ARCHIVES, HISTORICAL CLIMATE RECORDS, AND THE CLIMATE OBSERVATIONS OF THOMAS CORCORAN, HUDSON'S BAY COMPANY, 1827-1841

By

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Abstract

Growing interest in the natural environment has prompted important research into climate issues such as global warming and, more generally, into how humans interact with the environment. The information resources for this research are clearly important to its advancement. One primary source for climate researchers is the historical archival record.

Archives hold massive amounts of information from so many different sources on so many subjects that the historical record in archives can overwhelm researchers. The archival profession thus plays an important role in helping researchers locate and understand these records.

This thesis looks at the use of archival records in paleoclimatology, which is the study of climate before the general availability of written climate records. The first chapter provides a general overview of the different records that contain paleoclimatological information and some of the reasons why societies record such information. The second chapter expands on this overview by discussing in more detail the characteristics of particular archival records and the types of information paleoclimatologists seek in them. The final chapter examines some of the records created by Thomas Corcoran, a mid-nineteenth-century employee of the Hudson's Bay Company. His records are an important case example of climate information for that period.

Finally, the thesis will suggest how the archival profession can help find and thus 'create' records related to climate. This new conception of the archivist's role

suggests that the archivist is no longer a mere keeper of the records, but an active participant in record creation.

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Introduction

As concerns about environmental conditions mount, and society begins to deal with much more complex and elusive environmental problems, the value of historical information gleaned from archival records is receiving much greater attention among environmentalists and climatologists. Archival institutions increasingly contain large amounts of data which can be used for environmental research. For environmental researchers a better understanding of how humans interact with their surroundings, and what impact this may have on our environment, is now crucial. As climatologists Keith Alverson, Raymond Bradley and Thomas Pedersen say, "The records of the past show that climate shifts can appear abruptly and be global in extent, while archaeological and other data emphasize that such shifts have had devastating consequences for human societies. In the past, therefore, lies a lesson."[1]

The Hudson's Bay Company Archives (HBCA) at the Archives of Manitoba is an important Canadian source of historical environmental information. There are literally thousands of records in the HBCA that contain day-to-day environmental data, such as temperature, wind direction, precipitation, and thawing conditions. Only a very small percentage of these records has been used in environmental history research and an even smaller amount identified for such research. Geographer Timothy Ball's experience in the late 1970s, when he first proposed doing a doctoral thesis on historical climatology using HBCA records, illustrates this point. His proposal was initially rejected because the review committee believed that there was not sufficient data:

> How little is generally known about the extent, diversity, and detail of the HBC records, especially the weather information, was underlined for me when I made my doctoral thesis proposal to Queen Mary College, University of London. I proposed that weather maps be produced for each day, 1810-20, in northern Manitoba. The proposal was initially rejected because the committee said that there were insufficient recording stations for reasonable interpolation. Committee members were astounded when told that there were three times as many stations then as there are today.[2]

This thesis aims to improve understanding of the potential value of archives for environmental research. It is written primarily for archivists by an archivist in hope of stimulating greater interest in this increasingly important use of archives. It is also hoped that archivists will be sensitized to the types of sources, their characteristics, and the basic approaches to them which may support this research. It is not intended as a contribution to climatology as such, but aims to provide archivists with an introduction to the general value of archives for historical climatological research, an overview of the kinds of records which may be of use in such research, and a sample analysis of one such record at the HBCA. This thesis is not intended to provide extended amounts of historical climate information from archives to climatologists or to analyze the information extensively for its climatological research value. This is best done by climatologists. It is hoped that historical climatologists may benefit from this thesis by learning more about the kind of contribution archivists can make to their

research through the archivists' contextual, historical analysis of archival records. In this way a more meaningful dialogue and mutual education may occur which will benefit historical climatological research and archival work.

To attempt to accomplish these goals, the three chapters of this thesis will focus on the following areas. Chapter one will provide a general overview of various types of historical records that hold climate information. Chapter two will expand on this overview by discussing in more detail the characteristics of particular records and how climatologists use them. Chapter two will also suggest that the Canadian "total archives" tradition enhances climate history research by encouraging archives to acquire a very wide range of documentation. Records with long-term climate data prior to the twentieth century are considered rare. A study done by the American National Research Council in 1999 explains: "Deficiencies in the accuracy, quality and continuity of the records . . . place serious limitations on the confidence that can be placed in the research results."[3] Therefore, finding sources that have this continuity can be crucial to understanding future climate trends; the Hudson's Bay Company Archives holds such records. Chapter three will look more closely at an example of an archival record that has been considered useful in historical climate research. Information from post journals created by Hudson's Bay Company (HBC) employee Thomas Corcoran from 1827 to 1841, and located at the HBCA, will be examined. Randomly selected entries will be reviewed in order to report the climate data that they contain. The chapter will also discuss who Corcoran was in order to help researchers interpret the records that he created.

The records of Thomas Corcoran have been looked at briefly by climatologists and identified by them as likely to be valuable in climate research. This thesis will probe them further to try to help climate researchers to learn more about their value. Corcoran meticulously recorded daily climate data from the beginning of his service as a clerk in charge for the HBC in 1818 until his retirement in 1856. Why are these particular documents worth examining for their value to climatological research? To help us understand present and future climatic trends, it is necessary for researchers to understand past environmental conditions, such as those environmental conditions prior to extensive human development within in a region. By understanding how climate has varied in recent times, climatologists can have a better understanding of what may occur in the future. Climatologist Raymond Bradley[4] emphasizes understanding the impact of human activities on climate and environment; these anthropogenic climatic effects will be partly responsible for future trends. Bradley states that, "Unless we improve our understanding of what these factors are, and how the climate system has responded to them in the past, there is little prospect of interpreting, or anticipating, future climatic changes."[5]

The Corcoran records are from the era following AD 1500, which is categorised by some climatologists as the climatic period most directly affected by human influence. During this time, the Earth was being explored and documented more systematically than ever before. This vast body of documentation provides many new sources of climatological knowledge, which Bradley and Philip Jones argue offers insight into human history as well:

> Over the course of the next 500 years extraordinary changes in society took place. These occurred against a background of environmental changes, which may have played a critical role in some of the events which occurred. However, until we can document climatic variations of the last 500 years, the extent of such influence will remain controversial.[6]

Bradley adds that, "Some of the most diverse and invaluable sources of proxy data are historical documentary records. The data are particularly important as they deal with short-term climatic fluctuations during the most recent past."[7]

Paleoclimatology will be a focus of attention in this thesis. The American government's National Oceanic and Atmospheric Administration (NOAA) explains that "Paleoclimatology is the study of climate prior to the widespread availability of records of temperature, precipitation and other instrumental data."[8] Students of paleoclimatology look at different forms of data to describe past weather events. Historical data is considered to be part of the proxy data that climatologists can use to establish past climate conditions since past climates cannot be observed directly. As such, written records of environmental indicators are considered valid forms of data, as NOAA maintains:

> Historical documents contain a wealth of information about past climates. Observations of weather and climatic conditions can be found in ship and farmers' logs, travellers' diaries, newspaper accounts and other written records. When properly evaluated, historical data

> can yield both qualitative and quantitative information about past climate.[9]

It is important to note here that since this information was not recorded specifically for the climatologist, and often without satisfactory instruments, there is a need to assess, or contextualize, this information. Who gathered these observations? What conditions affected its acquisition? How accurate is it? When was it accumulated and, finally, why was it written? Bradley and Jones write, "Such records of climatically sensitive natural phenomena are surrogate or proxy measures of past climate; they contain climatic information which must be extracted and separated from the non-climatic matrix in which it is embedded."[10] It is important to know whether this extraction can be done with such records.

