J. Acad. Entomol. Soc. 7: 14-19 (2011)

History and status of the Natural History Society of New Brunswick entomology collection: 1897-1931

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ABSTRACT

The Natural History Society of New Brunswick (NHSNB; 1862-1932) played a key role in the creation of the New Brunswick Museum (NBM), transferring its insect collection to the NBM upon the museum's opening in 1932. Here we review the history of the NHSNB insect collection, amassed mainly between 1897 and 1910, and report on the collectors involved and the experts and institutions sourced for specimen exchange and assistance with insect identification. The NHSNB entomology collection provides an important historical perspective on the early development of entomological research in Atlantic Canada and illustrates the wide-ranging scientific contacts established by one entomologist working in the Maritimes in the late 19th and early 20th centuries. William McIntosh, the principal collector, established contacts with various well-known amateur and professional entomologists across Canada and in the northeastern United States, gaining identification assistance in particular from specialists associated with the U.S. National Museum-U.S. Department of Agriculture. An inventory of the extant NHSNB insect specimens shows that 7,248 of an estimated 19,467 specimens present in 1914 remain, principally Lepidoptera, Coleoptera, Hymenoptera and Diptera. Despite losses, specimen records of scientific significance remain. About 30% of the 142 odonate species currently known from the Maritimes and southeastern Quebec are first documented on the basis of NHSNB specimens collected from 1898—1900, a 1906 specimen of *Eumorpha labruscae* (Lepidoptera: Sphingidae) remains the only one from Canada, and beetles that document the first occurrence of adventives help to establish time-lines for the introduction of non-native Coleoptera to the Maritimes.

RÉSUMÉ

La Société d'histoire naturelle du Nouveau-Brunswick (SHNNB, 1862-1932) a joué un rôle clé dans la création du Musée du Nouveau-Brunswick, transférant sa collection d'insectes au Musée quand celui-ci a ouvert ses portes en 1932. Nous récapitulons l'histoire de la collection d'insectes de la SHNNB, constituée surtout entre 1897 et 1910, et parlons des collectionneurs ainsi que des spécialistes et établissements qui ont participé à l'échange de spécimens et aidé à identifier les insectes. La collection de la SHNNB ouvre une perspective historique importante sur les débuts de la recherche entomologique dans le Canada atlantique et illustre le vaste réseau de contacts scientifiques que s'était créé un entomologiste à l'œuvre dans les Maritimes à la fin du 19e et au début du 20e siècle. William McIntosh, le collecteur principal, a établi des liens avec divers spécialistes et amateurs bien connus d'entomologie au Canada et dans le nord-est des États-Unis, obtenant de l'aide pour identifier les insectes, en particulier de la part des spécialistes du United States National Museum et du ministère américain de l'Agriculture. L'inventaire des spécimens d'insectes qui subsistent de la SHNNB montre qu'il reste 7 248 du nombre estimé de 19 467 spécimens que contenait la collection en 1914, principalement des lépidoptères, coléoptères, hyménoptères et diptères. Malgré les pertes, la collection contient des exemplaires scientifiquement importants. Environ 30 % des 142 espèces de l'ordre des odonates qu'on connaît des Maritimes et du sud-est du Québec sont d'abord répertoriés d'après les spécimens de la SHNNB recueillis entre 1898 et 1900. Un spécimen de *Eumorpha labruscae* (lépidoptère de la famille des sphingidés) de 1906 demeure le seul provenant du Canada, et des spécimens de coléoptères indiquent l'apparition d'espèces adventices dont ils aident à dater l'introduction dans les Maritimes.

Received 22 December 2010. Accepted for publication 25 January 2011. Published on the Acadian Entomological Society website at www.acadianes.ca/journal.html on 22 March 2011.

