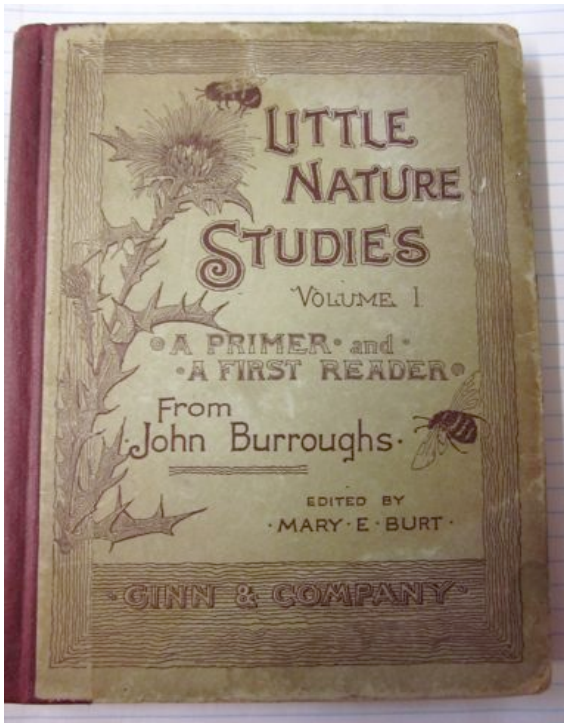


Fig. a. Cover of Little Nature Studies¹

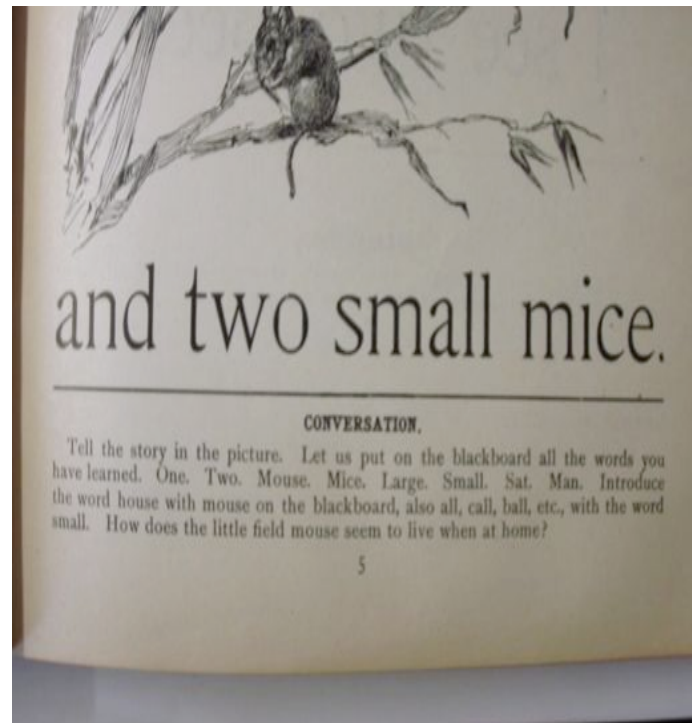


Fig. b. Excerpt from Little Nature Studies²

A semi-monthly educational journal titled, The Canadian Teacher. This journal was published by the Educational Publishing Company Limited in Toronto. We looked at the earliest available issue from February 1st 1915, as we have discovered, there are enough similarities between 1900 -1920 to establish that the science is applicable. Each issue featured suggested work for students in the field of Nature Study.

We also looked at the Foundation for the Atlantic Canada Science Curriculum, this primary

1 John Burroughs, Little Nature Studies, ed. Mary E. Burt (Ginn & Company, 1903)

2 John Burroughs, Little Nature Studies, ed. Mary E. Burt (Ginn & Company, 1903), 5.

resource was Published by the Atlantic Provinces Education Foundation in Halifax in 1998.

We also consulted a number of secondary sources including:

- Margaret Conrad and Alvin Finkel's text, Canada: A National History was used as a secondary source. The text looks at the history of Canada beginning around 1500 and examines the social, political, and economic issues in regards to Canadian life up until present day. Published in 2007 by Pearson Longman of Toronto.
- Atlantic Canada: A Concise History was a second text we referred to during research. Written by Margaret Conrad and James Hiller, the book takes an in depth look at the Maritime region between the years of 1000-2005. The text portrayed the social, economic, and political situations of the region during this time frame. Published by Oxford University Press in 2006 in Don Mills, Toronto, Ontario.
- We used a number of Internet sources during research. We accessed The New Brunswick Museum online, http://www.musee-mccord.qc.ca/scripts/printtour.php?tourID=VQ_P3_9_EN&Lang=2 for information in regards to the social context of New Brunswick during the 1900-1910 decade.
- <http://www.eyewitnesstohistory.com/ford.htm>, was used as a reference to Henry Ford's T model automobile that had profound technological implications for the early twentieth century.
- We looked at the first flight by the Wright Brothers for a reference to the technological context of the period. <http://www.fi.edu/flights/first/during.html> is the website we used to gather and compile information on this topic.
- Relating to the technological innovation and thinking of the time, we referred to Albert Einstein's papers of 1905. <http://www.teslasociety.com/einstein.htm> gave us a sense of his work and the implications it had on the decade.

Teaching and Learning Resources for Science Education in New Brunswick from 1900-1910

After studying every resource that was made available to us in regards to New Brunswick Science education from 1900-1910. We have determined that no formal curriculum documents used. Instead, text books were commissioned for classroom use under ministerial acts or approved by the Chief Superintendent of Education from New Brunswick. These text books would provide all the content the teacher was expected to teach, and featured the information students needed to know for their matriculation exams. These text books featured encyclopedia-type information, illustrations, demonstrations the teachers should "preform", and exercises and practical work for students.