Historical documents have the advantage of being distributed over all continents and of containing potential information on almost all aspects of climate. This information can help fill gaps left by other sources used by climatologists. This documentation comes in various forms. Geographers Alan Catchpole and D.W. Moodie observe that its "most useful role lies in supplying fragments of otherwise unavailable information, or in verifying or validating data derived from other sources."[11] The many HBCA journals, post records, diaries, and reports can contribute to climate research and are considered to be quite important sources of information, especially where no other sources exist.

The conclusion of this thesis will outline how an understanding of the records in various archival holdings can help in areas of scientific research such as climatology. It will suggest that archives are not a mere repository of old records,

useable for only a limited range of historical studies and genealogy, but for a widening array of purposes, including climatology. The thesis will also conclude with the suggestion that an archivist who understands the history of the records can help interpret and locate various forms of archival information, both for climatologists and others.

Endnotes

[1] Keith Alverson, Raymond Bradley and Thomas Pederson. Paleoclimate, Global Change and the Future (Berlin/New York: Springer, 2003). Preface.

[2] Stuart Houston, Tim Ball and Mary Houston. Eighteenth-Century Naturalists of Hudson Bay. (Kingston/Montreal: McGill-Queen's University Press, 2003), p. 117.

[3] Ibid., p. 113.

[4] Raymond Bradley is Professor and Head of the Department of Geosciences at the University of Massachusetts, Amherst. He has authored/edited five books and published more than 100 articles on climatology and climate change over a wide range of time scales.

[5] Raymond Bradley and Philip Jones, eds. Climate Since A.D. 1500 (London: Routledge, 1992), p. 1.

[6] Ibid., p. 3.

[7] Raymond Bradley, Paleoclimatology: Reconstructing Climates of the Quaternary (San Diego: Academic Press, 1999), p. 439.

[8] National Oceanic and Atmospheric Administration (NOAA). "What is Paleoclimatology." Accessed: October 24, 2004. http://www.ngdc.noaa.gov/paleo/primer.html .

[9] National Oceanic and Atmospheric Administration (NOAA). "Paleo Proxy Data." Accessed: October 24, 2004. http://www.ngdc.noaa.gov/paleo/primer_proxy.html .

[10] Bradley and Jones, eds. Climate Since A.D. 1500. p. 3.

[11] A.J.W. Catchpole and D.W. Moodie, "Archives and the Environmental Scientist." Archivaria 6 (Summer 1978), p. 120.

Chapter One

Historical Records, Climate Research, and Archives: An Overview

An interest in recording information about the environment has preoccupied human beings throughout history. The methods and media for recording environmental information have evolved over time, but the desire to know and even master the environment has been a key part of human experience. Recording climatological information has been an important feature of this phenomenon. Today's researchers are able to locate environmental information from every corner of the planet where humans have set foot. Wherever they have been, details of the local environment can be found in various media.

For instance, Chinese oracle bones may have some of the oldest environmental information useable by climatologists for that area of the world. Alan Catchpole and D. W. Moodie note: "They provide the only written records available in China prior to 1100 B.C. and contain carved descriptions of farms, crops and agricultural methods as well as predictions of rain and snow."[1] These records in themselves do not give us information on day-to-day weather patterns and were not created for that purpose. Nonetheless, researchers know that oracle bones from the Yia Hsu Period (1400-1100 BC) document that rice cultivation occurred in the Anyang region of northern Honan in March, or a month earlier than at present.[2] This is a significant finding as it demonstrates that the climate has changed over time and is not as stable as many people used to believe. Another example of very old records which document environmental conditions, but which were not made for that purpose, can be found in Japan.

Catchpole and Moodie note that Japan has excellent historical sources of climatic information stretching over several centuries. They illustrate their point by referring to the Emperor's annual celebration of the blooming of the Cherry Tree at Kyoto. This important event (held until 1868) has generated a regular record of blooming dates since the ninth century.[3]

Records like these can be found throughout the world. Although a record may not directly contain weather or climate information such as numerical temperatures, evidence taken from the record demonstrates how a cultural response to an event can show how the environment affected society. This can be reflected in the records kept by these societies. Geographer Timothy Ball notes how inferential historical evidence regarding human activities can be related to climate. Settlement, cultivation, and migration patterns are shaped by climatic conditions.[4] As always, historical evidence containing written information which directly reflects human views of the environment is most valuable. However, as British climatologist H.H. Lamb notes, "... many weather diaries are extant, but very few have been studied in even a cursory manner."[5]

Native people lived in North America long before the arrival of Europeans. The former understood the importance of climate and its effects on their population. Therefore knowledge concerning climate (retained mainly in oral tradition) pre-dates the European expansion into the North American continent. The evidence discussed in this thesis is from conventional Euro-Canadian historical records. Some information on Native contributions to knowledge of climate is in these types of records. Hudson's Bay Company journals record

weather information given by Natives to European fur traders, especially if conditions were untypical. Peter Fidler reported in 1819 that "the invariable information of the different Tribes I have enquired at agree that the country is becoming much drier than formerly."[6] A book on this very topic has been recently published, *Voices from the Bay: Traditional Ecological Knowledge of Inuit and Cree in the Hudson Bay Bioregion* (Ottawa, 1997), compiled by Miriam McDonald, Lucassie Arragutainaq and Zack Novalinga. This book covers various aspects of Native American ecological knowledge within the Hudson Bay watershed.

By studying weather evidence related to climate in Canada with the understanding that this can only go back for the most part as far as European expansion into the continent, we can find large amounts of both government and private records that were kept on this subject. One can ask why such records were kept and who kept them? The most important single source of these records is the Hudson's Bay Company, which was established in 1670, and developed an extensive commercial trade network across much of what is now Canada. Ball speculates about why such records were created. He believes that the company's governors wanted to see more agriculturally self-sufficient trading posts. By understanding the environment where the posts were located, officials could determine what could and could not be cultivated and thus reduce costly food imports: "The struggle for self sufficiency revolved around attempts at growing English produce in gardens at each Fort, and by animal husbandry.

Obviously climatic information would be of some value in determining those species most suitable to the conditions."[7]

Ball identifies another reason why such records may have been kept. An apparent interest in this type of information on natural history was of interest to many company employees. Various observers of natural history working for the Hudson's Bay Company would gather enormous amounts of information. There was also a very close connection between the British Royal Society and the Hudson's Bay Company. Samuel Wegg, for example, who was a long-term treasurer of the society and a member of the company board (serving as Governor of the Company for six years), was keenly interested in the acquisition of scientific information.[8] Across the first 150 years of this accumulation of specimens and data, there was little scientific expertise available to the company: "But curiosity was unlimited, and those with it were termed 'curious' men, meaning something very different from twentieth-century usage. The fur-trade officers of the Hudson's Bay Company lived in and contributed to one of the most exciting periods in the history of science."[9]

The Royal Society's interest in and continuous prompting of the Hudson's Bay Company to continue this work helped create a source of information of incredible value for today's researchers. Unwittingly, the fur traders became some of the first weather observers in the New World. This contribution to climatology is considered quite important to modern day science.[10] Finally, an additional reason for keeping daily weather records was the high degree of dependence of company employees in their day-to-day lives and work on

weather conditions that could affect how trade was done in good or poor weather. [11]