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INTRODUCTION

Research collections provide the foundation on which the scientific study of insects and other terrestrial arthropods rest (Wiggins et al. 1991). As concerns about biodiversity loss and change grow, the value of such collections will only increase, with older material often providing the baseline for monitoring, and current and future inventory work. Although Canada's larger insect collections (>100,000 specimens) are well known to entomologists, smaller but historically important collections may receive less attention. Such is the case with the insect collection of the Natural History Society of New Brunswick (NHSNB), mainly amassed between 1897 and 1910 and now housed with the New Brunswick Museum. In the interests of making the material in this collection better known to entomologists, we here provide a brief review of the history and current contents of this collection. Although the NHSNB collection has been integrated into the growing insect collection now maintained by the New Brunswick Museum (now exceeding 100,000 specimens), significant parts of the collection have been databased electronically, allowing information about portions of the historic collection to be readily extracted. Databasing efforts are ongoing. Information presented here has been extracted directly from this database or taken from specimen labels, from the published Bulletin of the NHSNB, and from an unpublished manuscript probably prepared about 1914 by William MacIntosh, the curator and principal collector of the NHSNB insects and the first Director of the New Brunswick Museum [McIntosh undated A]. We use the circa 1914 manuscript collection figures, as provided by McIntosh, as a baseline. Although insect specimens were clearly collected by McIntosh and perhaps others after this date, growth in the permanent NHSNB insect collection seems to have been minimal after 1914. Much of the material acquired after this date seems to have been used to support educational programs presented by McIntosh, or was dispersed to school teachers and those in the agricultural community.

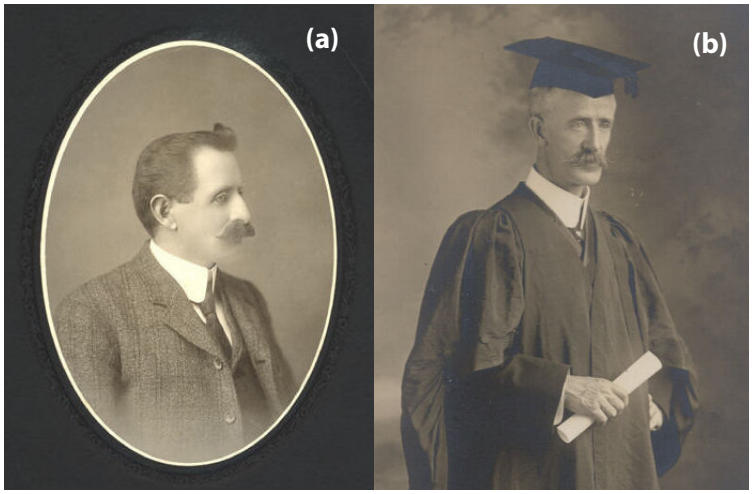
Development of the NHSNB Entomology Collection

The NHSNB, established in 1862 in Saint John, New Brunswick, amassed significant natural history, archaeological, and historical collections and established a museum open to the public. The Society's collections were transferred to the New Brunswick Museum shortly before it first opened its doors in 1932. The NHSNB was a leading scientific organization of its time with international ties (Buhay and Miller 2010). As with institutions and like-minded Societies in the United States (Sorensen 1995), the NHSNB provided some of the initial support and encouragement needed for the early growth of entomological research in the Maritimes. However, the NHSNB founding members' principal interests were geology, and to a lesser degree botany and ornithology, and it was apparently not until about 1884 that the Society received any donations of insects to its collections. Among these early donors was Mrs. C.E. Heustis, certainly one of Canada's earliest female entomologists and a contributor of observations to the journal The Canadian Entomologist during the late 1870's (i.e., Huestis 1879). Unfortunately, these early collections have not survived, although it was reported for 1893 that the insect collection was the only part of the Society's museum holdings that was fully catalogued (Kain 1894). It was not until 1897, when William MacIntosh (Figure 1a) was reported to have curated the then existing insect collection and donations of 700 specimens (mainly collected by MacIntosh), that the collection now extant had its origins (Hall 1898). None of the specimens that now remain pre-date 1897. In a paper read before the Society in December 1898, McIntosh reported that less than 1000 specimens assembled by Heustis and other early collectors were still in the Society collection (McIntosh 1899a). By about 1914 he noted that most of this material had been "*exposed to light and insects and were almost entirely destroyed*" [McIntosh undated A].

The NBNHS Presidential address for 1900 makes it clear that MacIntosh's work on the insects of the province and the growing insect collection were viewed as some of the most significant work of the Society (Hay 1901). By then, McIntosh had already published several papers in the Society bulletin on the butterflies and noctuid moths of the province (McIntosh 1899a,b,c). Papers on the sphingid moths and Diptera of New Brunswick, and a supplementary list of the butterflies of the province, would follow shortly thereafter (McIntosh 1901, 1903, 1904). Ultimately, McIntosh went on to serve as part-time provincial entomologist for the New Brunswick Department of Agriculture from 1907—1932 (McTavish and Dickison 2007).