What is most illuminating about these texts comes from the information we gathered by reading the prefaces. Here, the authors and editors make clear their intentions for how the text should be used. We see many similarities between the attitudes of science educators had during the 1900s and the attitudes held by current science educators on the topic of science education.

In The Elements of Structural Botany the editor notes that the text was designed to be more rational than what has been commonly adopted as a teaching style.³ It was designed with, "A view of laying a foundation for intelligent study of systematic Botany Schedules to fix the pupil's attention and test the accuracy of pupil's knowledge."⁴ The book offered schedules and charts to fill in as the teachers

3 The Elements of Structural Botany (Toronto, J.W. Gage and Co.'s Educational Series, 1897).

4 The Elements of Structural Botany (Toronto, J.W. Gage and Co.'s Educational Series, 1897).

went along with the students. Interestingly, the editors proposed that, as opposed to what had been the norm, common plants should be put into the learner's hands right away.⁵ That the teacher would guide the student through examination of the plant. Rather than teaching about the plant before the student actually got to see it. The hope was, “to cultivate, in short, not merely his memory, but also, his powers of observations.”⁶ The editors were hoping teachers would adopt a more practical based approach to teaching Botany.

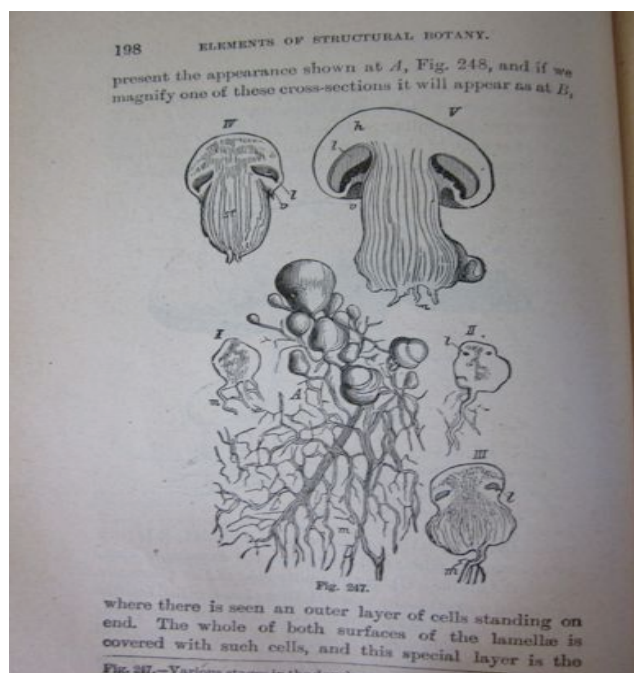


Fig. c. Excerpt from Elements of Structural Botany⁷

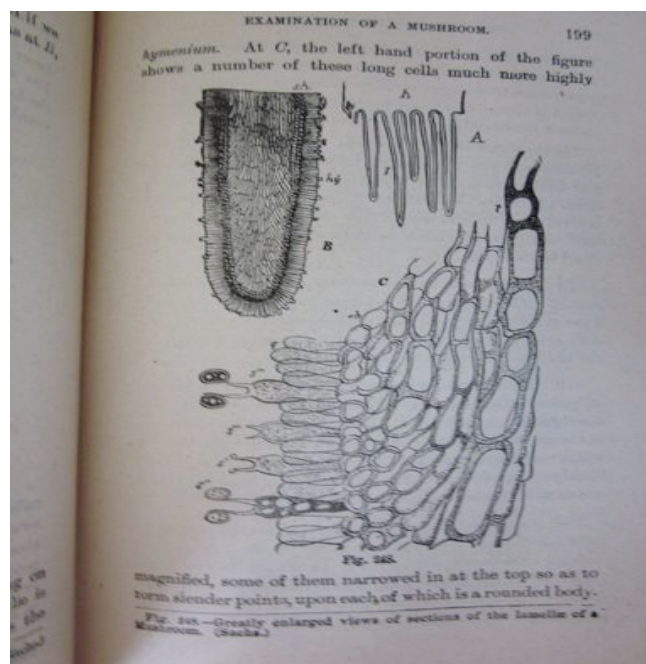


Fig. d. Excerpts from Elements of Structural Botany⁸

The text book Elementary Natural History was prescribed by the Board of Education, under the authority of the Common Schools act of 1871, for use in the Schools of New Brunswick.⁹ In the preface, the author L. W. Bailey explains that he wanted the text to be more than just a collection of facts. He wanted it to be presented in such a way that could be learned by young minds.¹⁰ That his text, “while enabling the teacher or student, as the case may be, to meet those requirements more readily, he may at the same time succeed in awakening an intelligent and lasting interest in the subject themselves.”¹¹ Bailey did not want students to just learn the subject but, actually take an interest in the subject and become motivated learners. He believed learning could be done in a not purely scientific way without losing its scientific accuracy.¹² He supported making nature study as practical as possible while using as many real life specimens as can be collected. This way, “useful habits of observation and comparison may be awakened and developed even in very young minds.”¹³ Here we see an

5 The Elements of Structural Botany (Toronto, J.W. Gage and Co.'s Educational Series, 1897).

6 The Elements of Structural Botany (Toronto, J.W. Gage and Co.'s Educational Series, 1897).

7 The Elements of Structural Botany (Toronto, J.W. Gage and Co.'s Educational Series, 1897), 198.

8 The Elements of Structural Botany (Toronto, J.W. Gage and Co.'s Educational Series, 1897), 199.

9 L.W. Bailey, Elementary Natural History. (1887).

10 L.W. Bailey, Elementary Natural History. (1887).

11 L.W. Bailey, Elementary Natural History. (1887).

12 L.W. Bailey, Elementary Natural History. (1887).

13 L.W. Bailey, Elementary Natural History. (1887).

emphasis on student's conducting their own observations. There is no mention of inquiry or students doing experiments, but there is great emphasis on observation and hands-on, practical school work.