It is important to bring these records to the attention of researchers and to demonstrate their potential value for current and future environmental studies. With a growing concern for the environment, and especially climate change, archives may play a key role in helping researchers find the information they require to make knowledgeable decisions in this regard. There is considerable evidence of global warming in scientific publications and other media.[12] In 2004, the BBC's online news service said that scientific studies of climate change indicate that it may result in the extinction of a million animal and plant species by 2050.[13] The BBC's Alex Kirby adds: "Similarly, the evidence that human activities are intensifying natural climate change is impressive, and hardening. The world really is changing, almost imperceptibly, but in line with what science says will happen." [14] Subtle changes are hardly noticed by the general public, and it is even harder to prove that these changes are happening. Over a few years we may not notice a fraction of a degree increase or decrease in average temperature, but over a long period these changes, if they continue, can have detrimental effects. Kirby comments: "The trouble with imperceptible change is that for a long time it has virtually no impact, certainly not on the political timescale of four or five years. And politicians respond (often) to what they think matters to voters."[15] The need to understand and to transmit this information to others is becoming critical. We can no longer deny that change is happening. But where can we find the information or evidence to help give these predictions

greater credence, as some powerful interests are still sceptical? Humans have been recording climatic information for centuries. The need to find and interpret these records is becoming an important factor in better understanding human impact on the environment.

Literature on environmental issues and archives is limited. For example, if we look at *Archivaria*, Canada's leading journal on archival issues which has been published since 1975, only two articles have been written that directly relate to the environment. Topics such as climate history and change need to be addressed so that governments and others can make knowledge-based decisions on these issues. With massive population growth, industrialization and unrestricted use of natural resources over the past century, widespread interest in our environment, specifically our climate, has grown considerably and now among archivists as well.[16]

Archival records are a valuable and largely untapped source of information for climatic research. The amount of climatic knowledge is vast, and its potential is great. Greater awareness of the value of this information is still lacking. We must also address the difference between information and knowledge. Though we may acquire a lot of environmental information, the need for environmental knowledge is greater. Archival theorists are placing emphasis on this, as are other professionals in the information field.[17] As Daniel Boorstin, a historian and former Librarian of Congress, puts it:

> The challenge facing librarians today is to establish the distinction between knowledge and information, the

> importance of the distinction and the dangers of failing to recognize it. Knowledge is cumulative, the enduring treasures of our whole human past.[18]

Environmental studies is a very broad field. It includes but is not limited to: forest management, air quality, flora and fauna extinction rates, and ozone depletion. Interest in this field is growing as demand for more information on how climate affects everyday life becomes important. Catchpole and Moodie noted this as early as the mid-1970s:

> The present decade has witnessed an unprecedented demand from our politicians, conservationists, economists, farmers, and the public for improved long term forecasting. Given today's state of development of meteorological science, it is not possible to forecast climatic changes over periods of years. Since long-term forecasts must be performed empirically by projecting past trends into the future, the key to improving short term forecasts lies in a fuller understanding of the past.[19]

We must find a way to improve our knowledge of historical information about climate in archives. This is not to say there has not been interest in climatology prior to contemporary times, but there is a need to acquire a better understanding. Environmental issues, such as climate change, affect every part of our lives. Governments and "watchdog" groups, such as Greenpeace and the Sierra Club, play an important role in responding to this major concern. Meteorological studies are becoming more and more important. Archives can and should play an important role in this area of study. American archivist Todd

Welch comments: "Considerable disagreement exists on the ideas, values, and goals of environmental thought, but the need and search for relevant environmental information is universal. Therefore, it is crucial that archivists select, preserve, and encourage the use of records containing information related to the interaction between nature and humans." [20]

Whatever disagreements individuals or organizations may have on the topic of the environment, it is clear that there is a need for more information. Archival knowledge can help provide the answers. Archives are more than just a storehouse for old documents. Archivists play an important role in collecting not only documents, but a body of knowledge from the past that is relevant to the present and the future. Archivists must do so by intelligent engagement in the document selection process. Archivists must understand what type of information is being stored and what kind of knowledge can be obtained from it.

Archivists have been changing their thinking and methods in order to provide this service in the much more complex information universe we inhabit. In light of the exponential growth in the volume of records, the increasing complexity of multimedia records, and the growing diversity of research interests, which archivists cannot always anticipate or know a great deal about, archivists are turning more and more to knowledge of the context in which records were created (or the actual history of the records themselves) as the intellectual basis for their work. This is important when looking at climatological records. With these records, too, it becomes important to gain a deeper understanding of the history of the record. One feature of the history of records is that they have been

(sometimes) carefully selected. Not all records are kept. A large percentage are purged.[21] They are not just a haphazard grouping of historical documents, but a collection of records relating to certain people and events, which reflect the interests of those who made, selected, and still use them. As Terry Cook points out, using an early example, archives have had an influence and purpose of their own in the area of record keeping:

> Medieval archives, scholars now find, were collected – and later often weeded and reconstructed – not only to keep evidence of legal and business transactions, but also explicitly to serve historical and sacral/symbolic purposes, but only for those figures and events judged worthy of celebration, or memorializing, within the context of their time.[22]

When looking for historical climatological records we are not able to search as directly for this information as we can today with contemporary climate information. We cannot simply contact Environment Canada [23] or other weather agencies across the globe in order to find environmental records dating back hundreds of years. These agencies have been collecting data over the last century, but historical environmental records go beyond that time. Due to the relative youth of these types of agencies, climatic information about Canada and other countries is limited. A better understanding of what was collected and why it was collected can help us in locating such information. Today, because of the growing interest in the environment, governments purposefully collect it. Prior to

this activity, climatological data would be collected mainly for other purposes, such as to meet the food supply needs of an area, as discussed earlier in this chapter.

Future research into environmental concerns will likely be better supported by archives. Vast amounts of more recently created archival records contain environmental information. In addition, the recent emergence of the field of environmental history augurs well for future study of the environment using archives. Environmental history goes beyond the history of the physical environment itself to include human interactions with nature, attitudes toward and uses of nature, and the history of the conservation movement. For some contemporary environmentalists this historical perspective has been lacking. Many have thought that this history is limited to the current interest. Environmentalist Derek Wall states that:

> For most of us, even the committed activist, the Green movement has no history. Worries about environmental destruction seem very modern. Acid rain, the greenhouse effect and ozone depletion are concerns of the last twenty years, especially of the last four or five.[24]

Wall dismisses this shortsighted view by stating that we now need to become aware of this history: "I argue not only that the Greens have a history but that both they and wider society would do well to learn about it." [25] As Todd Welch notes, the contemporary environmental movement and management of the environment are heavily reliant on recorded information – both historical and

recently created. What has been developing recently from past research is the need for documented information from the past that can be used as evidence:

> These early developments and the growing awareness and involvement of private citizens, government agencies, and legal professionals in the 1960's and 1970's created a demand for environmental research with practical applications for society as a whole. This research goes beyond improving our understanding and management of the environment and requires documentation for the preparation of environmental impact statements and the creation and enforcement of environmental laws. [26]

In light of these statements, one needs to ask certain questions related to the climate and the archives. What can be found in archives that would be relevant to this varied research? What are archivists doing to help researchers locate and access these records? Are archival records usable as evidence by the scientific community? There are certain criteria that must be met for climatologists to use these past documents in research. As Canadian archivist Candace Loewen states, "... environmental records are often most valuable when cumulative in nature and viewed longitudinally; transactions are less important than patterns over time."[27] It is important when looking at environmental records to focus on continuity and a specific geographical area, which is far more useful for research. The more detailed information that is available, especially if the data is constant, helps in the development of current

accurate readings. Climate history involves a complex reconstruction of information that can be difficult to decipher from its sources.