In his report to the NHSNB Council for 1905, McIntosh, then Chair of the Entomology Committee, was able to report that "*insect collecting has been carried on unremittingly during the past seven years…*" (McIntosh 1906). Although the NHSNB membership, by then, included some 206 men and women, it appears that it was largely McIntosh and his colleague, A. Gordon Leavitt (Figure 1b), who did most of

Figure 1. William McIntosh, circa 1920 (a) and A. Gordon Leavitt, circa 1917 (b). Both men were past their major insect collecting period when these photos were taken. **Photo credit:** New Brunswick Museum.



the entomological field work. McIntosh stated as much, when he reported that "*Messers. McIntosh and Leavitt have devoted nearly all their spare time to collecting [insects] during the past year [1905]*" (McIntosh 1906). Although the membership continued to grow, peaking in 1910 at 633 members of all classes (Squires 1945), if surviving specimens can be considered representative of collector effort, entomological activity was almost entirely restricted to McIntosh and Leavitt. About 80% of insects remaining in the NHSNB collection bear the labels of these two collectors; even their original collecting nets survive (Figure 2).

Figure 2. Insect collecting nets believed to have been used by William McIntosh and A. Gordon Leavitt. NBM Collection 2010.37.1. 2).

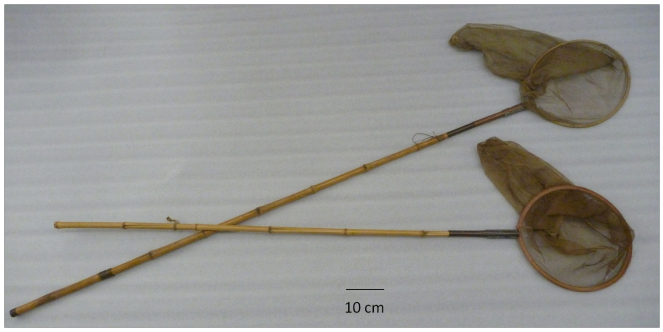


Table 1 lists collectors represented in the insect collections now remaining, their years of activity, and the insect orders collectors deposited. It is worth noting that with the exception of George Morrisey (a junior member during his collecting period), G.D.F (George DeForest?), another junior member, and Philip R. McIntosh ("P.R.M", nephew of Wm.), nearly all the other collectors listed are well known professional entomologists, including D.H. Clemens (U.S. National Museum, Washington), James G. Needham (Lake Forest University, Illinois), P.H. Timberlake (U.S. Department of Agriculture, Washington), J.D. Tothill (Entomological Branch, Ottawa), C.H. Townsend (U.S Department Agriculture), C.H. Tyler Townsend (U.S Department Agriculture), B.H. Walden (Connecticut Agricultural Experiment Station), and H.F. Wickham (University of Iowa). All were associated with universities or government entomological agencies in Canada, or more often, the United States, presumably sending specimens (nearly all of which were collected between 1907—1910) from regions outside the Maritimes on exchange.

By 1909, intense collecting by McIntosh and Leavitt, now both in their early 30's, seems to have tapered off. Leavitt (1909), as Chair of the NHSNB Invertebrate Committee reported that "*very little has been done in this department [in 1909], the collections being already sufficiently full for our present needs… About 500 insects have been collected, most of which were sent to other institutions*". In the following year, McIntosh, who had now been employed as a full-time curator for the Society for several years, noted that "*The educational work of the Museum…is…considered the most important department of modern Museum work*" (McIntosh 1910). It appears that McIntosh's interests had begun to shift to museum education, work for which he was later rightly recognized (Squires 1945). Nonetheless, insects continued to be acquired; "*A considerable number of insects…were collected during the year*" (McIntosh 1913). Leavitt's contributions included several new sawfly species later

Table 1. Extant entomological specimens from the Natural History Society of New Brunswick Collection organized by collector[1] showing number of specimens, date collected, and insect Orders donated by each collector.