The author of Beginner's Botany, L. H. Bailey, offers a similar view towards turning the education of Science into a more experience based study. He believed that “plants and animals” should be made into a theme rather than just mere book study.¹⁴ He felt that all information should be adapted for the understanding of a beginner. That lessons should start broad and work into the details. He talks about how important it is to understand that all learning is relative, and it is impossible to state the last thing about any preposition.¹⁵ He tells his readers that, what is elementary to one mind may be technical to another. The attitude the author has towards education seems like a very modern one. What he is describing is differentiation and a student based learning approach.

Bailey says, “we are beginning to learn that the ideals and abilities should be developed out of common surroundings and affairs of life rather than imposed on the pupils as a matter of abstract, unrelated theory.”¹⁶ He recognizes how important context is, that our communities and way of life should reflect what is being taught. This is why there is such an emphasis on nature based science, as opposed to any other science. This was a recurring theme in all of the sources we found. Most students in New Brunswick at this time come from agriculture based communities. Therefore, they we expected to learn about the science of plants and soil. Bailey seems to be very concerned with the learner and states it is better for a “beginning pupil to acquire a real conception of a few central principles and points of view respecting common forms that will enable him to tie his knowledge together and organize it and apply it than to familiarize himself with any number of facts he may know indirectly or remotely.”¹⁷ Bailey recognizes that it is more important to understand the foundation of Science, and to be able to make connections using that knowledge, rather than just learning facts.

In the Rural Science text by J. J. Green, the author indicates in his preface that the text is about operations familiar to boys living in the country.¹⁸ He says that the information given is useful to all boys, but it will be of particular benefit to boys who will go onto rural occupations. Green argues that the majority of male pupils in rural schools will enter into agriculture based work or further their studies at farm Institutes and Agricultural Colleges.¹⁹ Here we see a text promoting great motivation in doing practical Science education, while also designed with the purpose of helping students to get good jobs in the agricultural industry. Interestingly, each chapter is started with an assignment of practical work that will help students learn the concepts that follow throughout the section. This included learning about things such as: seed testing, soil, growing cycles, etc.,.

