

CONTRIBUTIONS TO THE HISTORY OF CANADIAN MALACOLOGY

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INTRODUCTION

Some years ago I finished the manuscript of a Catalogue of Canadian Mollusca which was published (La Rocque, 1953) by the National Museum of Canada. The introduction to this work included an outline of the history of malacological work in Canada but the manuscript proved so lengthy that I was asked to excise the history from it in order to produce a catalogue of manageable size. This was done and in the intervening years I have added to the history as materials became available. The revised and somewhat expanded paper is presented here in the hope that it may prove useful to those who have come into the field in recent years and that it may bring back pleasant memories to those who knew some of the scientists mentioned in these pages who have died in the last few years.

It would be somewhat presumptuous to call these notes a history since much work remains to be done before a complete account of malacological work in and about Canada emerges. Using the title "Contributions" has the further advantage of inviting others to add to them and to put on paper information available to a few or buried in correspondence files or archives where they may eventually be lost. The gaps in the subject

will be all too evident to those who read this account; calling attention to the gaps may induce others to fill them. Such is my hope in presenting this incomplete account in the following pages.

There is a tendency in Canada to deplore the country's proximity to a large and more powerful neighbor. In science, at least, that proximity has had and still has advantages for the smaller country, advantages which are demonstrated in a small way by the development of malacology in Canada. Many workers south of the border have helped in many ways ranging from collecting expeditions to valuable assistance in identifying specimens. In general, I think it would be fair to say that in this field, at least, the United States has both helped and stimulated development. Particularly in systematics and in ecological and anatomical work, anything done on the Mollusca of the northern states has a bearing on Canadian species. In addition, the doors of American Universities and scientific institutions have always been open wide to qualified Canadians many of whom have taken advantage of the opportunities offered and returned to Canada with improved skills and knowledge.

In preparing this account, I have adhered to my original policy of confining myself largely

to personalities no longer living. The thinning of the ranks since the first draft of this paper was prepared for presentation at the A.M.U. meetings in Toronto in 1939 has made it imperative to include the work of distinguished Canadians such as Frank R. Latchford and that of their American friends, such as Bryant Walker, Calvin Goodrich, Imogene C. S. Robertson, Clifford Blakeslee, Henry A. Pillsbury, Victor Sterki, and many others. I trust that those still living who had a hand in shaping the course of malacology in Canada will forgive me for omitting them.

The course of events of importance to malacology and a few dates indirectly influential on the development of our field are enumerated in the Chronological Table which follows. In the remainder of the paper I have discussed trends, accomplishments, reminiscences, personal and otherwise, which may be of interest.

References cited have been reduced to a minimum here; a full list will be found in my Catalogue (La Rocque, 1953) except for a few, omitted there since they relate particularly to history, which are given under References Cited.

CHRONOLOGICAL TABLE

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| 1534 Jacques Cartier discovers Canada. | 1836 Sowerby's Mollusca in Richardson's Fauna Boreali-Americana. |
| 1578 Parkhurst writes on shells from Newfoundland. | 1839 Gray on shells of Beechey's Arctic Voyage. |
| 1608 Champlain founds Quebec. | 1840-1845 Haldeman's Monograph of the Limniades. |
| 1612 Lescarbot's "Histoire de la Nouvelle France" published. | 1841 Queen's University founded. |
| 1613 Champlain's "Voyages" published. | Gould's Invertebrates of Massachusetts. |
| 1636 Harvard College founded. | 1842 Foundation of the Geological Survey of Canada. |
| 1663 Laval University founded. | 1843 DeKay's Zoology of New York, Mollusca. |
| 1672 Nicholas Denys' "Description géographique et historique ... histoire naturelle de l'Amérique septentrionale." | 1846 Albany Hancock on shells from Davis Straits. |
| 1693 Collège of William and Mary founded. | 1848 Ottawa University founded. |
| 1701 Yale founded. | 1850 Gould, Mollusca in Agassiz' Lake Superior. |
| 1740 University of Pennsylvania founded. | Forbes on Mollusca of the "Herald" and "Pandora." |
| 1746 Princeton founded. | 1855 Lovell Reeve on shells of the "Assistance" Voyage. |
| 1754 Columbia University founded. | 1857 First volume of the Canadian Naturalist and Geologist, Elkanah Billings, Editor. |
| 1763 Canada ceded to Great Britain. | Willis on Shells of Nova Scotia. |
| 1804 Maton and Rackett's history of conchology published. | 1858 Robert Bell on shells collected for the Geological Survey of Canada. |
| 1816 Thomas Say's article in Nicholson's Encyclopedia. | - Elkanah Billings on freshwater shells. |
| 1817 University of Michigan founded. | - J. W. Dawson on Mollusca of Gaspé Bay. |
| 1821 McGill University founded. | 1859 Robert Bell on natural history of the Gulf of St. Lawrence. |
| 1822 Rackett's description of Canadian shells. | - P. P. Carpenter on Labrador shells. |
| 1824 Say's description of shells of Long's Expedition. | - D'Urban on Argenteuil and Ottawa counties. |
| J. E. Gray's shells of Parry's Voyage. | 1859-60 D'Urban on shells of the Rouge River. |
| 1827 University of Toronto founded. | 1861 Robert Bell on post-Tertiary shells and Lake Superior shells. |
| 1830 Mrs. Sheppard on the shells of Quebec. | |
| 1834 R. Owen, shells of Ross Arctic Expedition. | |
| 1835 R. Owen on shells of the Northwest Passage Expedition. | |