This then brings us to the question of which historical archival records contain information relevant to climate history? Loewen says, "Environmental records are those records which reveal the age-old human desire to monitor, control and forecast (sometimes) unpredictable nature, including the actual data marshalled to support these aims." [28] This definition helps us understand records created for the purpose of recording environmental factors, but other, less comprehensive records can also hold important data for environmental research. These records include diaries, photographs, paintings, and oral history, among others. All of them can contain valuable information, even if they do not seem to be primarily about the environment because "what may not have been considered an environmental issue or environmental record yesterday may be one today."[29] There are records created with environmental science in mind, and records created for other purposes which can now be used for environmental purposes. However, it requires more work to retrieve the important data which may lie within the latter. This is where an understanding of the history of the record becomes important.

In historical records, day-to-day weather might not be described at all, or just in sporadic descriptions. Often, only great events like a blizzard, torrential rain, or flood would be recorded, thus limiting the records' value for future forecasting. The entire picture is preferred, with both good and bad weather included. Another form of historical environmental reporting, noted by H. H.

Lamb, is general seasonal reporting. It may contain the following kind of general statement: "Severity or mildness of the weather prevailing in the main winter months of December, January, and February" and "Raininess or drought in summer." [30] These records are considered to contain limited information when the many months that have been virtually ignored are considered. Several accounts of this type can be found around the world.

When we look at chronicles in Canada, which, compared to Asia and Europe are relatively new, there is still rich documentary evidence that includes both instrumental and non-instrumental records: "The record predates the development of instrumental observations and encompasses a period of exploration and settlement by essentially literate people over a vast area of largely untouched wilderness."[31] The documentary record of Canada's environment began with the arrival of the first French and English explorers who left records in the 1500s and 1600s. We can find such records in the archives of religious institutions, private persons, governments, and businesses. One of the richest archival bodies of environmental data is in the Hudson's Bay Company Archives at the Archives of Manitoba. Catchpole and Moodie comment: "In terms of length, scope and quality the records of the Hudson's Bay Company provide a corpus of chronicles unrivalled in North America, yet the potential for environmental research into these records remain largely untapped." [32] Although this was stated in the late 1970s, it remains true today.

Climatologists have been interested in archival holdings for many years. The main reason for this is the breakthrough in translating text into scientific data.

This has enabled researchers in various archives to look at records and derive environmental data from them. The use of this information helps the environmental scientist recreate past climatic trends and attempt to predict future trends. Archives keep the records of human interactions with other humans, but if we know where to look we can also find information on the environment.[33] When environmental researchers are looking for environmental data, the type of information they require must be considered scientific. The evidence must be standardised so that the data can be verified. Catchpole and Moodie explain that "... the evidence employed by the environmental scientist is composed of standardised observations whose accuracy and sensitivity have been judged by the scientific community as efficient to measure changes in the process or phenomenon under investigation."[34] Today environmental scientists work with data gathered by standardised instruments. Accuracy is increased by these methods. Environmental scientists are unable to use the same standards when looking at the (often) pre-instrumental archival records. Still, climatologists look at the records to glean what they can about the environment prior to human development, which is the subject matter of paleoclimatology. It is important to note that only the most technologically advanced regions of Europe in the eighteenth century used instrumental recordings of climate. In other areas of the world, such as Canada, they were not equipped with the technology for environmental readings. Even in more contemporary times the use of modern environmental technology is quite new. Therefore, research which focuses on instrumental readings is limited to specific geographical areas and times.

Catchpole and Moodie say that "for large parts of the earth's surface, acceptable weather observations span but several decades save the most favoured areas where they might extend through a century."[35]

It is not necessary for the archivist to understand the specific details of scientific research or knowledge. It is important that archivists understand what records may contain. Familiarity with history becomes an asset to any archivist, who can then apply this knowledge to understanding record creation. The changing self-understanding of many contemporary archivists can do much to help climatologists to locate and assess the scientific value of archival records in their research. Old stereotypes of archivists as simply passive keepers of 'dead' documents are fading.

The invasion of Iraq in 2003 has brought attention to some of the oldest of these records. With the looting that ensued from the American invasion, many vital artefacts and records are believed to have been stolen or destroyed. Thousands of Sumerian tablets over 5000 years old were part of this treasure. The tablets written in cuneiform text are some of the earliest types of human writings in existence. The tablets contain information that could help unlock many weather mysteries. Journalist Ben Russel writes, "The secrets of El Nino, one of the most mysterious and destructive weather systems, could be unlocked by hundreds of thousands of ancient clay tablets now feared lost or damaged in the chaos of Iraq."[36] These tablets consist of information pertaining to a pre-industrial agrarian society in Mesopotamia and how the environment affected this society.

Russel writes that a cataclysmic weather pattern hit this civilization and these tablets recorded this event:

> The tablets record the ancient Akkadian and Sumerian empires, which once dominated the land, now, divided between Iraq, Iran and Syria. They outline the catastrophic collapse of the City of Ur more then 4000 years ago. Hundreds of thousands of people are thought to have died in a disastrous series of floods and severe droughts that may have lasted up to 30 years . . . the tablets, known as the Lamentations of Ur, tell of the city's decline in about 2200 BC. Thousands of other clay tablets, many the size of cigarette packets, form an everyday record of tithes paid to temples in the form of grain and livestock.[37]

These tablets form the "the longest single, largely-unbroken climate record on earth."[38] The importance of these records, other than their age and content, lies in their continuity. A continuous recording of events during this period can be observed through the study of these tablets.

Archival records remain current. Archivists have gone beyond the role of Jenkinsonian keepers of the record, to try to understand the records and their creators. They are not mere keepers of this information. There is more to searching for environmental information than locating a record and transcribing the information it contains. There is a need to understand the context of its creation and use that to create a deeper understanding of the record. The

contemporary archivist must focus on these aspects of the record that might not be as great a concern to historians or other researchers. Cook explains that historians are "interested in the factual content and interpretation of records not in the actual nature of the records themselves."[39] Archivists are interested in the nature of the records, or "the study of their relationship to society at large."[40]

Archivists are focusing much more on understanding and making available knowledge of the context of the creation of the records, or the history of the records themselves, as this provides new pathways to the information records contain and helps researchers to assess its validity for their research purposes. Archivists are thus asking: who created the record? where was it made? and when was it made? As Cook explains, this means that the archivists' own research into the history of the records has the following goals:

> They must research to determine the provenance of a collection or series, its integrity as a fond; its original order or filing arrangement (if lost or unclear), the interests or activities of its author (if an individual), or the administrative structure, decision-making processes, functions, and legal mandates of the corporate creator, the evolution and changes of these factors over time and the consequent influence on records creation and complex registry systems, the use of records over time by their creator; the peculiarities and characteristics of the medium of record; and the interrelationships of each collection or series with similar ones to which they are organically related[41]

This knowledge of how records have been created and handled over their life span provides leads to various types of researchers. It is perhaps especially useful to those studying the history of climate, who are often searching for elusive information in possibly unexpected places. The more contextual information we have about the activities of records creators, for example, the greater will be our ability to identify activities that would have resulted in (or been likely to result in) creation of information relevant to a particular line of research and then follow this lead to the records in question.