14 L. H. Bailey, Beginner's Botany. (MacMillan Company of Canada, 1908).

15 L. H. Bailey, Beginner's Botany. (MacMillan Company of Canada, 1908).

16 L. H. Bailey, Beginner's Botany. (MacMillan Company of Canada, 1908).

17 L. H. Bailey, Beginner's Botany. (MacMillan Company of Canada, 1908).

18 J.J. Green, Rural Science. (Toronto, MacMillan Company of Canada, 1913).

19 J.J. Green, Rural Science. (Toronto, MacMillan Company of Canada, 1913).

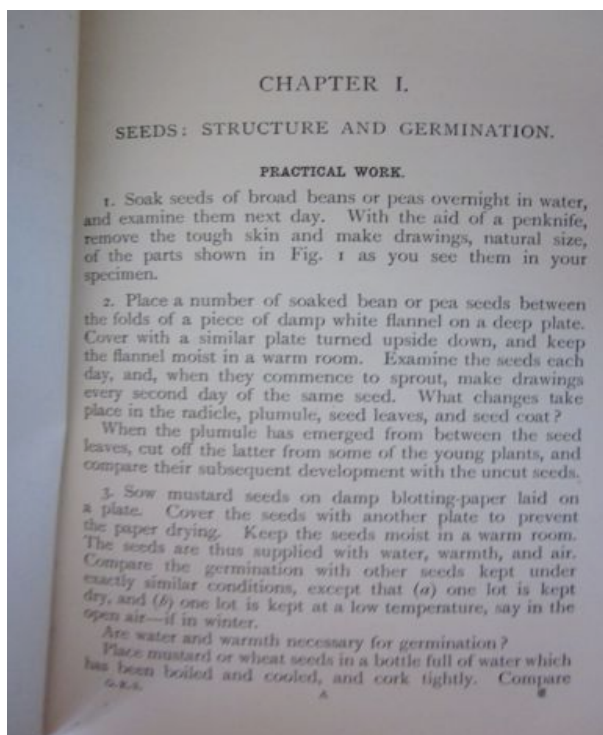


Fig. e. Excerpt from Rural Science²⁰

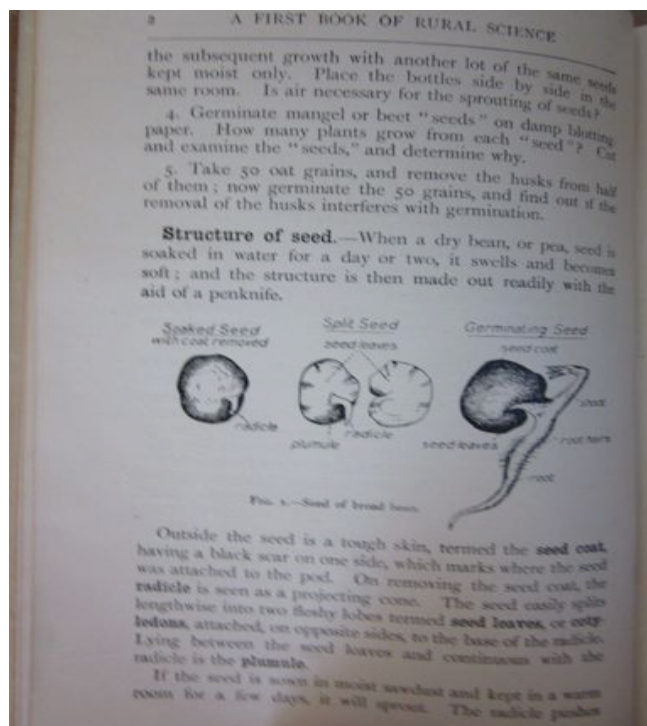


Fig. f. Excerpt from Rural Science²¹

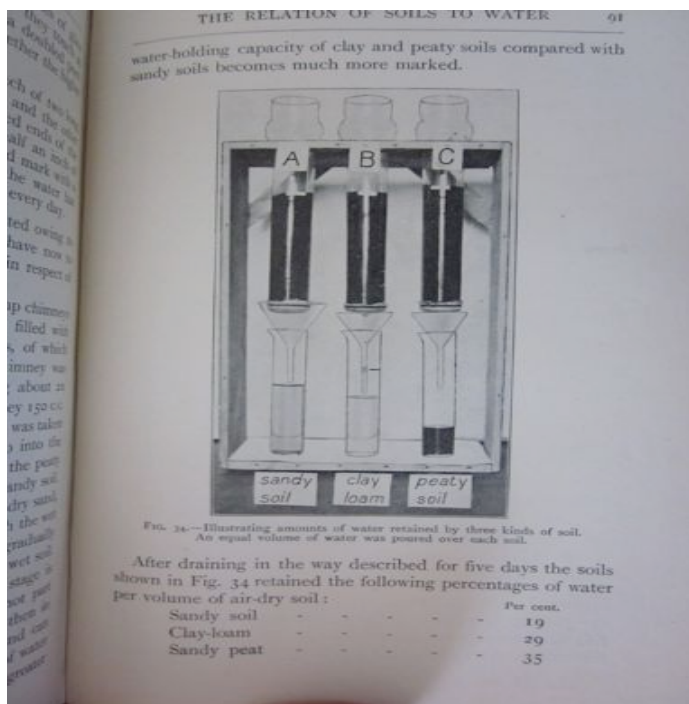


Fig. g. Excerpt from Rural Science²²

20 J.J. Green, *Rural Science*. (Toronto, MacMillan Company of Canada, 1913) 1.

21 J.J. Green, *Rural Science*. (Toronto, MacMillan Company of Canada, 1913) 2.

22 J.J. Green, *Rural Science*. (Toronto, MacMillan Company of Canada, 1913) 91.

The New Canadian Geography was a text book especially adapted for use in Public and High Schools, authorized for use in New Brunswick. In the Preface, the editor notes that he sees Geography as the basis of Science. He shares an attitude that is common among his contemporaries, the idea that Science education should be not just the learning of facts but, understanding why the world has come to exist the way it has. The text is still a very factual one with lots of explanations about climate, geographic formations, plant life and animal life.²³ The text also offers an overview of world cultures that reflects the particularly prejudice views held in that era. The text offers many suggested exercises, usually with the teacher modelling a scientific situation which the students are to observe and then solve problems based on what they observe.²⁴ Again, the Science work in this text is extremely observation based.

The Canadian Teacher, an educational resource journal for teachers, offered an activity on birds nests. Teachers could use this activity as a means to promote awareness and interest in the natural world. The activity called for students to collect birds nests over the winter months and examine them. A checklist of questions that directed students through the process of examining the nests helped lead the student to find the nests proper owner. Questions asked include: "Name the bird which built the nest, where was it found, what tree was it found, how high, if found on the ground, describe it's locality, what was the shape, what materials were used, how are the materials fused together."²⁵ This resource activity fits well with L. W. Bailey's ideology of activating the learner's mind and engaging the subject on a practical level. There is a large focus on student based observation.

A number of rural schools had gardens as a resource for Science education. The Department of Education distributed pamphlets on how to operate a school garden and how it could be used to cooperate with nature work that was done within the classroom.²⁶ Inspectors visited school gardens every year to determine if they would receive the annual funding of \$30.00. Letters from the inspector upon seeing these gardens indicate that the inspector often felt that more could be done in the school gardens. He said that school gardens gave schools a good image in the community because people would see the children were learning skills they could use to benefit the community's economy.²⁷ Schools were encouraged to have diverse gardens and use any profits they could make by selling their harvest.²⁸ The gardens were usually used for students in the lower grades. School gardens were a good tool for helping students learn their nature studies as well as, prepare for work in the agricultural industry. Schools in urban centres such as St. John and Fredericton did not have the same opportunities.

We were also able to view the matriculation and leaving exams given out by the New Brunswick Department of Education. Students in their Junior and Senior year would write the same exam and answer questions depending on what type of education or work they were moving onto next. These were extensive exams that featured the subjects: Greek, Latin, French, Arithmetic, Geometry, History, English Literature, Grammar and Composition. For Sciences the students were tested on Geography, Botany, Chemistry, Physiology and Hygiene, and by 1903 they were tested on Physics as well.²⁹ The content of the questions changed very little over the decade. Only Geography seemed to shift from being more world focused to more Canadian focused. Otherwise, the types of questions asked seem to very similar to what we might see today in Chemistry and Biology. Only Physics seems

23 New Canadian Geography, 1899.

24 New Canadian Geography, 1899.

25 The Canadian Teacher, Feb 1st 1915

26 Inspectors letters on state of rural school gardens to Chief Superintendent.

27 Inspectors letters on state of rural school gardens to Chief Superintendent.

28 Inspectors letters on state of rural school gardens to Chief Superintendent.

29 Matriculation Exams, 1900-1910.

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The Zoology notebook examines the theory behind classifying species. The history begins with Aristotle, moves into the Roman Period to Pliny, and onto the middle ages, encyclopaedic era and finished in the modern period. The notebook concerning Agriculture pertains to a brief history and summary of Canada's then current Agricultural situation, supported by numerous facts on Agriculture. With Daisy Ramsay's notebooks, we see lots of factual information about vast subject ranges. There seems to be no evidence of inquiry based learning strategies promoted at the teacher "training" level.