- 1861 W. G. Binney: Northwest Territories collections by Ross, Kennicott and Drexler.
 - Chapman, two papers on "drift."
 - A. E. Williamson on shells of Toronto.
- 1862 Stimpson on Hudson Bay and Pleistocene of James Bay.
 - Willis on marine shells of Nova Scotia.
 - Whiteaves on land and freshwater shells of Lower Canada.
- 1863 Whiteaves' second paper on land and freshwater shells of Lower Canada.
 - Baird on British Columbia shells.
 - Packard on Labrador shells.
 - Willis on Nova Scotia shells.
- 1864 Baird and Lord on Dentaliidae especially of British Columbia.
 - P. P. Carpenter, four papers.
- 1865 P. P. Carpenter on Vancouver Island. Tryon begins publishing the American Journal of Conchology.
 - Stimpson on Buccinum in Canadian Nat. & Geol.
- 1866 Lord's book on British Columbia.
- 1867 Confederation.
 - Packard on shells of Labrador and Maine.
 - Willis on Littorina littorea in Nova Scotia.
- 1869 Whiteaves on marine Mollusca of Eastern Canada.
- 1870 Binney's Gould published.
 - Whiteaves' second paper on marine Mollusca of Eastern Canada.
- 1871 Smith and Verrill on Lake Superior shells.
 - Whiteaves' third paper on marine Mollusca of Eastern Canada.
- 1872 H. Alleyne Nicholson on shells dredged in Lake Ontario.
- 1873 Carpenter's Mollusca of Western North America.
- 1874 Kent on Newfoundland giant squids.
 - Whiteaves' fourth paper on marine Mollusca of Eastern Canada.
 - Verrill's two papers on giant squids.
- 1875 Verrill on giant squids again.
 - G. M. Dawson on Mollusca of the 49th parallel.
- 1876 Jeffreys' Mollusca of the "Valorous."
 1877 Jeffreys' on the "Valorous" again.
 - Verrill on giant squids,
 - Jones on Nova Scotia shells.
- 1878 Whiteaves on West Coast marine shells.
- 1879 Jeffreys' "Lightning" and "Porcupine" Mollusca.
- 1880 Robert Bell on Manitoba shells.
 - Boettger on Hudson Bay shells.
 - Whiteaves on West Coast marine shells.
 - Whiteaves on shells of Manitoba and the Nelson River.
 - Heron on shells of Ottawa.
- 1881 Whiteaves on shells of Hudson Bay.
- 1882 Latchford on Ottawa Unionidae.
 - Verrill on Newfoundland giant squids.
 - A. F. Gray on Unio borealis near Ottawa.
- 1883 Katherine J. Bush on Labrador Mollusca and Echinodermata.
- 1884 Ami's list of fossils from Ottawa region.
 - Latchford on Anticosti shells.
 - Matthew on shells of the Bocabec site, New Brunswick.
- 1885 F. Bain on shells of Prince Edward Id.
 - Christie on Manitoba shells.
 - Ganong's 2 papers on New Brunswick shells.
 - Latchford on Manitoba shells.
 - J. W. Taylor on the same subject.
 - Westerlund's "Vega" Expedition Mollusca.
 - Verkrüzen on Newfoundland shells.
- 1886 Conchologist's Exchange begins publication.
 - Dall on shells from Ungava Bay.
- 1887 Ganong on New Brunswick Mollusca.
 - Tyrrell on shells from Alberta and Saskatchewan.
 - Whiteaves on British Columbia shells.
- 1888 Binney's reprinting of Say's works.
 - Winkley on New Brunswick shells.
- 1889 The Nautilus succeeds the Conchologist's Exchange.
 - Ganong on Mollusca of Acadia.
 - G. W. Taylor on Vancouver Island shells.
- 1890 Ganong on John Robert Willis' life and work.
 - Hanham on Hamilton, Ontario, Mollusca.
 - Provancher on Quebec Mollusca.
 - Taylor and Latchford's Ottawa list.
- 1891 Cockerell on British Columbia slugs.
 - Leslie on Hamilton, Ontario, Mollusca.
 - G. W. Taylor on Vancouver Id. land snails.
- 1892 Farrer on "Planorbis multivalvis in Newfoundland.
 - C. C. Nutting's Saskatchewan R. paper.

- 1892 G. W. Taylor's checklist of Canadian non-marine Mollusca.
- Bryant Walker on Michigan Mollusca.
- 1893 Hanham on Gaspé shells
- C. F. Newcombe on marine shells of British Columbia.
- 1894 Frank Smith on Lake St. Clair fauna.
- 1895 G. W. Taylor's Catalogue of West Coast marine Mollusca.
- A. P. Coleman's two papers on the Don beds at Toronto.
- 1896 Lemon on Ontario shells.
- 1897 Ami on Post-Pliocene Mollusca of the Ottawa Valley.
- Dall on British Columbia marines.
- Hanham on Quebec City Mollusca.
- 1898 Ganong on Mollusca of the Bay Chaleur.
- Lemon on interglacial fauna at Toronto.
- 1899 Randolph on shells from the Yukon.
- Hanham on Manitoba shells.
- 1899-1900 Grant on Hamilton Mollusca.
- 1900 Bryant Walker's Additions to the Canadian list.
- 1901 Ami's lists of Ottawa District fossils.
- Whiteaves' Catalogue of Marine Invertebrates of Eastern Canada.
- 1902 Brodie on animal remains from Indian village sites.
- 1903 G. W. Bailey's New Brunswick list.
- 1904 Whiteaves on Newfoundland Mollusca.
- Bryant Walker on Canadian shells.
- Schmitt's monograph of Anticosti.
- 1905 Dall's Harriman-Alaska report.
- Five papers by Whiteaves.
- 1906 A. R. Campbell's Pictou County list.
- Chadwick on Prince Edward Island.
- Vanatta on British Columbia shells.
- 1907 Clapp on shells of Magdalen Islands.
- E. B. Williamson on shells north of Sault Ste Marie, Ont.
- Bryant Walker on Cobalt marl shells.
- Ives on Prince Edward Island shells.
- 1908 Wintenberg on use of shells by Ontario Indians.
- 1909 Lermond's Maine list published.
- 1910 Victoria Memorial Museum completed and occupied.
- Dall and Bartsch on B. C. marines.
- Ganong on the early voyages to Canada.
- 1911 Allen records Lymnaea auricularia from Canada.
- F. C. Baker's Lymnaeidae published.
- 1912 Ardley on Ostrea in the Pleistocene of Montreal.
- 1913 Stafford on the Canadian Oyster.
- Dall and Bartsch on new marine species from both coasts of Canada.
- Hanham on B. C. marines.
- Robertson's Toronto list.
- 1914 World War I begins.
- Simpson's Catalogue of the Naiades published by Bryant Walker.
- Nylander on shells of the St. John River.
- C. F. Newcombe on Pleistocene raised beaches in British Columbia.
- 1915 A. D. Robertson on Georgian Bay, Ont.
- C. W. Johnson's New England Mollusca.
- 1916 Sterki's Catalogue of Sphaeriidae.
- Kindle's paper on Bay of Fundy Mollusca.
- 1917 E. M. Walker on land snails near Lake Simcoe, Ontario.
- Lillian Thompson on Nova Scotia shells.
- Kindle on Nova Scotia marines.
- 1918 World War I ends.
- Grier's paper on Lake Erie Naiades.
- Whittaker on McKay Lake fauna.
- Bryant Walker's Synopsis published.
- Kindle and Whittaker's Bathymetric checklist published.
- 1919 Dall on Mollusca of the Canadian Arctic Expedition (followed by several others).
- Andrew Halkett on the scallop.
- Wintenberg on Helix hortensis in Nova Scotia.
- 1920 Two more papers by Grier on Lake Erie.
- 1921 Dall's West Coast list.
- Whittaker on marl shells in Ontario.
- O'Donoghue on West Coast nudibranchs.
- 1922 S. S. Berry on land snails from the Canadian Rockies.
- Coleman on Pleistocene lakes.
- O'Donoghue, 3 papers on nudibranchs.
- Whittaker on McKay Lake.
- Bryant Walker's Goderich list.
- Ortmann and Walker's paper on nomenclature of the Naiades.
- Latchford's account of Canadian Sphaeriidae completed.