This wider contextualization of the record will also enable researchers, such as climatologists, to assess records in a clearer context, in order to determine better their value as scientific evidence. In providing this knowledge to researchers, archivists make a distinctive professional contribution to knowledge in the humanities, social sciences, and other sciences.

The next two chapters will discuss further how this changing view of the archivist's role can assist research into historical climatology.

Endnotes

[1] Catchpole and Moodie, "Archives and the Environmental Scientist." p. 120.

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[3] Ibid., p. 123.

[4] Timothy Ball, "Climatic Change in Central Canada: A Preliminary Analysis of Weather Information from the Hudson's Bay Company Forts at York Factory and Churchill Factory, 1714-1850." (Ph. D. thesis, University of London, 1983), p. 47.

[5] H.H. Lamb, Climatic History and the Future. (Princeton, N.J.: Princeton University Press, 1997), p. 30.

[6] Houston, Ball and Houston. Eighteenth-Century Naturalists of Hudson Bay. p. 123.

[7] Ball, "Climatic Change in Central Canada." p. 86.

[8] Bradley and Jones, eds. Climate Since A.D. 1500. p. 42.

[9] Houston, Ball and Houston, Eighteenth-Century Naturalists of Hudson Bay . p. 12.

[10] Ibid., p. 14.

[11] Ball, "Climatic Change in Central Canada." p. 88.

[12] Alan Pounds and Robert Pushchendorf, "Clouded Futures." Nature 42 (2004), p. 107.

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[14] Alex Kirby, "Doom warnings sound more loudly." (BBC News Online, January 10, 2004) http://news.bbc.co.uk/2/hi/science/nature/3384067.stm

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[16] Todd Welch, " 'Green' Archivism: The Archival Response to Environmental Research." American Archivist 62, (1999), p. 75.

[17] Terry Cook, "From Information to Knowledge: An Intellectual Paradigm for Archives," in Tom Nesmith, ed. Canadian Archival Studies and the Rediscovery of Provenance. (Metuchen, New Jersey, Scarecrow Press, 1993), p. 220.

[18] Ibid.

[19] Catchpole and Moodie, "Archives and the Environmental Scientist." p. 117.

[20] Welch, " 'Green' Archivism," p. 75.

[21] "Culling and Purging: The process of pulling and disposing of unwanted materials." Society of American Archivist (SAA) website. http://www.archivists.org/glossary/. Accessed: March 1, 2005.

[22] Cook, "What is Past is Prologue," p. 18.

[23] Environment Canada. "Welcome to the National Climate Data and Information Archive." Accessed: October 1, 2004. http://www.climate.weatheroffice.ec.gc.ca/Welcome_e.html?

[24] Derek Wall, Green History. A reader in environmental literature, philosophy and politics, (London, Routledge, 1994), p.1.

[25] Ibid., p. 2.

[26] Welch, " 'Green' Archivism." p. 76.

[27] Candace Loewen, "From Human Neglect to Planetary Survival: New Approaches to the Appraisal of Environmental Records." Archivaria 33 (Winter 1991-92), p. 91.

[28] Ibid., p. 95.

[29] Ibid.

[30] Catchpole and Moodie, "Archives and the Environmental Scientist." p. 117.

[31] Ibid., p. 124.

[32] Ibid., p. 125.

[33] Ibid., p. 113.

[34] Ibid., p. 114.

[35] Ibid., p. 115.

[36] Ben Russel, "Tablets that may reveal El Nino secrets are feared lost in Iraq." Independent UK Online (June 9, 2003) http://news.independent.co.uk/world/environment/story.jsp?story=413756

[37] Ibid.

[38] "Hunt is on for ancient 'global warming' documents" Ananova (June 4, 2003) http://www.ananova.com/news/story/sm_787743.html

[39] Cook, "From Information to Knowledge." in Nesmith, ed. Canadian Archival Studies and the Rediscovery of Provenance. p. 217.

[40] Ibid.

[41] Cook, "From Information to Knowledge." in Nesmith , ed. Canadian Archival Studies and the Rediscovery of Provenance. p. 212.

Chapter Two

Analysing the Climate Record in its Various Forms

This chapter examines the emerging use of archival information in efforts to understand and address climate issues. What kinds of archival records and data can be used by researchers? Some examples include the log books from Hudson's Bay Company ships that are now housed in the Hudson's Bay Company Archives (HBCA). Catchpole used this data to reconstruct a climatic pattern. He noted that Lamb and Johnson (see bibliography) used them to study annual July and January surface pressure patterns over the North Atlantic since 1750. Others also used this wind information to examine the characteristics of historic storms. Other examples include French archival church and municipal records which document the dates of annual grape harvesting between the fourteenth and twentieth centuries. They have been used by climatologists to study trends in the history of weather temperature. In order to ensure that grapes were of the best quality, they were harvested when a certain optimal temperature was reached. When this date occurred reveals patterns in the history of temperature which the researchers suggest are consistent with increased global warming in the twentieth century A third example is archival photographs of glaciers in the Canadian Rockies taken at the turn of the twentieth century. Climatologists say that when the size of the glaciers in these photographs is compared with current glacier conditions, the evidence illustrates the rapid increase in the rate of their melting due to global warming. [1]

In 1978, Catchpole and Moodie explained how archival documents can be important to the environmental sciences. The use of conjectural information from archival records is something that should be looked at when areas of empirical climate data are scarce.

> In the environmental sciences, prediction is empirical rather than theoretical, largely conducted by projecting past trends and relationships into the future. Since the scientific record of past environments is meagre, however, alternative sources of evidence are essential and, among them, various archival resources offer significant potential for probing the historical past. Nowhere is this more apparent than in climatology in which for several decades there has been imaginative use of historical evidence for studying past climates. Documents have played a useful role in reconstructing past biological and hydrological environments and changes in these environments have in turn been used as valid indicators of climatic change.[2]

In chapter one, a broad view of environmental and climatic records was discussed. We have seen how throughout time people have recorded information about their natural environment. It is important to understand that climatologists have many resources to examine climate history. Archivists should be aware of them and their relation to archival records. Bradley created a table that identifies some of these different examples. As we see in Table 1, only historical

documents are found on all continents and, as Bradley states in the table, documents cover almost all aspects of climate. Bradley calls the non-textual records in this table, such as tree rings and varved[3] sediments, natural archives.

Evidence of climate change comes in different forms. Catchpole and Moodie expertly define the various kinds of evidence that climatologists can use. There can be both direct and indirect evidence. Direct evidence is measured by standardized observations and indirect evidence consists of environmental and human evidence. Environmental evidence is composed of elements "such as the physical and chemical constituents of sedimentary rocks, the nature of rock weathering, erosion and deposition."[4] It may also include biological factors, "such as past animal and plant life as revealed by their fossil remains."[5] Examples of these different types of elements can be seen in ice core samples, tree rings, and other natural archives.

Table 1: Sources Paleoclimatic Data.[6]

Type Of Record	**Main Distribution**	**Potential Information**
Historical Documents	All Continents	Almost all aspects of climate.
Tree Rings	Continental areas*, excluding desert and tundra regions	Temperature, precipitation atmospheric aerosols, atmospheric composition.
Ice cores	Polar and high mountain regions	Temperature, precipitation atmospheric aerosols, atmospheric composition.
Varved Sediments	Continents and some coastal basins	Temperature, precipitation, solar radiation.
Corals	Tropical oceans	Sea surface temperatures, adjacent continental rainfall.