32 Notebooks of Miss Daisy B. Ramsay.



Fig. i. Excerpt from Notebooks of Miss Daisy B. Ramsay³³

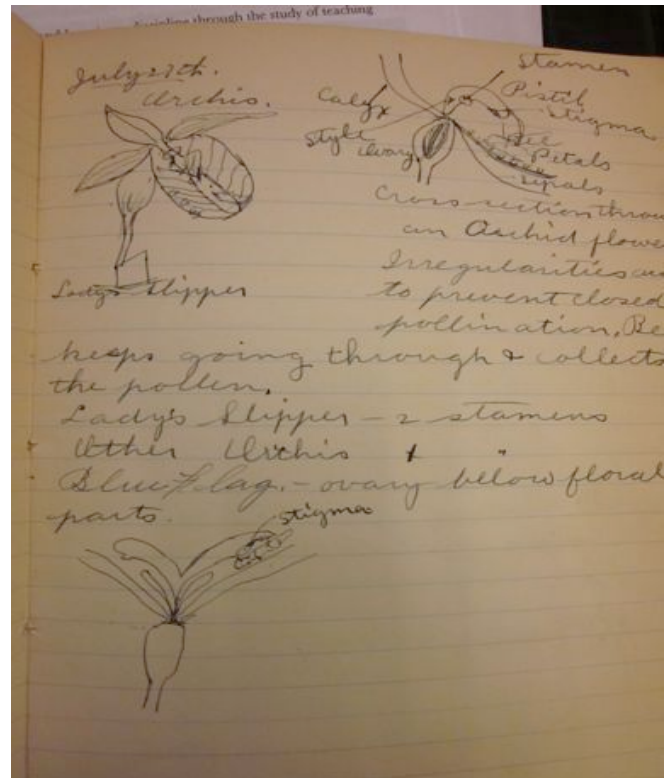


Fig. j. Excerpt from Notebooks of Miss Daisy B. Ramsay³⁴

Context of Education in New Brunswick



Fig. k. Image of School Building in Blackville, NB circa 1900.³⁵

33 Notebooks of Miss Daisy B. Ramsay.

34 Notebooks of Miss Daisy B. Ramsay.

35 Annual report of the Schools of New Brunswick 1900. Put out by the Chief Superintendent of Education. Fredericton, 1901.

During 1900-1910, the New Brunswick public education system was not yet centralized. The province had yet to create school districts, instead the divisions fell by county lines. The Board of Education was presided over by Chief Superintendent, J.R. Inch. Most students attended one room school houses. Often in the urban areas, this would mean having 50-70 students in a room with one teacher, where as rural schools might have as little as 6 to 12 students attending.³⁶ During the year 1900 there were 1771 schools in New Brunswick, this number grew to 1806 by the end of 1910.³⁷ School numbers would often fluctuate throughout the year due to attendance and weather. Some were not open all year round. In 1900 there were 1856 teachers employed in New Brunswick and by 1910 there were 1974 teachers.³⁸ These teachers were responsible for 61, 444 pupils in 1900 and 62, 994 by the end of 1910.³⁹ Overall, the decade did not see a dramatic increase in the number of schools, teachers or students.

The schools were divided into grammar schools and superior schools. The superior schools were what would today be elementary schools. They were for grades one to eight and students had to be six years old to attend.⁴⁰ The subject taught in superior schools were: Reading and Spelling, Writing and Print Script, Number and Arithmetic, Drawing, Health lessons, Nature lessons, Morals, French, Latin, Physical exercises, Singing, Geography, English Grammar, History, Algebra, and Geometry.⁴¹ Grammar schools would be what we now consider high schools, teaching grades nine through twelve. There were far fewer of these schools, and most students had to travel and pay if they wanted to attend. The subjects taught there were: English Language and Literature, Latin, Greek, French, Arithmetic, Geometry, Algebra, Trigonometry, Bookkeeping, History, Geography, Industrial Drawing, Botany, Chemistry, Physiology and Hygiene and Physics.⁴² The schools of this time were not very inclusive. There were separate schools for the Deaf and Dumb as well as the Blind. These schools were located in Halifax and New Brunswick students were sent there.⁴³

There were strong attitudes amongst educators about the use of Nature Study during this time period. A letter in the 1908 Annual Report was written with the intention of making sure that nature study was conscientiously followed by all teachers. The Board wished to make sure that teachers did not fail to, “give a great impetus to the study of nature in our schools.”⁴⁴ There was a great value placed on Nature Study. The course aims highlighted in this letter were, “to develop on the part of the child the habit of intelligent observation, to actually connect home and school interests, and to increase his knowledge of his own neighbourhood, its flora and fauna.”⁴⁵ To make sure that teachers were teaching

36 Annual report of the Schools of New Brunswick 1900. Put out by the Chief Superintendent of Education. Fredericton, 1901.

37 Annual report of the Schools of New Brunswick 1910. Put out by the Chief Superintendent of Education. Fredericton, 1911.

38 Annual report of the Schools of New Brunswick 1900. Put out by the Chief Superintendent of Education. Fredericton 1901.

39 Annual report of the Schools of New Brunswick 1910. Put out by the Chief Superintendent of Education. Fredericton 1911.

40 Annual report of the Schools of New Brunswick 1902. Put out by the Chief Superintendent of Education. Fredericton, 1903.

41 Annual report of the Schools of New Brunswick 1900. Put out by the Chief Superintendent of Education. Fredericton, 1901.

42 Annual report of the Schools of New Brunswick 1900. Put out by the Chief Superintendent of Education. Fredericton, 1901.

43 Annual report of the Schools of New Brunswick 1905. Put out by the Chief Superintendent of Education. Fredericton 1906.

44 Annual report of the Schools of New Brunswick 1908. Put out by the Chief Superintendent of Education. Fredericton 1909.

45 Annual report of the Schools of New Brunswick 1908. Put out by the Chief Superintendent of Education. Fredericton 1909.

the appropriate Nature Studies and not ignoring it, a leaflet was sent out. It was expected with this that there would, “no longer be any reason or excuse for treating such an important subject in a desultory or perfunctory manner.”⁴⁶ The Board wanted to make sure that Nature Studies were being taught at a proficient and high level across the province.