- 1923 Adamstone's two papers on L. Nipigon.
- Mant on Vancouver Island shells.
- 1924 Adamstone on bottom fauna of Lake Nipigon.
- Whittaker on shells of Mackenzie River basin.
- Macoun on Vancouver Id. marines.
- Johansen on shells from Anticosti.
- Ida S. Oldroyd's West Coast Pelecypoda published.
- 1925 Crickmay on Pleistocene of British Columbia.
- Dall on British Columbia marines.
- Dall on Canadian Arctic Expedition Pteropoda.
- Vanatta on Newfoundland shells.
- Mozley's first of a long series of papers on western and northern Canada.
- Kindle on Lake Ontario dredgings.
- 1926 Dall on St. Lawrence collections made by Johansen.
- O'Donoghue on nudibranchs.
- Winslow's Michigan checklist.
- Johnson on Labrador, Newfoundland, and Nova Scotia shells.
- Johansen on shells of the "Arctic."
- 1927 Museum Branch of the Department of Mines officially designated "National Museum of Canada."
- O'Donoghue on nudibranchs.
- Frierson's checklist of Naiades published.
- Tolmachoff on Pleistocene of Lake St. John.
- Oldroyd's Gastropods published.
- 1928 F. C. Baker's Fresh Water Mollusca of Wisconsin published.
- Rawson on Lake Simcoe.
- 1929 Crickmay on Pleistocene of B. C.
- Henderson's Mollusca of Oregon and Washington.
- Hayes on Nova Scotia Littorina.
- 1930 Ahlstrom on Lake Erie Mollusca.
- Rawson on Lake Simcoe Mollusca.
- Vanatta on Newfoundland shells.
- 1931 Two papers by F. C. Baker.
- Baker and Cahn on Central Ontario.
- Foundation of "Conchological Society of America" with one Canadian charter member.
- 1932 F. C. Baker, two more papers.
- Cronk on Shakespeare Island Lake, Ont.
- Goodrich and van der Schalie on Naiades of the Great Lakes.
- Goodrich's Mollusca of Michigan.
- 1933 F. C. Baker on Canadian Lymnaeidae.
- Goodrich on Mollusca of Moose Factory.
- 1934 Three papers by F. C. Baker.
- George E. Fairbairn on McKay Lake shells.
- Johnson's Checklist of marine Mollusca, Labrador to Texas.
- 1935 C. L. Newcombe on Nova Scotia Mya arenaria.
- Mattox's first paper on Campeloma.
- Henderson's Fossil non-marine Mollusca of North America.
- 1936 Two papers by F. C. Baker.
- Brooks on Newfoundland non-marines.
- Nichols on Arctic raised beaches.
- 1937 F. C. Baker's Mollusca of Prince Albert National Park, Saskatchewan.
- G. E. Fairbairn on Ottawa Mollusca.
- Goodrich on Canadian Goniobasis.
- 1938 Brown, Clark, and Gleissner on Lake Erie Naiades.
- Fairbairn on "Helix rufescens" at Ottawa.
- M. W. Smith on Lake Jesse, Nova Scotia.
- 1939 World War II begins.
- F. C. Baker on Western Ontario shells.
- Goodrich on Pleuroceridae of the St. Lawrence drainage.
- 1940 Brooks and Brooks on Newfoundland non-marine Mollusca.
- Medcof on Campeloma.
- Kerswill on Eastern Canadian Pteropoda.
- Mattox on Campeloma.
- 1941 Nylander on marl shells from Quebec.
- 1942 Goodrich on Pleuroceridae of the Pacific drainage.
- 1943 Nylander on marl shells from Quebec.
- Nylander on Lymnaeidae of eastern Canada.
- 1944 Herrington's first paper on Sphaeriidae.
- 1945 World War II ends.
- F. C. Baker's Planorbidae.
- Palmer on the Carpenter Collection.
- 1948 Robertson and Blakeslee's Niagara Frontier Mollusca.
- 1958 Palmer's memoir on Carpenter's types.

PRE-LINNEAN WRITERS

Mollusca are mentioned incidentally by many explorers and discoverers. One of the earliest is a letter to Richard Hakluyt "containing a report of the true state and commodities of Newfoundland" by "M. Anthonie Parkhurst Gentleman, 1578" given by Hakluyt, vol. 3, pp. 170-174: "As thouching the kindes of Fish ... there are ... Oisters, and Muskles, in which I haue found pearles about 40 in one Muskle, and generally all haue some, great or small. I heard of a Portugall that found one woorth 300 duckets. There are also other kinds of shell-fish, as limpets, cockles, wilkes, lobsters, and crabs."

Another writer in Hakluyt (same vol., p. 194) describing Sir Humphrey Gilbert's voyage to Newfoundland in 1583, says that oysters occur there; "Oysters hauing pearle but not orient in colour: I tooke it by reason they were not gathered in season." Ganong thinks that "he must confound some other mollusc with the Oyster." A little farther on, the same writer says; "Lakes or pooles of fresh water, both on the tops of mountaines and in the vallies. In which are sayd to be muskles not unlike to haue pearle." This may be the earliest record of freshwater Mollusca in Newfoundland.

Jacques Cartier, although he gives copious remarks on the animals and plants of Canada, does not mention any invertebrates.

Champlain, in his Voyages (1603 or 1613) records the presence at what is now Weymouth Harbour, St. Mary's Bay, Nova Scotia, of "many Shell-fish, such as Mussels, Cockles and Sea-snails" which he observed in his exploration of 1604. At St. Croix, now Dochet, Island in the St. Croix River, he found Cockles, Mussels, and Sea-snails. His other reference to Mollusca is in his description of Bras d'Or Lake, Cape Breton, in which he says, "there are many islands, filled with a great deal of game, and shell-fish of several kinds, among others of Oysters which are not of good flavor."

Lescarbot (*Histoire de la Nouvelle France, 1609*) speaks of the occurrence of Mussels at St. Croix Island, and referring to the natural productions of the country, he says: "I would be forced to make an entire book if I should discourse on all the fishes ... but I will restrain myself to two or three, after having said that at Port Royal there are great beds of Mussels, with which we filled our boats when sometimes we went to those places. There are also there, Scallops, Palourdes twice as large as Oysters in size; also Cockles, which have never failed us."

Nicholas Denys ("*Description géographique et historique des Costes de l'Amérique Septentrionale*" and "*Histoire Naturelle ... de l'Amérique Septentrionale*") gives several observations of interest. He knew of the occurrence of the Oyster at several points in Nova Scotia, and mentions the abundance of shell-fish at several places, notably at Cape Sable, La Have Harbour, George's Bay, near the mouth of Bras d'Or Lakes, Tatamagouche, Miramichi, Bathurst, Port Daniel. He noticed Razor-clams (Coutellières) near Cape Sable and Scallops (Conniffles), at La Have. He also gave interesting descriptions of the Squid and the oyster fishery.

We must not expect too much from these early travel reports since they were not written in the same spirit as later scientific reports. They are permeated with a sense of wonder at the strange new country and its unfamiliar fauna and flora, not always conducive to exact description. The investigations themselves were slanted towards economic considerations, hence the obsession with pearls and edibility whenever Mollusca are mentioned. All of them may be suspected of at least slight exaggeration as to quantities available because of the constant preoccupation with bringing out the wealth of resources of the new regions visited. Their descriptions of Canada may be compared with the glowing accounts published two centuries later to entice settlers to various parts of the world, including Canada.