Collector	Specimens	Date	Orders
D.H. Clemons	6	1908-1910	Diptera
G.D.F.[1]	22	1907	Coleoptera
? Hatch	4	1908-1910	Diptera
A.G. Leavitt	2601	1902-1907	Odonata, Coleoptera, Diptera, Lepidoptera, Homoptera, Hymenoptera
Philip R. McIntosh	796	1897-1902	Odonata, Plecoptera, Orthoptera, Hemiptera, Neuroptera, Coleoptera, Diptera, Lepidoptera, Trichoptera, Hymenoptera
William McIntosh	3121	1897-1930	Odonata, Plecoptera, Orthoptera, Hemiptera, Neuroptera, Coleoptera, Diptera, Lepidoptera, Trichoptera, Hymenoptera
B. Morrisey	1	1904	Lepidoptera
G. Morrisey	123	1907-1909	Coleoptera, Diptera, Lepidoptera, Hemiptera
James G. Needham	7	1907	Coleoptera
J. Russell	1	1907	Homoptera
W.R. Thompson	43	1908-1910	Diptera
P.H. Timberlake	385	1907-1910	Diptera
J.D. Tothill	3	1908-1910	Diptera
C.H.T. Townsend	9	1908-1910	Diptera
B.H. Walden	22	1911	Coleoptera
H.F. Wickham	81	1898-1928	Coleoptera

[1]George DeForest?

NOTE: Total is lower than Table 2 due to 23 NHSNB specimens lacking collector data

described by others, including the namesake *Phyllocolpa leavitti* (Rohwer, 1910) (Hymentoptera: Tenthredinidae), notice of which appeared in the local St. John Sun and Telegraph newspaper (Anonymous 1910). By 1914 it appears that a good deal of insect material was being directed to the educational programming of the NHSNB , with McIntosh reporting that "*so much material has been given to schools and farmers and used for educational exhibits as to seriously deplete the general collection*." [McIntosh undated A].

McIntosh also sought and received the assistance of various professional and amateur specialists, sending insect specimens for identification to entomologists in Canada and the United States. James Fletcher, Dominion Entomologist and Botanist in Ottawa, identified various insects; beetles went to H.F. Wickham in Iowa; and, Lepidoptera were sent to Hermann Strecker, a well known private collector resident in Pennsylvania. Geometrids went to the Rev. G.W. Taylor, based in Vancouver and Honourary Provincial Entomologist for British Columbia, while noctuids were identified by Dr. Rodrigues Ottolengui, a New York dentist and member of the New York Entomological Society. Some bees were examined by noted apiarist and authority on bees, F.W.L. Sladen, probably after he had emigrated from England to Canada in 1912 to assume an appointment as Dominion Apiarist in Ottawa. A few dragonflies were identified by James G. Needham, probably during his tenure at Lake Forest University, Illinois, but most remained unexamined until the recent intensive work on the odonates of the region initiated by Brunelle (2010) in the 1980's. Perhaps surprisingly, McIntosh does not seem to have drawn on the expertise of E.M. Walker (University of Toronto), who was publishing on Canadian Orthoptera from 1897 to the late 1950's, or when he began to publish on Odonata from about 1905 (Wiggins 1966). That there is no evidence that McIntosh consulted Walker when the latter began to publish on the Odonata of the Maritimes in 1917, supports the suggestion that McIntosh's interests had largely shifted to public education by then.

McIntosh, and perhaps Leavitt (who collected most of the Hymenoptera), seem to have drawn on the expertise of entomologists associated with the United States Department of Agriculture-United States National Museum (USDA-USNM) insect collection in particular. John B. Smith identified some noctuids; moths in general were examined by William Beutenmuller and Harrison G. Dyar; and, some Coleoptera were sent to H.H. Harrington. However, there is no evidence beetles were sent to the Canadian coleopterist, W.H. Harrington, who Majka et al. (2006) suggest examined a specimen of *Myodites zeschi* LeConte (Coleoptera: Ripiphoridae), reported in a manuscript list of beetles that appears to have been prepared by William McIntosh about 1914 [McIntosh undated B]. H.H. Harrington, H.F. Wickham, or McIntosh himself, likely identified this specimen, although there is nothing on the manuscript list to indicate who might have done so. Diptera were sent to D.W. Coquillet and sawflies to H.H. Harrington and S.H. Rohwer, all of the USDA-USNM.