James W. Robertson was another outspoken Science Educator during 1900 – 1910 in New Brunswick. He gave an address in St. John in 1908 titled, Education for the Improvement of Agriculture in New Brunswick. He spoke out about making Agriculture a much bigger part of the school day than as it was currently being taught. He felt that education should reflect the needs of the province, and since the economy of New Brunswick was based in agriculture there should be a much greater emphasis on this in school.⁴⁷ He points out that most people agree the primary purpose of getting an education is to get a good job. Therefore, students should receive more training school gardens and agriculture studies. Robertson felt that schools should develop in students, “a love of manual labour, a love of ideas and learning, and love of one's fellows.”⁴⁸ He felt agriculture at schools made the schools and students more industrious and efficient. He argued that a quarter of the time, school should be spent doing things that are tangible, a quarter of the time on language, literature, and history; and the remainder of the time on math and nature sciences.⁴⁹ This is drastically different from the time allotment of subjects that educators think is appropriate in today's curriculum.

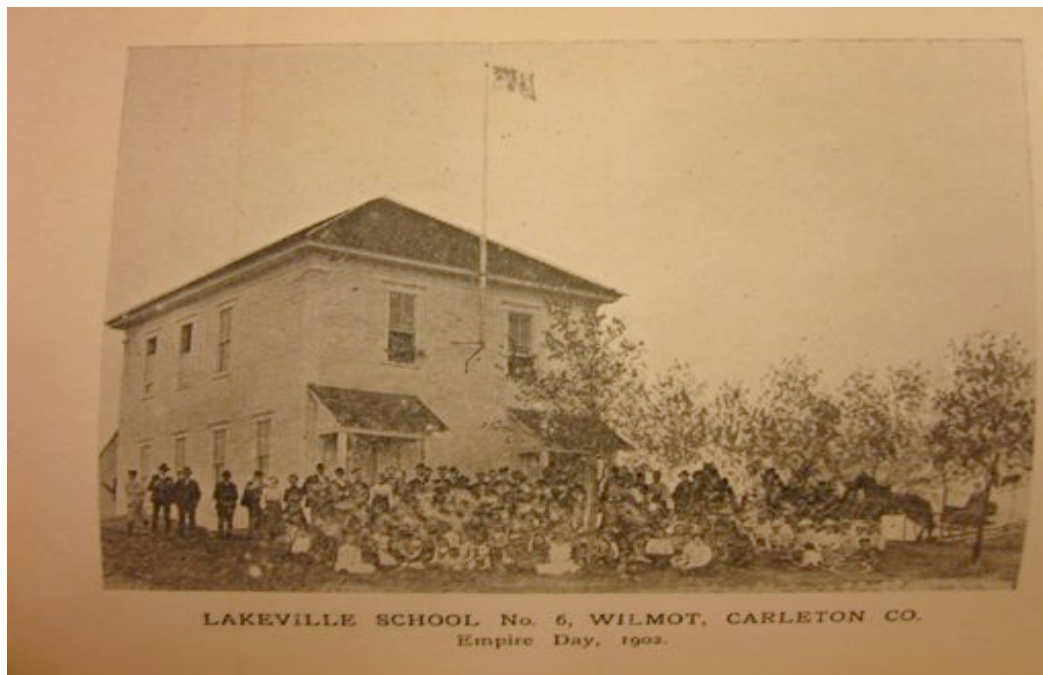


Fig. 1. Image of a Schoolhouse in Wilmot, NB circa 1902⁵⁰

Broader Social and Scientific Context

Three different men led the decade of 1900-1910 in New Brunswick. Premier L.J. Tweedie (1900-1907), Premier Clifford Robinson (1907-1908), and Premier John Douglas Hazen (1908-

46 Annual report of the Schools of New Brunswick 1908. Put out by the Chief Superintendent of Education. Fredericton, 1909.

47 James W. Robertson, *Education for the Improvement of Agriculture in New Brunswick* (St. John, NB, 1908).

48 James W. Robertson, *Education for the Improvement of Agriculture in New Brunswick* (St. John, NB, 1908).

49 James W. Robertson, *Education for the Improvement of Agriculture in New Brunswick* (St. John, NB, 1908).

50 Annual report of the Schools of New Brunswick 1902. Put out by the Chief Superintendent of Education. Fredericton, 1903.

1911).⁵¹ Under the leadership of these men, New Brunswick saw a slow rise in population from 331,120 people in 1901 to 351,889 in 1911. The Chief Superintendent of Education for the decade was J.R. Inch.

Economically, New Brunswick and the Maritime provinces were expanding to an extent. “For almost two decades after 1900, most Maritimers and Newfoundlanders would have said that they lived in an age of social and economic achievement and promise.”⁵² The agriculture industry in New Brunswick was strong and productive due to the demand both locally and in the western provinces.⁵³ The traditional industries of shipbuilding and the logging industry were taking a backseat to the new advances in technology of the time. “The construction of the harbour ferry, *Ludlow*, in 1904-1905 marked the end of success for the shipbuilding industry in New Brunswick. Fewer and fewer ships were being built in the shipyards of Saint John.”⁵⁴ To compensate for the declining industries New Brunswick once relied on, new ones had to be sought after. Industrialists were enticed to open up industries in the region by the promise of “cheap land, free water, and the exemption from municipal taxes.”⁵⁵

Politically, New Brunswick was rapidly losing its voice at the federal level. Due to a combination of migrating workers to the western provinces and New Brunswick’s weaker economic position in Canada. The Politicians at the federal level were more concerned with the central and western provinces than the “have not” provinces in the east.⁵⁶

The decade was also met with troubling social issues. The region was struggling to keep its head above water economically; investors were leaving the region for greener pastures in central Canada. The traditional industries were disappearing and New Brunswickers were searching for solutions in new industrial business. Consistent with the rest of Canada, woman's call for rights also played a significant role in New Brunswick society during the decade. “Woman’s right to vote, the prohibition of alcohol, mothers' allowances, improvements in public health, and children's rights.”⁵⁷