TRANSITION PERIOD

Early Linnean writers from Europe visited North America in the eighteenth century. Most of them collected all sorts of natural history objects which found a resting place in the museums of Europe but few of the Mollusca thus collected were described in separate papers dealing with Canada. Once natural history establishments of various kinds appeared in North America, papers on Mollusca began to appear in their Proceedings and Journals, for example in the publications of the Academy of Natural Sciences of Philadelphia and Silliman's Journal, later the American Journal of Science. During this period two names stand out, those of Thomas Rackett and Thomas Say, one in England, the other in the United States.

Thomas Rackett (1757-1841) was a country clergyman somewhat after the style of Gilbert White of Selborne. He established himself early as an antiquarian of ability and published many papers on antiquities. He became a Fellow of the Royal Society, of the Society of Antiquaries, and of the Linnean Society. In his eighties he took up conchology with enthusiasm but did not publish as voluminously on the subject as he had on antiquities. He is known to us chiefly for his "Description of some shells found in Canada" (1822). His *Helix monodon* is the land snail now called *Stenotrema leai* (Binney) and his *Helix angulata* falls in the synonymy of *Helisoma anceps* (Menke). His shells were collected on the shores of Lake Huron in 1816, by one Edmund Sheppard of the Royal Artillery who could well have been a relative of Mrs. Sheppard mentioned later in this paper.

Rackett's paper on Canadian shells was a short one of only two pages, but he published another with W. G. Maton (Maton and Rackett, 1804) on "An Historical Account of Testaceo-logical Writers" which lists writers from Aristotle to the end of the eighteenth century, one of the earliest histories of malacology.

Thomas Say (1787-1834) is the outstanding figure in American malacology in the first

half of the nineteenth century. In accuracy of description and thoroughness he is the acknowledged leader of his time. His complete works were reprinted by Binney and several accounts of his life have been published.

He described the shells collected by Long's Expedition in the region of Lake Superior including such typically Canadian species as *Helisoma corpulentum*, *Bulinnea megasoma*, and *Pogonetes harpa* which still bear the names he gave them.

QUEBEC GROUP

The first of Canada's scientific societies to produce a conchologist was the Literary and Historical Society of Quebec. Founded in 1824 under vice-regal patronage it was thriving in 1830 and had attracted the intelligentsia of the city. In that year it published a paper "On the recent shells which characterize Quebec and its environs," by Mrs. Sheppard. I have elsewhere (La Rocque, 1935d) given all the facts available to me about this lady. She was the wife of William Sheppard who, with his brother Peter, was a founder-member of the Literary and Historical Society. In the list of founders he is merely William Sheppard, Esquire, but later his articles are by "Honorable Wm. Sheppard, of Woodfield." He was three or four times president of the Society and the centenary volume (1924) mentions that his portrait is in the possession of the Society. In 1841 we find him listed with the corresponding members. It is probable, therefore, that the Sheppards lived in Canada some sixteen years, then returned to England. Wallace (Encyclopedia of Canada, vol. 5, p. 388) states that Sheppard was a member of the Executive Council of Lower Canada from 1837 to 1841 and that he died in 1867. Beyond this and the facts given above, we know nothing of the Sheppards.

In later years, the Literary and Historical Society confined itself almost exclusively to the subjects indicated by its name.

The next group of papers on the Mollusca

of Quebec appeared in the "Canadian Naturalist and Geologist" of Montreal, founded by Elkanah Billings who was its first editor, and in the reports of the Geological Survey of Canada. The availability of a new natural history periodical stimulated publication of data on Canadian Mollusca. Moreover, the Geological Survey was then located in Montreal and it attracted to its staff geologists and paleontologists who were also interested in natural history; the arrival of J. W. Dawson on the scene and his lectures on natural history at McGill University led to a flowering of interest in that field, including conchology and Pleistocene fossils. The newly founded Montreal Natural History Society appointed a curator in the person of Joseph Frederick Whiteaves, fresh from Oxford, who immediately began studies on the Mollusca of Canada, a subject which occupied him until his death in Ottawa in 1909.

The first volume of the Canadian Naturalist and Geologist appeared in 1857. It contains an unsigned paper on the freshwater gastropods of Canada (Anon. 1857) which I have credited doubtfully, and perhaps erroneously, to J. W. Dawson; it may have been written by Elkanah Billings. The latter is undoubtedly the author of "Notes on the Natural History of Montreal" which contains some data on shells. In the second volume (1859) Robert Bell of the Geological Survey lists some species from the Gulf of St. Lawrence. The Rev. Philip P. Carpenter has an article on Labrador shells and W. S. M. D'Urban the first half of his paper on shells of Argenteuil and Ottawa counties, Quebec. The remainder of this paper was published in the next volume of the Naturalist. D'Urban also published a list of shells for the same counties in the annual report of the Geological Survey for 1858 (published in 1859). Papers on Canadian Mollusca continued to appear in the Canadian Naturalist and Geologist and its successor the Canadian Record of Science until at least 1895.

Elkanah Billings (1820-1876) was born in the township of Gloucester, not far from the Rideau River, inside the present limits of the city of Ottawa. Trained for the law, he

practiced briefly in Ottawa, edited the "Bytown Gazette" for a time and in 1856 accepted an appointment as paleontologist to the Geological Survey of Canada. His new post required his removal to Montreal where the Survey was located and this brought him in contact with the group of naturalists just mentioned. His previous newspaper experience probably led him to initiate the Canadian Naturalist and Geologist as a side line to his duties with the Survey. A biographic sketch by Ami (1901) includes a list of Billings' publications.

Robert Bell (1841-1917) was born near Toronto, of Scottish parents. Both his father and his grandfather were Presbyterian ministers. His father had an interest in nature which he communicated to his son. Bell was attached to a party of the Geological Survey of Canada at the age of fifteen. Later he attended McGill University from which he graduated first in engineering and later in medicine. During his work with the Survey he visited many parts of Quebec and Ontario, collecting fossils, plants, and shells as part of his duties. He served for a time as "Interim Professor of Chemistry and Natural History" at Queens University but resigned from that position to return to field work with the Survey. In 1872 and 1873 he accompanied A. R. C. Selwyn on geological work from Lake Superior to Fort Garry; in later years he worked in northern Ontario, Manitoba, and the Athabasca-Mackenzie region. He did geological work in Hudson Bay, traveling on the "Neptune" and "Alert." In 1899 he worked in the area of Great Slave Lake. He was acting director of the Geological Survey from 1900 to 1906. His conchological work was incidental to his formal duties in the field but it was done in regions then so inaccessible that we owe to his industry the first records of many parts of Canada. After retiring from the Geological Survey in 1906 he went to live in Manitoba, where he died in 1917. A biographical sketch by Ami (1927) includes a list of his publications.