*Studies of tree growth in tropical areas have not yet provided useful paleoclimatic reconstructions

The human evidence is the topic of this thesis. Catchpole and Moodie divide human evidence into behavioural and communicated evidence. Behavioural evidence consists of observations taken from human reactions to climate conditions. This can include how agricultural practices develop in a changing environment and how human settlements are affected by weather changes. Communicated evidence would be described as how: "our ancestors experienced past climate and their writings, art and lore provide evidence of climate change."[7] Communicated evidence can include both artistic and written evidence.

The artistic evidence can consist of a simple cave drawing which depicts fauna or flora in the region. Artistic evidence can also include European masterpieces, which capture a moment in time. For example, Pieter Bruegel's painting "Hunters in the Snow" depicts a Dutch winter scene in February 1565, a year in which the winter had been especially long and harsh according to opinion at the time. This reflects the generally poor winter conditions in that decade in Europe when snowfall measured at Zurich doubled by comparison with the previous twenty years.[8]

The artistic evidence can reinforce what is known in the written record. When climatologists look at the written record for evidence of climate change they are able to use two types: Contemporary factual accounts and contemporary fictional accounts. Most climatological research depends on physical evidence which has direct links to actual climatic conditions, but fictional works have also been used

in this research. Catchpole explains: "Although products of the imagination, works of fiction are usually set in the real world. Factual accounts, on the other hand, aim at faithfully reflecting the real world, but remain subjective inasmuch as they are modified by the perceptions and predilections of the author."[9]

Subjectivity, of course, is a feature of archival documents, as well as the conventionally fictional ones. As a form of communication between individuals, written documents consist of subjective and biased remarks. This does not diminish their importance, but means that it is crucial to obtain as clear an understanding of the record as possible, and especially of its provenance. "Nevertheless," says Catchpole, "information about past climates can be gleaned from both sources though the level of subjectivity severely degrades the scientific utility of fiction, especially in the absence of corroborating evidence."[10]

Written fictional evidence, although taken from the imagination of the author, may still have some association with the actual world, or environment, around the author. One example used by Catchpole and Moodie is from descriptions of Victorian winters by Charles Dickens. Citing H. H. Lamb, they explain that Lamb "considers Dickens' account of the Thames freezing in midwinter and of long spells of snow cover as being indicative of winter conditions significantly more severe than those of the present."[11] Works such as this one can be used for their interpretation of climate, or at least to help researchers understand some significant weather phenomena of the period. More confidence can be placed in this form of evidence if there is also corroborating factual evidence (Table 1). The

validity of all past climate information becomes much greater when multiple forms of evidence are used.

As for written factual accounts, this form of evidence is much like what one may find in an archives. The information, though factual, is nonetheless still subject to the writer's interpretation of events. Written factual evidence consists of two forms of evidence: sporadic descriptions and chronicles. Sporadic description can include: "letters, occasional reports, accounts of journeys, newspaper clippings, journals punctuated by frequent omissions."[12] These are less useful as evidence since continuity in records for environmental research is very important. The accounts are still of value as they may add evidence to research already done, corroborating evidence already found, or supply us with the only written account of environmental conditions during a certain time period in a geographical area. An example of sporadic description is ten photos located in the City of Winnipeg Photograph Collection at the city archives.[13] These photos depict city streets after rainfall at the end of June and beginning of July 1932. The reason for the creation of these photographs is not known, but the creator believed it important to indicate that they were about the rainfall during this period of time on the streets represented in the photographs. All of this information is written on the back of the photographs. It is sporadic, but it gives an indication that rainfall may have caused a significant drainage problem on the city streets in order to have received this kind of attention. Although these photographs were created for one purpose, they may now have a different use. If

one goes farther into the collection, weather conditions indicated, for example, by snow on buildings, can be viewed and related to a period in time. As a single document, not much information can be gleaned from each photograph, but as the collection is examined, one can start to see how the city is affected by climate. It should be noted that information found in sporadic text is incidental, or may show only exceptional weather events.

What researchers really desire with factual accounts is a continuous line of information within the archival records. Chronicles include records "written at regular time intervals at particular places, including diaries, journals and sequences of letters written at regular intervals."[14] For example, a daily weather journal is more comprehensive, and it contains a continuous line of data that helps show a defined period of time for a location. This allows climatologists to measure differences in climate in the same location over time.

The written text useable for environmental research falls into two important categories: non-instrumental weather chronicles and general chronicles. Catchpole and Moodie explain that the content of these two types of evidence differs:

> Although the difference is again one of degree rather than kind, the weather chronicles are distinguished by their objectives and content. Written with the intention of recording specific weather phenomena at regular time intervals, their content is restricted largely to descriptions of matters such as windspeed and direction, cloudiness,

> raininess, warmth, cold, frosts, fog and snow. The more common general chronicles are the diaries and journals kept for purposes other than recording weather, but which nonetheless often contain numerous references to the environment. Whereas the information contained in the weather journals is more or less systematic and comprehensive, that in the general chronicle is not only incidental to the main purpose of the record, but is also impressionistic, focussing on occurrences which have attracted the attention of the author. [15]

The documentary evidence in Canada covers only a brief period in climate history. There is nonetheless a very rich legacy. With the entrance of the two main colonial powers Britain and France, as well as rival corporations such as the HBC and the North West Company, to the North American continent, exploration and information gathering grew quickly. People began recording vast amounts of information, often for their patrons overseas. The Hudson's Bay Company kept "meticulous records of business operations in North America, including environmental phenomena impinging upon the execution of trade in this vast wilderness domain."[16]

Catchpole and Moodie list a wide range of different records found within the holdings of the HBCA, including "explorers' journals, Indian trade accounts, ships' logs, letter books and even daily temperature records from instrumental observations."[17] They note that the two most important types of records found within this collection that can help in environmental reconstruction are the post

journals and the ships' logs. The third chapter will examine the post journals kept by Thomas Corcoran in the early nineteenth century.

Before we look at the different records held at the HBCA, such as post journals and ships' logs, we should first look at an important tradition that has helped keep a wide variety of records in Canadian archives. We have identified in this thesis a wide range of different records such as: journals, photographs, artwork, post journals, letters and newspaper clippings. When thinking of archives, many believe that archives only hold textual records. Although textual records are the most voluminous ones in Canadian archives, the Canadian tradition of "total archives" encourages archival institutions to keep a wide variety of media of records from both private and public institutions and private individuals to help create a general understanding of Canadian historical development. Terry Cook explains that this has been a key feature of publicly funded archives in Canada since the earliest days of such archives in the late nineteenth century. The "total archives" method attempts to cast a wide net around records in hopes of preserving societal memory as effectively as possible. Cook adds that this represents both an administrative and cultural archival service: "The Canadian 'total archives' approach involves the integration of the official role of archives as guardian of their sponsors' continuing corporate requirements for recorded evidence of their transactions and the cultural role or archives as preservers of societal memory and historical identity, in both cases encompassing all media."[18]

The Archives of Manitoba, which houses the HBCA, is an example of this type of "total archives." Although the company's records were created by a private corporate entity, they document early governance of much of the territory of what is now Canada. Canada as a whole has rich and diversified archival holdings, which form an archival legacy that owes a great debt to the "total archives" tradition.