Prime Minister Wilfred Laurier led Canada during the decade of 1900-1910 under a Liberal government. Under his Liberals, Canada saw successful economic growth, massive immigration to the west, introduction of two new provinces, and a country connected by rail, advances in technology, and an improved education system.⁵⁸ The population increased during the decade from 5,310,000 in 1900 to 6,988,000 by 1910.⁵⁹ Canada’s agenda of opening up the west to settlers and immigrants help account for these numbers. In 1872, the Dominion Lands Act was passed that set the tone for the rapid immigration that Canada saw as a nation during this decade. The Act was designed to allow immigrants from Europe to purchase land from the government at cheap rates, enticing many to immigrate and settle.⁶⁰

Laurier’s National Policy for Canada was rooted in the same ideology that Sir John A.

51 Premiers of New Brunswick Canada. (2010). The New York Times Company. Retrieved from <http://canadaonline.about.com/od/premiers/a/premiersnb.htm>

52 M Conrad, and J Hiller. *Atlantic Canada: A Concise History* (Don Mills, Ontario: Oxford University Press, 2006) p.145.

53 M Conrad, and J Hiller. *Atlantic Canada: A Concise History* (Don Mills, Ontario: Oxford University Press, 2006) p.145.

54 A Year to Remember: 1904 New Brunswick. Musee McCord Museum. Retrieved from http://www.musee-mccord.qc.ca/scripts/printtour.php?tourID=VQ_P3_9_EN&Lang=2

55 A Year to Remember: 1904 New Brunswick. Musee McCord Museum. Retrieved from http://www.musee-mccord.qc.ca/scripts/printtour.php?tourID=VQ_P3_9_EN&Lang=2

56 A Year to Remember: 1904 New Brunswick. Musee McCord Museum. Retrieved from http://www.musee-mccord.qc.ca/scripts/printtour.php?tourID=VQ_P3_9_EN&Lang=2

57 A Year to Remember: 1904 New Brunswick. Musee McCord Museum. Retrieved from http://www.musee-mccord.qc.ca/scripts/printtour.php?tourID=VQ_P3_9_EN&Lang=2

58 M Conrad and A Finkel. *Canada: A Natural History*, Second Edition, (Toronto, Ontario: Pearson Longman. 2007), 140.

59 Population of Canada by year. (November 1, 2010). In Wikipedia, the free encyclopedia. Retrieved from http://en.wikipedia.org/wiki/Population_of_Canada_by_year

60 M Conrad and A Finkel. *Canada: A Natural History*, Second Edition, (Toronto, Ontario: Pearson Longman. 2007), .244

MacDonald began in the previous decades. The main concern for the direction of Canada was protection from outside markets, unification of the country through the rail lines, and an open door immigration policy. In doing so, Laurier's intentions were to strengthen the industrial and agricultural economy.⁶¹

Starting in 1900, rapid developments in machinery, equipment, and the invention of new technology allowed for improvements in the efficiency of industry and quality of life for many. Some examples are improvements in cold storage, transportation, such the Ford car, CPR railway, and the steam ship. In 1901, Guglielmo Marconi was the first person to receive a wireless communication signal sent across the Atlantic from Signal Hill, Newfoundland.⁶²

Agriculture in Canada saw a shift from a "way of life" to an economically viable mode of production. Traditional family farms grew into larger, more efficient complexes designed to pump out large quantities of produce. The central provinces of Ontario and Quebec excelled in the commercialization of farming.⁶³

Between the years of 1901 and 1911, a massive movement of people from rural outlying communities migrated to urban centres to find work in the growing manufacturing sectors of almost all major cities in Canada. "Noise, over-crowding, poor sewerage systems, and inadequate roads combined to make life unpleasant for most city dwellers."⁶⁴ Related to the issues surrounding the problems in these cities, women's roles began to transform. Women began to voice concerns about the problems of inner city living through various religious groups such as the Young Women's Christian Association (YWCA) and the Woman's Christian Temperance Union (WCTU). Advances in technology also contributed to the changing role of women in Canadian society of the time. "With the introduction of manufactured clothes, and the tendency toward smaller families and educating children in public schools, much of what was considered women's work moved outside the home."⁶⁵

The education system in Canada was also changing during this decade. By 1905, education was free to students and there was a policy of mandatory attendance for elementary students. There was a general social unrest over a potential breakdown of society, mostly fuelled by the condition in urban centres, educators emphasized a curriculum based on teaching skills that would be needed for the current "industrial labour market." A national shift in focus to a more practical and relevant content base allowed for the introduction of new curricula, household sciences and a variety of courses in manual training. These courses were introduced to account for the changing attitudes.⁶⁶

On a global scale, the decade of 1900-1910 produced remarkable technological achievements. On December 7th, 1903 in Kitty Hawk, North Carolina, the first successful manned flight took place. Brothers, Wilbur and Orville Wright were the first to design and successfully fly the first manned aircraft.⁶⁷ Through rigorous testing in self-made wind tunnels, the brothers were the first to use "three axis flight control" which allowed them to not only take to the sky, but also to control the craft while in the air.

61 M Conrad and A Finkel. *Canada: A Natural History*, Second Edition, (Toronto, Ontario: Pearson Longman. 2007), 240 -244.