We know very little about W. S. M. D'Urban. Benjamin D'Urban, after whom Durban in South Africa was named, died in Montreal

in 1849. W. S. M. D'Urban may have been a son or other relative of his. His first paper, on Canadian birds, appeared in 1856 and some 12 other papers on natural history of Canada are listed by the Royal Society Catalogue of Scientific Literature. In 1863 he was writing on Ferns of South Africa and in 1865 on naturalized weeds of British-Kaffraria. He is said to have published in the *Zoologist* (London) as late as 1909.

Philip Pearsall Carpenter (1819-1877) was in Montreal from 1865 to his death in 1877. Mrs. Palmer (1958, pp. 7-14) has given an account of the life and scientific works of this remarkable clergyman which need not be repeated here. Suffice it to say that his presence in Montreal infected with his enthusiasm all those who came in contact with him. His extensive knowledge of the Mollusca of the world and his high reputation had great effect in stimulating the study of conchology in Montreal.

Joseph Frederick Whiteaves (1835-1909) arrived in Montreal in his middle twenties, already a Fellow of the Ashmolean Society, with several publications already in print, and an appointment as Curator of the Montreal Natural History Society. He was later to succeed Billings as paleontologist to the Geological Survey of Canada. He moved to Ottawa with the Survey in 1880 and died there in 1909. His main work was on the fossils collected by the field men of the Geological Survey and on monographic syntheses on Paleozoic and Mesozoic fossils but he maintained his interest in living Mollusca to the end and published on the subject as late as 1907. His collection of shells, which included species from all over the world, was acquired for the National Museum. How well I remember the characteristic pill-boxes filled with light blue or pink cottonwool and with glass tops in which his smaller shells were stored. Part of my work as a museum assistant with the Survey was to remove the dust of some twenty years which had already accumulated on them.

No really adequate biography of Whiteaves has yet appeared. The obituaries are sketchy

both on his life and on his scientific work. Information still exists in his letter books which are still in the care of the Geological Survey and some personal documents may still be in the possession of his grandchildren, some of whom still live in Ottawa and elsewhere in Canada.

Léon Provancher (1820-1892) came from an entirely different environment. He was born at Bécancour, Quebec, and at the age of fourteen entered the Seminary at Nicolet. Here his taste for natural history was first aroused by a short chapter on Botany in a book of general science.

In 1844, having completed his studies he was ordained to the priesthood and was assigned to his native parish of Bécancour as curate (*vicaire*), which post he occupied until 1847. In that year typhus was raging on Grosse-Isle among the Irish immigrants quarantined there in thousands and the Archbishop of Quebec no sooner sent a priest to minister to their religious needs than his legate contracted the dread disease. Provancher was one of forty-two young priests sent to this station; of these fully half contracted typhus and four died. Fortunately, Provancher was not one of them. In 1848 he was appointed curate of St-Gervais, then successively parish priest (*cure*) of St-Victor, Isle Verte, St-Joachim, and finally, in 1852, of Portneuf.

In 1858 he published his "*Traité élémentaire de Botanique*" the first of its kind in Quebec. Many publications followed, among them his "*Flore canadienne*" and some publications of a religious character.

In 1868 he began publishing the "*Naturaliste Canadien*" and for twenty years issued it regularly, writing most of the articles himself. In 1869 he retired from active work in the church, due to failing health, and made his home first at Quebec and then at Cap-Rouge, a few miles away. In 1890 he published a list of Quebec Mollusca and his "*Mollusques de la Province de Québec*." Of the latter he managed to issue the Cephalopods and Gastropods

before funds ran out; the Pelecypods were never published, to my knowledge. The work is well organized and compares favorably with regional accounts of the day.

Provancher was one of those rare men who had an unquenchable thirst for knowledge and a burning desire to transmit it to others. Only by careful husbanding of every spare moment was he able to accumulate his extensive knowledge of entomology, botany, and malacology. His chosen work was that of popularizer of biology in Quebec and this he accomplished in spite of the lack of publications, money, and public support. He wrote many text-books and monographs on the natural history of Quebec, his interests ranging from plants to mammals, birds, fishes, reptiles, and Mollusca.

He died in 1892 and was buried in the parish church of Cap-Rouge but for twenty-five years his grave remained unmarked. Rev. Canon Huard, his biographer and successor as editor of the "Naturaliste," started a subscription to erect a tablet marking his grave and was finally able to place a handsome marble slab over the last resting place of one who may well be termed the "Linnaeus of Canada."

Provancher's herbarium, correspondence, and library are preserved at Laval University, Quebec, where the "Naturaliste Canadien" is still published. So far, I have been unable to find out what became of his shell collection although it is probably also at Laval.

Finally, the names of workers better known in other fields must be mentioned here. They collected shells for Dawson, Whiteaves, and Billings and their contributions to the progress of malacology must not be neglected. Some of them, for example A. H. Foord, Sir William Logan, J. A. Dresser, were prominent geologists; others, such as R. J. Fowler, William Couper, and M. de Villeneuve, had sufficient interest in natural history to collect shells but they did not, so far as I know, publish anything on Quebec Mollusca. A. W. Hanham, Frank R. Latchford, Rev. G. W. Taylor, Pascal Poirier, George E. Fairbairn, and Olof

O. Nylander are mentioned elsewhere in this account although all of them either collected or published on Quebec Mollusca.

ONTARIO GROUP

Conchology has flourished at different times in three centers of Ontario, Hamilton, Toronto, and Ottawa, with a few isolated workers in other localities.

In Hamilton, the Hamilton Association had a conchological division, at least from 1889 to 1891, which consisted mostly of two enthusiastic workers, Hanham and Leslie. I have been unable to obtain any details about Leslie, but Hanham is fairly well known.

Mr. Hanham was for many years a bank manager stationed in several cities all over Canada. In the late 1880's he lived in Hamilton and actively collected shells. In 1890 he published a list for that district. In 1893 he moved to Quebec and while there collected in the Gaspé region and the vicinity of Quebec City itself. We find him at Winnipeg in 1899, publishing a list of Manitoba shells. By 1911 he had moved to British Columbia and was still active in conchology; from that date until 1926 he published a series of papers on British Columbia shells. He retired from the bank and lived at Duncan, B. C. until his death, some time before April, 1944.

W. R. McColl, of Owen Sound, collected Mollusca over a long period of years but so far as I know did not publish anything. Among other things, he discovered *Cepaea nemoralis* at Owen Sound and the variety of *Valvata lewisi* which bears his name. He corresponded with Dr. Robert Bell and died a few years ago.

The earliest list of Toronto Mollusca appears to be that of A. E. Williamson (1861); in 1872, H. A. Nicholson published a few records in his *Fauna Canadensis*. For many years Dr. William Brodie and Chief Justice Latchford collected in the region and in 1913 their records

were assembled by A. D. Robertson, together with a few others, and published as Chapter 21 of the Natural History of the Toronto region. Since then a few additions to the list have been made by subsequent workers.