If we turn now to the written documents in the HBCA, the Hudson's Bay Company required the keeping of journals as early as 1683. Although some have been destroyed by fire or lost, many survive. They detail a wide variety of aspects of company work and human experience in northern North America:

> Journals of the various establishments of the Hudson's Bay Company in North America, recording weather, daily activities, occurrences of note, arrivals and departures of visitors and expeditions into the hinterland. Many journals include copies of accounts and correspondence inward and outward. Some have attached or separated meteorological journals noting temperature, wind velocity and barometric pressure, while other posts include logs of various vessels operating in Hudson and James Bays, journals of expeditions into the hinterland, astronomical journals noting stars and planets and their measurements, or medical journals kept by the surgeon.[19]

The ships' logs consist of a variety of information relating to the fleet that the Hudson's Bay Company controlled. They include information on the ship's intended route, movements, and weather and sailing conditions. The ship's sailed annually between England and North America, following the same path for safety reasons. Using these records, Catchpole and Moodie were able to collect environmental data related to the formation and break-up of ice in estuaries on Hudson Bay for the period of 1714-1871.[20]

The use of written records in climate studies is quite significant. There are certain advantages to using the written record over other sources of evidence. Geographer Faurer states that, unlike other forms of evidence, the written historical source of climate information is often primarily intended to convey that information.[21] Faurer also emphasizes that historical sources are valuable because they contain valuable date information.[22] A third advantage of historical texts is that they can range across a specific period of time, which is crucial in understanding the recent past. "It is from the reconstructions of the most recent past," says Faurer, "that predictions of climatic change for the coming decades will primarily be made."[23] Knowing the dates and being able to follow the environmental data from day to day helps in establishing a continuous line of evidence. The period in which this thesis falls is a period roughly described as after 1500,[24] which falls within a geological period known as the Quaternary period and which includes the principal period of European expansion into North America. Bradley and Jones explain that the period after 1500 is an important

one in the relationship between human history and environmental factors, as people explored the globe and migrated in greater numbers than ever before. Europeans began to arrive in North America in great numbers. Europe's colonial powers required information about their new acquisitions.

Much of this period falls within the scope of paleoclimatology. Environment Canada explains that it is the study of a "climate of a prehistoric period whose main characteristics may be inferred, for example, from geological and paleobiological (fossil) evidence."[25] Another way to view it is the "study of climate prior to the period of instrumental measurement." [26] Bradley says that the need to understand climate prior to the use of instrumental measurements is an important factor in better understanding our environment. The use of instrumental records spans only a small part of climate history and therefore does not give a complete or even accurate overall record. Bradley and Jones say, "Only when the causes of past climatic fluctuations are understood will it be possible to fully anticipate or forecast climatic variations in the future."[27] To be able to accomplish this task, researchers must use proxy sources to be able to help test hypotheses about future climate trends. Faurer notes, "Proxy sources comprise the traces of past climates found in the organic and the inorganic components of the environmental as well as in the human record."[28] Several different forms of proxy data are available for research. The four principal categories of proxy data for Paleoclimatic Reconstruction are: glaciological (ice cores), geological

(sediments), biological (tree rings, corals, pollen, fossils) and finally historical (written records of environmental indicators).

It is important to understand periods of climate history prior to any major human or anthropogenic influences if we are going to have a better understanding of how our current climate is affected by human involvement. Bradley writes that "unless the natural variability of climate is understood, it will be extremely difficult to identify with confidence any anthropogenic effects on climate."[29] It is known that the climate has gone through abrupt changes in the past, but our understanding of these changes is inadequate. He adds:

> Our knowledge of what these thresholds are is completely inadequate; we cannot be certain that anthropogenic changes in the climate system will not lead us, inexorably, across such a threshold, beyond which may lie a dramatically different future climate state. Only by careful attention to such episodes in the past can we hope to comprehend fully the potential danger of future global changes due to human-induced effects on the climate system.[30]

Therefore it is necessary for researchers to access this past information and to also be able to translate it into usable scientific data. Researchers are looking for this data in proxy sources. According to Bradley, of the four principal sources of paleoclimatic information – the glaciological, geological, biological and historical documentary -- the latter have "the potential of providing annual (or intra-annual) data for up to a thousand years in some areas, but the potential has

been realized only for the last few centuries in a few areas."[31] For this information to be used as climatic evidence, accuracy of the dates selected must be obtained. In all paleo-records, says Bradley, accurate dating is of critical importance: "Without accurate dating it is impossible to determine if events occurred synchronously or if certain events led or lagged others. This is a fundamental requirement if we are to understand the nature of global changes of the past."[32]

Historical records have the advantage of being far more precise in the area of accurate dating. Their use as environmental climatic data, though limited on a longer timeline, has the advantage of being far more accurate for determining time and place. Reconstruction of past climate trends has a number of stages. The first stage, data collection, requires locating the archival source of historical data. The next stage involves deciphering the information collected. The use of content analysis is the current and most accurate way of making historical information from texts useable as scientific data. As Bradley says of such documentary data, "Some of the most diverse and invaluable sources of proxy data are historical and documentary records."[33] Faurer says that prior to content analysis, the extraction of climate information from documents involved "intuitive decision-making"[34] Catchpole and Moodie describe this method as follows:

> In this approach, the eminent scholar reads with meticulous care the documents pertaining to a problem and then makes his own judgement about the problem. The acceptability and quality of these judgements may

> be conditioned as much by the mind of the reader as by the documents read.[35]

The question remains: how do we interpret this information? How can historical documentary data be made useable by researchers in their quest to understand the history of climatic conditions? This is the main aim of content analysis. It is the principal method of translating historical information about climate, with all of its subjective information, into as reliable a body of knowledge as possible. Being able to interpret this information will become key to using it in future research. Past data collected from these records has often been subjective and qualitative. Whatever source we are looking at, if it was created prior to the use of instruments, it will contain data which in its raw form cannot be considered as a valid source of scientific data. Bradley comments, "In all these sources, the historical climatologist is faced with the difficulty of ascertaining exactly what qualitative descriptions from the past are equivalent to in terms of modern-day observations."[36] To address this problem, Bradley asks what did people mean in the past by the weather terms they may have used: "What do terms 'drought', 'frost', or 'frozen over' really mean? How can qualifying terms (e.g. 'extreme' frost) be interpreted?"[37] As simple as these questions may appear, we have to look at the issue they raise in a broader light. Today, in more formal meteorological information gathering, terms such as frost and any adjectives we might attach to them would be properly defined and instruments would be used in establishing these definitions.

The Meteorological Service of Canada (MSC), within Environment Canada, has established a glossary, *Introduction to Meteorology and Related Sciences,* that can be found on its website. The MSC glossary reflects contemporary meteorology's effort to assist reliable weather analysis through adoption of standardized terms. If we take the term "frost" as an example, we can locate eleven entries in the glossary on the MSC web page. Frost is defined as: "Ground frost. A covering of ice, in one of its many forms, produced by the sublimation of the water vapour on objects colder than 0°C."[38] As we can see, this definition gives us a description and an objective number to measure it by. The glossary also includes the definition of frost measuring tools such as the frost hygrometer, which "is used in the determination of the dew (frost) point by observing the temperature of an artificially cooled surface at the moment when dew (frost) first appears on it." It should be noted that the actual definitions are not what is important to observe here. It is more important to understand that there is a standard being used.