62 M Conrad and A Finkel. *Canada: A Natural History*, Second Edition, (Toronto, Ontario: Pearson Longman. 2007), 260.

63 M Conrad and A Finkel. *Canada: A Natural History*, Second Edition, (Toronto, Ontario: Pearson Longman. 2007), 261.

64 M Conrad and A Finkel. *Canada: A Natural History*, Second Edition, (Toronto, Ontario: Pearson Longman. 2007), 271.

65 M Conrad and A Finkel. *Canada: A Natural History*, Second Edition, (Toronto, Ontario: Pearson Longman. 2007), 283

66 M Conrad and A Finkel. *Canada: A Natural History*, Second Edition, (Toronto, Ontario: Pearson Longman. 2007), 288

67 Flights of Inspiration – First Flight. Retrieved from <http://www.fi.edu/flights/first/during.html>

In 1905, Albert Einstein published three papers to the German journal “Annalen der Physik”⁶⁸; these three papers had incredible implications to the scientific world. Each ultimately developed into their own section of physics.⁶⁹

Detroit, Michigan was the setting for another revolutionary advancement of the early twentieth century. In 1908, Henry Ford produced the first T model Ford automobile; the first of it’s kind. The vehicle was cheap to produce and cheap to sell. The assembly line mode of production allowed for Ford to make the T model efficiently with low costs, ultimately, he created an automobile that the everyday working class family could afford.⁷⁰

The early part of the twentieth century saw a flood of technological innovation and inventions. The world on a global scale was coming out of the industrial revolution, a period that saw profound change in everyday life. Advances in technology set the stage for rapid economic growth, in turn, creating massive urban centres that highlighted the division between the working class and the individuals that employed them.

Relation or Significance of Study for Education in New Brunswick

Upon taking a comparative study of Science Education documents from 1900 – 1910 and today's Science curriculum and foundation documents, we have found there is much less in common between the two than we had first thought. Originally, we were motivated by the attitudes of past science educators towards doing practical and experiential work, as well as their want to make readers interested in the study of Science, to think that that their work was designed with aims closer to those expressed in the current Science curriculum. However, further research has shown there to be few similarities between the two. The General Curriculum Outcomes of the Atlantic Science Curriculum as as follows:

“Science, Technology, Society, and the Environment: Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology.

Skills: Students will develop the skills required for scientific and technological inquiry, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions.

Knowledge: Students will construct knowledge and understandings of concepts in life science, physical science, and Earth and space science, and apply these understandings to interpret, integrate, and extend their knowledge.

Attitudes Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge to the mutual benefit of self, society, and the environment.”⁷¹

From comparing these outcomes to the aims that authors and editors indicated with their text books, we find very few similarities. The only real commonality is in the attitudes of students. Both

68 Annus Mirabilis. (November 1, 2010) In Wikipedia, the free encyclopedia. Retrieved from http://en.wikipedia.org/wiki/Annus_Mirabilis_papers.

69 Albert Einstein. Dr. Ljubo Vujovic, Tesla Memorial Museum of New York. Retrieved from, <http://www.teslasociety.com/einstein.htm>

70 Henry Ford changes the World, 1908. (2005). EyeWitness to History. Retireved from. <http://www.eyewitnesstohistory.com/ford.htm>

71 Atlantic Canadian Science Curriculum, Grade 3. 2002

time periods are in agreement on having students develop a keen and genuine interest in learning science. There is also importance placed on learning about environmental and social contexts of science in both times. However, the Science during 1900 – 1910 was concerned with mastering the Earth and supporting the country agriculturally. Whereas today's social and environmental curriculum contexts are more focused on sustainability and man's relationships with the Earth.

The aims of the two curricula are also meant to be accomplished in radically different ways. The current science curriculum is driven to develop scientific literacy. The aim of science education in the Atlantic provinces is to create diverse learning experiences that get students to “explore, analyze, evaluate, synthesize, appreciate, and understand the interrelationships among science, technology, society, and the environment.”⁷² Students are expected to “do” inquiry based learning, make connections, “do” problem solving, and construct their own knowledge. None of these adjectives are used in the Science documents from 1900-1910. The work done in Science during the early 1900s was all observation based practical work. Students were not experimenting, asking questions or creating their own knowledge. Obviously there was very little technology that played a role in science education, unlike today's curriculum that places great significance on the use of technology. Instead students are asked to observe: demonstrations by the teacher, what they see in nature, the gardens, and samples in the classroom. The students then answered questions based on their observations. The Curriculum of 1900-1910 was observation based rather than inquiry based. However, it is noted in most texts from the time that this is a move away from the previous practice of fact based learning. We see this decade as the first step towards our current science curriculum by recognizing the importance of practical work and not just relying on retaining facts.

It would appear the economy of New Brunswick had much more influence over Science education in New Brunswick during 1900-1910 than we had originally thought. The majority of workers during this decade were employed in the Agricultural Industry. As such, the Science curriculum was often designed with educating students so they could go onto work in this field. This is why the Science curriculum primarily focuses on nature studies. They were preparing students, particularly boys, with knowledge about plants, animals, soil, climate, and crops so that they could contribute to the economy of the province. Showing that the students studied agriculture was also beneficial to the images of schools. Especially in rural areas where children were often needed at home on their farms. If schools could show they were teaching children how to be good workers, in the future they could gain more community support. This is why school gardens were so prevalent in rural schools. They made the schools look attractive and useful, while giving students opportunities in training to work in the Agriculture industry later in life. Therefore, science education was not so much designed with meeting standard goals of scientific pursuit but rather as a reflection of the social context of that time.

Conclusion

To our surprise, the science education of 1900-1910 does not hold the same motivations as the current science curriculum. The current curriculum is rooted in inquiry based learning, where students are encouraged to completely engage themselves in problems in a variety of different ways, they actively “do” science. This process is intended to promote and instill scientific literacy skills in students of the current public school educational experience. Science during the first decade of the twentieth century had economic implications instilled within its mandate. The observation based activities that teachers would transfer to their students did not promote the same values the 2010 science curriculum does. Only through observation and a checklist could science in the 1900-1910 decade be achieved.

72 Atlantic Canadian Science Curriculum, Grade 3. 2002

The economy of this decade was the major factor in determining what was learned in these early years of public education. It was essential to create a generation of skilled people who could continue the economic mode of production, hence the importance on agricultural relevant curriculum.