With my good friend Jack Oughton, I have elsewhere published an obituary (La Rocque and Oughton, 1940) of Francis Robert Latchford. Both of us well remember the huge Toronto house which was his home and the comfortable study in which he graciously received two budding malacologists and talked shop over a roaring fire with them while showing them his fine collections. He was born at Aylmer, Quebec, near Ottawa, on April 30, 1856, of Irish parents. He graduated from the University of Ottawa in 1882, was admitted to the bar in 1886, and made a Queen's Counsel in 1899. From that date until 1905 he sat as member for South Renfrew in the Provincial Parliament, serving successively as Commissioner of Public Works and Attorney-General. In 1908 he was appointed a judge of the High Court of Ontario and henceforth resided in Toronto during the winter and Ottawa during the summer. In the course of a busy life he found time to collect Mollusca, first in the Ottawa region, then wherever his duties as a judge took him. He wrote over 35 papers on Mollusca. He will be mentioned again in connection with conchology in Ottawa.

Until World War II or thereabouts, Toronto was a center of activity in malacology. Toronto University, the Royal Ontario Museum of Zoology, and the Ontario Fisheries Research Laboratory sponsored work in Mollusca and many fine papers resulted, for example those of E. M. Walker on De Grassi Point, of Adamstone on Lake Nipigon, and of Rawson on Lake Simcoe, to mention only a few.

The village of Bytown, at one end of the Rideau Canal, assumed the name of Ottawa in 1855. Soon afterwards it was designated as the Capital of Canada by Queen Victoria. Naturalists appear surprisingly early in its history.

One of the earliest was Elkanah Billings, already mentioned, who published many early records of mollusks from the Ottawa region. Natural History societies were in existence in Ottawa as early as 1859 but it was not until 1880 that the first list devoted exclusively to the Ottawa region made its appearance. It was published in the Transactions of the newly founded Ottawa Field-Naturalists' Club and was by Gilbert Clifford Heron, son of an Ottawa pioneer. Heron removed soon afterwards to Kansas but not without leaving an able successor in Latchford.

The main facts about Francis Robert Latchford's life have already been given; it remains now to outline his conchological beginnings in the Ottawa area. For many years he was the leader of the Conchological Section of the Ottawa Field-Naturalists' Club. His many papers in the Transactions and the Ottawa Naturalist testify to his zeal and his considerable accomplishments both in collecting almost every species known for the area and in infecting others with his enthusiasm for conchology. Of these, Pascal Poirier, then a struggling young lawyer, later became a Senator of Canada, philologist and historian. H. Beaumont Small, who was the last of the founding members of the Ottawa Field-Naturalists' Club to survive, joined in the collecting excursions and helped publish reports on the finds of the section. James Fletcher, Botanist and Entomologist to the Dominion Experimental Farms, still found time to collect shells in his spare moments. Finally, the Rev. G. W. Taylor, who had long been in correspondence with the Ottawa group, visited the city in the late eighties. This resulted in the publication, jointly with Latchford, of the 1890 list of Ottawa Mollusca.

As mentioned earlier, it was my privilege to know Judge Latchford personally. Shortly after I published my first paper on Mollusca, I had a surprise visit from him one summer day in the thirties. In spite of his rather formal dress and his walking stick, he was very informal in manner and we were soon talking shop.

It was not long before we had arranged a field trip to White Lake for the following Sunday. The trip was a roaring success. Judge Latchford fished for Sphaeriidae with his Walker dredge and got quite a few; all together, we bagged an impressive lot of freshwater snails and clams. I saw him again a few times in Ottawa and Toronto and we carried on a correspondence almost until the time of his death.

Among Ottawa workers, Edward J. Whittaker, a geologist with the Geological Survey, developed an interest in Pleistocene and living Mollusca. His papers on marl shells of McKay Lake and other lakes in the Ottawa region gave promise of lengthier papers but his career was unfortunately cut short by an accident after he published his first papers.

For a few years after Whittaker's death conchology in the Ottawa district stagnated but interest revived briefly in the thirties. During that time I had the privilege of being associated with George E. Fairbairn who assembled a large collection, now in Ann Arbor, with Charles H. Young, "collector-preparator-specialist" in the National Museum of Canada, who had worked with Dr. J. Macoun and William Spreadborough in British Columbia and who was always ready for a foray after microlepidoptera or snails; with Claude E. Johnson, artist-naturalist with the Museum, who was also interested in collecting shells, and others, still living, who collected snails and clams for the National Museum. Their collections are a monument to their interest in conchology and are still carefully preserved in the National Museum of Canada at Ottawa.

MARITIMES GROUP

Our knowledge of the Mollusca of the Maritime provinces rests on the work of some eight men. First in importance is John Robert Willis (1825-1876) who published a list of Nova Scotia shells as early as 1857 but unfortunately in a rare periodical, the Halifax Church Record, almost unobtainable today. His second paper, a catalogue of the marine shells of

Nova Scotia, appeared in the Proceedings of the Boston Society of Natural History for 1861. He published three more papers.

Willis was born in Philadelphia. His father, a native of Ireland, moved to Canada, first to Kingston, Ontario, and later to Halifax. In 1854 he exhibited a collection of Nova Scotia shells at the Nova Scotia Industrial Exhibition at Halifax, for which he was awarded a prize. He also obtained another for a collection of insects. In 1855 he opened a correspondence with Spencer F. Baird of the Smithsonian Institution which continued over many years. He also corresponded and exchanged with Gould, Stimpson, Carpenter, and Cope, among others. He presented collections of Nova Scotia shells to King's College (Windsor), Acadia College, Wolfville, the Smithsonian Institution, and the British Museum, the Boston Society of Natural History, and the Academy of Natural Sciences in Philadelphia.

He was successively appointed superintendent of the Industrial School in Halifax and secretary of the Board of School Commissioners of that city. In 1875 he retired from the latter position and found himself without an appointment and in poor circumstances. He was forced to sell his collection and this almost broke his heart. He died in 1876 and was buried in Camp Hill cemetery. Further details of his life are given by Piers (1890) in Ganong (1890) together with a detailed bibliography of his published papers.

T. A. Verkrūzen who, according to Hutton and Harvey (1883, p. 204) introduced the Leonberg dog to Newfoundland, "spent a portion of two summers in dredging and collecting Mollusca around the shores of the Island. He also visited the banks in a fishing vessel for the same purpose. The result was a collection of the Mollusca of Newfoundland of great value to science, by an able and accomplished naturalist, who is a master of Conchology. He very kindly presented to the Geological Museum of St. Johns a collection embracing specimens of ninety-two different species which he had collected and identified. He

also printed a small pamphlet containing a complete list of his discoveries." As a matter of fact there were two pamphlets, one (*Zur Fauna von Neu Schotland und Neufundland*) in the *Jahrbucher der Deutschen Malakozoologischen Gesellschaft* and the other (*Die Mollusken Neufundlands und der Neufundland-Bänke*) in various numbers of *Der Sammler* for 1885 and 1886.