By about 1914 there were over 24,000 specimens in the NHSNB insect holdings, of which 19,467 had been incorporated into the collection, with Lepidoptera dominant. Although McIntosh does not state the number of Lepidoptera in the collection, based on the figures for other orders he provides in his unpublished manuscript, it would seem that about 5500 Lepidoptera were in the collection at that time.

Current NHSNB Holdings

The surviving NHSNB insect specimens number 7,248, with more than one-third of these belonging to the Hymenoptera (Table 2). All of the Odonata seem to have survived. Survival of specimens among other orders varies tremendously, from about 5% for Orthoptera to 60% for Hymenoptera. In absolute terms, the greatest losses have occurred among the Lepidoptera, with an estimated 4920 specimens lost, followed by Coleoptera, Diptera, and Hymenoptera with 3092, 2000, and 1663 lost, respectively.

Table 2. Number of insect specimens by Order reported by McIntosh [undated A] in the Natural History Society collection circa 1914 and extant in the New Brunswick Museum in 2010.

Order	Number of specimens	
	1914	2010
Odonata	231	273
Plecoptera	?	27
Orthoptera	129	6
Hemiptera	442	101
Neuroptera	?	3
Coleoptera	4187	1095
Diptera	3365	1365
Lepidoptera	6700?	1780
Trichoptera	?	78
Hymenoptera	4183	2520
Total	~19467	7248

In spite of these losses, specimen records of scientific significance remain. About 30% of the 142 odonate species currently known from the Maritimes and southeastern Quebec (Brunelle 2010) were first documented on the basis of specimens collected (mainly by Philip McIntosh) from 1898—1900, and these still reside in the NHSNB collection. A specimen of *Eumorpha labruscae* (Linnaeus) (Lepidoptera: Sphingidae), a southern sphinx moth, was noted by McIntosh in his Annual Report to the NHSNB Council for 1906. This specimen remains the only one from Canada (J.D. Lafontaine, Canadian National Collection (CNC), Ottawa, Ontario, personal communication to DFM). Included among the beetles are specimens that document the first occurrence of adventives and, therefore, help to establish time-lines for the introduction of non-native Coleoptera to the Maritimes, including *Quedius mesomelinus* (Marsham) (Staphylinidae), *Attagenus unicolor japonicas* Reitter (Dermestidae), *Ernobius mollis* (Linnaeus) (Anobiidae), *Gymnetron tetrum* (Fabricius)(Curculonidae), *Hypera zoilus* (Scopoli) (Curculonidae), and others. Many of these, and other first beetle records for the region in the NHSNB collection, have been reported on in the various recent papers of Majka and co-workers (i.e., Majka 2007; Majka and Smetana 2007; Majka et al. 2007; Majka and Johnson 2008). As the collection is more fully databased and more closely examined by specialists, further specimens of significance will undoubtedly emerge.

While only about one-third of the original NHSNB insect collection survives, it nonetheless provides an important historical perspective on the early development of entomological research in Atlantic Canada in the late 19th and early 20th centuries. It also illustrates the wide-ranging scientific contacts established by one of the Maritimes earliest entomologists. Although McIntosh (1903) published an introductory annotated list of the Diptera of New Brunswick, flies still in the NBNHS collection have not been examined in nearly a century and many are unidentified. Few of the NBNHS Hymenoptera remaining in the New Brunswick Museum appear to have ever been examined by a specialist.

ACKNOWLEDGEMENTS

We thank Mary Sollows for taking the photo used in Figure 2 and Jennifer Longon and Janet Bishop, NBM Archives and Research Library, for locating and providing photographs of William McIntosh and A. Gordon Leavitt. This project had its genesis, in part, as a non-credit, independent studies project by ADF while a student at Rothesay High School. ADF thanks Mr. Thomas Mueller, Rothesay High School, for initiating the opportunity that lead to his introduction to the New Brunswick Museum entomology collections. Examination of historic insect material in the NBM collection was carried out in the course of digitizing specimen data, funded in part through the New Brunswick Wildlife Trust Fund and the New Brunswick Environmental Trust Fund, for use in National Species Status Assessments.

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