Next to appear was J. Matthew Jones, whose "Mollusca of Nova Scotia" was published in 1877. His main interest, however, seems to have been the shells of Bermuda on which he published two papers (1864, 1888).

George F. Matthew (1884), although mainly interested in anthropology, mentioned a few species of shells found in an ancient Indian village site at Beaubec, New Brunswick.

At about the same time W. F. Ganong was preparing two papers on marine invertebrates of New Brunswick waters which appeared in 1885. Ganong's works added many new species and new records for New Brunswick. In addition, his paper on John R. Willis (1890) has brought attention to an interesting personality. The Library of the Geological Survey of Canada was chosen by Professor Ganong as the repository for a copy of Willis' privately printed list of Nova Scotia shells and a number of Willis manuscripts.

The Reverend Henry W. Winkley (1858-1918) was a native of Boston. For some years he was rector of a church in St. Stephens, New Brunswick, and while there he collected shells actively. His only paper on New Brunswick shells, so far as I know, was published in 1888. All his other papers deal with New England. He died in Boston and his collections went to the Museum of Comparative Zoology, Harvard. Charles W. Johnson published an obituary in the *Nautilus*.

George Whitman Bailey published "The Land Snails of New Brunswick" (1903); I have been unable to obtain any further information about him but suspect that he was related (perhaps a son?) to Jacob Whitman Bailey (1811-

1857) and Loring Woart Bailey (1839-1925), the latter professor of geology at the University of New Brunswick.

No account of Maritime conchology would be complete without mention of the work of Charles Ives. So far as I know, his only published paper (1907) appeared in the *Prince Edward Agriculturist*. Fortunately he corresponded with W. J. Wintemberg, then of Washington, Ontario, later of Ottawa, who gave me a collection of eleven of his letters which provide a few details about Charles Ives. The letters were written in the period from June 9, 1904 to March 10, 1913; three of them are undated, except for the day and month. They tell us that Ives had a large collection of shells including Prince Edward Island, New Brunswick, India, Ceylon, Africa, and Florida forms. He was a man between 40 and 50 since he had a son in the Northwest who had promised to send him specimens. In one letter he says that the weather is too stormy for outdoor work and in another he mentions that he can wield a pitchfork or a rifle more easily than a pen. He was a farmer, but his careful notes on shells and their habitat show him to have been a very unusual and intelligent observer. He corresponded with other conchologists of his time, notably Winkley, Whiteaves, and Professor Chadwick of Rochester, New York, who published a list of shells received from him in the *Nautilus*.

Ives was willing to place his collection of some 150 species in a museum but he regrets in one of his letters that no such institution existed in Prince Edward Island and that therefore he would probably have to keep it during his lifetime and added "God knows what will become of them after I am dead." One of his important finds was *Zoogenetes harpa* collected at Miscouche, the first record for Prince Edward Island, and a very unexpected one.

Olof O. Nylander (1864-1943) of Maine, collected on the tributaries of the St. John River in that state, in Quebec and New Brunswick, making known data on the Mollusca of a region of considerable interest. There is an anonymous obituary of Nylander in the *Nautilus* (57: 66, 1943).

GEOLOGICAL SURVEY GROUP

The Geological Survey of Canada was founded in 1842. At first the only field work was done by Sir William Logan, its director, and Alexander Murray, his assistant. Within the next two decades its staff grew until five or more parties were in the field every year. Sir William Logan, himself a naturalist of great ability, realized that survey parties were offered an opportunity to advance other sciences by collecting specimens in remote parts of Canada. From the very first, they brought in all kinds of botanical and zoological materials, including many shells. Among those who did much of this incidental collecting were Robert Bell, already mentioned, who collected from Lake Superior to the Gaspé Peninsula; George Mercer Dawson whose special field was the western provinces and the Yukon; Elkanah Billings, who contributed many Ottawa and Renfrew County specimens; Robert Chalmers and E. R. Faribault who collected in Nova Scotia and New Brunswick; N. J. Giroux in Quebec, Joseph Keele in the Yukon, Quebec, and the Maritimes; E. M. Kindle in northern Ontario and the Mackenzie River area; R. G. McConnell in Alberta and the Northwest Territories; William McInnes in Quebec, Ontario, and Saskatchewan; the two Macouns in almost every province of Canada; J. L. O'Neill, Owen O'Sullivan, James Richardson, A. R. C. Selwyn, J. B. Tyrrell, A. W. G. Wilson, and many more. Biographic details on these and other Canadian geologists are fully indexed in the "Bibliography of North American Geology" issued by the U. S. Geological Survey. Portraits of Sir William E. Logan, Elkanah Billings, John Macoun, and many others have been published by Collins (1928).

In 1907 the Geological Survey organized an ambitious program of dredging for marine invertebrates, first on the coast of British Columbia and then on the coast of Nova Scotia. This work was done under the direction of Professor Macoun by two industrious collectors, Charles H. Young and William Spreadborough, who accumulated vast quantities of material which was to be worked up by Dr. Whiteaves.

On the latter's death in 1909, the work was undertaken by Drs. W. H. Dall and Paul Bartsch of the U. S. National Museum.

After 1909 work on invertebrates lagged until 1917 when Edward J. Whittaker, already mentioned, began to take an interest in them. Whittaker was just beginning to grasp his subject thoroughly when he died in 1924, not without having published a few papers.

The outstanding member of this group is Joseph Frederick Whiteaves (1835-1909) previously mentioned in this paper. Appointed in 1875 as Paleontologist of the Survey, succeeding Billings, he later became also Zoologist and Assistant-Director. His most important work from our standpoint is undoubtedly his "Marine Invertebrates of Eastern Canada" which appeared in 1900, but he also wrote over 30 papers on Mollusca of Canada brought in by other officers of the Geological Survey or collected by himself. He also did much dredging in the Gulf of St. Lawrence and Gaspé Bay.

BRITISH COLUMBIA GROUP

Until the middle of the nineteenth century references to British Columbia Mollusca were few and casual. In 1866 John Keast Lord published his "Naturalist in Vancouver Island and British Columbia," the product of his observations and collections as naturalist to the British North American Boundary Commission. The Mollusca, described by Baird, are listed in the appendix of this work (p. 356) and the list contains nearly 80 species with annotations on life history and distribution. Baird had previously published much the same information in 1863.

The Reverend Mr. George W. Taylor (d. 1912) was born in Derby, England. The information on his life and work given here is from two obituaries by E. E. Prince (Ottawa Naturalist 26: 74-76, 1912; Proc. Royal Soc. Canada, 3d ser., 7: xv-xix, portrait, 1913) and one by A. W. Hanham (Nautilus 26: 83-84, 1912). He came to Canada in 1882 and soon assumed a place as an authority in entomology and

conchology. A clergyman of the Church of England, he was stationed in Ottawa, Ontario, Victoria, Nanaimo, and Wellington, B. C. Wherever he went he collected actively; for some years he gave up church work and took up residence on Gabriola Island, on the coast of British Columbia, in order to investigate the marine zoölogy of the nearby waters, and in the hope that a biological station would be established there by the Dominion Government. This hope was realized in 1909 when the station was founded with Mr. Taylor as its first curator, a post which he held until his death. He accumulated a vast collection of marine fishes and invertebrates by dint of much shore collecting and constant dredging expeditions. The late Dr. E. E. Prince, who went on one of these trips with him wrote: "... at every point where hauls of the dredge were made myriads of strange creatures were brought up from the depths below. From morning to night Mr. Taylor sorted out and named the specimens, usually working on deck till long after dark, aided by the light of a ship's lantern. He had such an unusual knowledge of marine zoölogy that he could name without difficulty a vast proportion of the hosts of molluscs, echinoderms, zoophytes, etc. and very fine collections resulted."

His conchological papers number at least eighteen, covering a period from 1889 to 1900 and their scope is very wide. The first was on the land shells of Vancouver Island; his "Canadian Land and Freshwater Mollusca" lists the sources from which a list of Canadian Mollusca could be compiled; in 1895 he published his "Preliminary Catalogue of the marine Mollusca of the Pacific Coast of Canada"; his last paper, so far as I know, was one on the discovery of *Hemphillia glandulosa* in Canada; it appeared in the Ottawa Naturalist for 1900.

Dr. Charles F. Newcombe, who died in 1924, is better known as a botanist and ethnologist but in his earlier years he was an enthusiastic collector of marine life and accumulated a large collection of Mollusca. His most important publication on the subject is his "Preliminary Check List of Marine shells of

British Columbia" published by the Provincial Museum in 1893.

Around 1910 that much traveled conchologist A. W. Hanham was transferred to British Columbia by his bank; he retired after a few years and died at Duncan, B. C. some time after 1937. I had the pleasure of corresponding with him and the last letter I had from him is dated April 9, 1937. It states that he had given up all work on shells. His British Columbia work is contained in three papers, published from 1911 to 1926.

The life and work of William Healey Dall (1845-1927) are too well known to need review here. He worked up much of the material collected in British Columbia and Nova Scotia waters previously mentioned. His associate and successor at the U. S. National Museum, Paul Bartsch (1871-1960) also did much work on Canadian Mollusca. An account of his life by Harald A. Rehder appears in the American Malacological Union Annual Reports for 1960, pp. 5-6, with a portrait. We owe Dall and Bartsch descriptions and identifications of many West Coast species represented by material in the National Museum of Canada.

Mrs. Ida Shepard Oldroyd (1856-1940) of Stanford University, California, was doubly connected with Mollusca in British Columbia, first as a collector of no mean ability and second as the compiler of a work on West Coast marine Mollusca (1924, 1927) which is still invaluable to workers in that field. I had the privilege of meeting her first in Florida in 1935 and a little later when she visited Ottawa briefly on her way home from New York City.

Professor Charles H. O'Donoghue is a native of England. In 1918 he came to Winnipeg as Professor of Zoölogy at the University of Manitoba. For a number of years he spent his summers in British Columbia, collecting and studying the Nudibranchs of the Pacific Coast. His papers on this much neglected group added greatly to our knowledge of Pacific Coast Nudibranchs. About 1930 he returned to Scotland as Professor of Zoölogy at Edinburgh.

The Biological Station established by the Dominion Government in British Columbia has become a center for the study of Mollusca in that Province. It was here that Professor Macoun's party made their headquarters in 1909, here that O'Donoghue collected his Nudibranchs, and here also that Mrs. Oldroyd spent a few summers continuing the work of Taylor.

PRAIRIE PROVINCE GROUP

The first mention of Prairie Province shells is probably that of Say in the Report of Long's Expedition (1824); some of Say's specimens were from what is now southeastern Manitoba. The earliest list known to us is that of George Mercer Dawson (1875) which covered the entire boundary region from Lake of the Woods to British Columbia. Robert Miller Christie (1885) published his list of Manitoba land and freshwater Mollusca in the Leeds Journal of Conchology.

The Rev. G. W. Taylor also published two papers (1893, 1895) on the area and Hanham (1899) gave us a new list of Manitoba Mollusca. Dall's Alaska report (1905) summarized all known records for the western provinces of Canada to that date. C. C. Nutting (1858-1927) has given us a list of shells collected by him and his associates of the University of Iowa Expedition on the Lower Saskatchewan River in 1891.

Alan Mozley's work in the Prairie Provinces from 1925 to about 1932 greatly extended our knowledge of that area. F. C. Baker (1937) published a list of shells collected by T. D. A. Cockerell in Prince Albert National Park, Saskatchewan.

ARCTIC EXPLORERS

Little work has been done on the Arctic Islands of Canada, its mainland above the Arctic circle and on the marine fauna of Canadian waters north of Hudson Bay. Most of our knowledge of these areas is drawn from the

work of the Arctic explorers, starting in the late eighteenth century and continuing to the present day.

First, we owe much to the Greenland group (Fabricius, 1780; Möller, 1842; Mörch, 1868; Posselt, 1898) and the Alaska group (Lehnert, 1884; von Martens, 1872; Dall, 1905) and the monumental work of von Middendorff (1861) on Siberia. James de Carle Sowerby gave us valuable records in his chapter of Richardson's "Fauna Boreali-Americana;" Oscar Boettger (1880) published a list of snails from Hudson Bay; W. G. Binney (1861) identified the shells collected by Ross, Kennicott, and Drexler in northern Canada; Isaac Lea described two species of Anodonta from Great Slave Lake; P. B. Randolph (1899) published a list of shells from the Klondike region, and Whiteaves (1881-1905) a number of lists from Ungava, James, and Hudson bays and the Yukon.

The land and freshwater fauna was summarized by W. H. Dall in his Harriman-Alaska report. Since then notable contributions have been made by the Canadian Arctic Expedition of 1913-1918. Whittaker (1924) published a list of Mackenzie River Mollusca; Goodrich (1933) gave us a list of Moose Factory Mollusca, and Mozley (1937, 1938) has published the results of his work on Arctic and sub-Arctic Mollusca.

CONTRIBUTIONS OF THE SYSTEMATISTS

Throughout its history Canadian malacology has profited from the assistance of systematists, mainly in the United States. Every one of our conchologists was in correspondence with specialists in Philadelphia, Washington, Ann Arbor, or California. The courtesy and generosity of these authorities south of the border persist to this day. In the past, Binney, Walker, Tryon, Conrad, Lea, Simpson, Dall, Goodrich, F. C. Baker, Paul Bartsch, Victor Sterki, H. A. Pilsbry, E. G. Vanatta, and many others have given of their time and knowledge to the study of our fauna. A list of the ablest living American conchologists would be

identical with that of Canada's malacological friends who continue the tradition of friendship and helpfulness initiated by their predecessors.

One need only follow the current literature of malacology to appreciate their contributions to Canadian science.

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KEY REFERENCES TO THE MOLLUSCA OF ARKANSAS

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This is the second of a series of state lists of key references. The first appears in this number of *STERKIANA*. Additions and corrections will be welcome.

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