But how does one define what the term "frost" means to an individual during the eighteenth century, or to one individual in Europe and another in the Hudson Bay territories? And if we add the adjective "extreme" to the description of frost, we can easily have quite a variation in perceptions. Do historical records, though rich in information, lack adequate standards? If we look at content analysis, we can see that these descriptive terms can still help us in understanding climatic life. Bradley explains that in content analysis "historical

sources are examined for the frequency with which key descriptive words were used (e.g. snow, frost, blizzard, etc.) and the use the writer may have made of modifying language (e.g. severe frost, devastating frost, mild frost, etc.)"[39]

Content analysis is a method most often found in the social sciences. Catchpole and Moodie, as well as Faurer and other geographers, have decided to develop and use it to attempt to expand the range of useful sources in historical climatology.[40] Prior to the development of content analysis, many of the methods for interpreting historical information were not considered reliable. Content analysis has helped open these materials for climatologists and archivists. Climatologists can obtain additional data and archivists can gain an understanding of records useful in climatology.

That said, content analysis is not without drawbacks and limitations in relation to historical sources, as suggested above. One limitation is the subjectivity of the record, which is often abetted by observations made without instruments. Another is the limited geographical range of the record. This is an important one to note. Today satellite and aviation technology tracks weather information across most areas of the world. The historical document, on the other hand, is limited to specific locations, such as forts, outposts, ships or cities. As a result of these concerns mentioned above, Faurer concedes "that the veracity of these sources can be questionable."[41]

And, also as a result of these concerns, the ability to contextualize historical documentary sources becomes very important. This means we should try to verify the source of the information as much as possible. Faurer notes:

> Historical sources of information for climatic reconstruction are often in the form of compilations from various other sources rather than first hand accounts. Where they do consist of first hand observations, they may be biased to serve ulterior purposes. It is therefore important to examine the origins of the sources thoroughly before extracting climatic information to ensure the veracity of their contents.[42]

In chapter three I will discuss how we can strive to do this by using a specific body of archival documentation. That chapter will look at a historical text in the Hudson's Bay Company Archives. As stated before, North American historical records on climate are of fairly recent origin by comparison with other parts of the world. Nonetheless, the records which contain climatic information in Canada are quite significant. As Faurer observes, "... the temporal deficiency of the North American record is largely compensated for by the exceptional quality of the resources of the Hudson's Bay Company."[43]

If we look at Table 2, we can see a comparison of North America and other areas around the world.

Table 2: Earliest Historical Written Records of Climate[44]

Area	Earliest written evidence (approximate dates)
Egypt	3000 B.C.
China	1750 B.C.
Southern Europe	500 B.C
Northern Europe	0
Japan	A.D. 500
Iceland	A.D. 1000
North America	A.D. 1500
South America	A.D. 1500
Australia	A.D. 1800

The HBC's archival records have been used for climate research but, as Faurer notes, "Although these records have been the source of numerous climatic reconstructions throughout the past two decades, they have potential to provide additional information about Canada's climatic history."[45]

This thesis looks at climate research methods from an archival viewpoint. Archival records may now be used in scientific and specifically environmental studies. A better understanding of the period of non-instrumental written records can only help us in forecasting future climate changes.

The questions climatologists ask may seem simple: "Has temperature or length of seasons increased or decreased? When were the major peaks and troughs and what were the rates of change between these intervals"[46]. But subtle changes in the environment are not always recorded or recorded directly. The resulting documentation is not always easily found. Climatologists must often use evidence in historical documents that may be unfamiliar to them; they must pose

imaginative questions to obtain climatological information, while still using the scientific method. Using content analysis enables climatologists to do this. Catchpole and Moodie advise: "Where documentary or descriptive evidence for environmental change is investigated, it is suggested here that the conditions for measuring such change can best be satisfied using the techniques and procedures developed by content analysis."[47]

Content analysis is a rather new method of analysis. Some of the pioneers of this technique date back to the mid-twentieth century. The interpretation of terms and definitions is quite a difficult task. Faurer, in her explanation of content analysis, states that "One of the greatest advantages and most common applications of this technique, however is to make latent content evident."[48] The ability to use the content from records for purposes other than the initial reason for their creation allows researchers the ability to find new sources of information from the past. With this knowledge, we can then hope to see better how human interaction with the environment can affect human affairs and the climate.

This thesis will not attempt to describe content analysis in its full scientific form, rather it will be used to demonstrate that written description, what we often find in archival records, can indeed be used for future research by using the scientific method. Catchpole and Moodie summarize this method clearly:

> One of the greatest strengths of content analysis is its ability to yield numerical data from lexical and other essentially qualitative sources. On the one hand, this permits ascertaining or measuring the standards and

> norms employed by past observers with much more precision than classical techniques of historical analysis permit. And on the other hand, the conversion of the historical observations into numbers facilitates ready and precise comparison with their contemporary counterparts.[49]

The ability to convert textual sources into quantitative material becomes a large task. The frequency count is the most common method of content analysis done for this purpose. "In this procedure," say Catchpole and Moodie, "inferences from text are derived strictly from the frequency with which specified symbols or themes appear within it."[50] Climatologists must go through the written text to locate categories of climate information, which they then often count in order to measure the magnitude and assess the importance of the phenomena detected.

Timothy Ball, in his doctoral thesis, used content analysis to study weather information for York Factory and Churchill Factory between 1714 and 1850. After a survey of climatological terminology was done using the post journals for these two areas, Ball was able to group his data into specific categories of climatic phenomena. (In chapter three I use some of these categories to sort the data collected from the Corcoran records.) Ball goes much further than this in his study and counts the features of the climate that he observed. He states, for example, that "HBC weather observations for Churchill, entered on a computer, total 61,443, of which 22,601 were for temperature alone and 13,505 recorded

precipitation events."[51] A study of this magnitude is time consuming as Ball explains:

> It took me four years to transcribe the data from the daily entries in the York Factory and Churchill journals alone, and occasional meteorological journals from these two posts. Computer entry of these data took the better part of the fifth year . . . Harington[52] was correct to mention the tremendous investment in time that is presently required to distil a useful drop of paleoclimatic [and modern, he might as well have added] data from archival and other sources.'[53]

Two key aspects of content analysis are similar to those of archival study. These are the understanding of both the content and the context of the records. We must understand the reason why this information was created if we are to use it for research. The better the archivists understand their holdings, the easier and more confident researchers can be with their analysis. To be valid, a finding must be replicable. Climatologists need to be able to gather data from the written record. In doing so they are able to formulate the question and hypothesis required. Again, it is not up to the archivist to understand the full extent of the scientific method, but it is important for the archivist to understand what type of information the researcher requires.

Climatologists must first be able to identify a research question. Faurer explains that the question "is formulated in the context of the communications to

be analyzed and a body of knowledge regarding the physical phenomena under investigation."[54] These communications are the selected archival records. The physical phenomena can be anything from temperature changes to spring flooding in the Hudson Bay area. What is important is that the information is available, the record is identifiable and that proper descriptions have been created with a proper understanding of the reason for the record's creation. Archivists who make this information about the history of the record available to researchers will help considerably in the pursuit and analysis of climatological evidence. The more the context of the creation of the records is understood, the more useful the records will be for all researchers, including climatologists. Archivists can provide this contextual information about records to assist climatologists. Archivists can help locate such information by providing an understanding of how the functions of institutions and of individuals in personal life might have resulted in the creation of climate information. This requires of archivists a deep immersion in the history of the activities of the institutions whose records they have. It requires archivists to be able to link these sources of information to the records keeping or filing systems where the information may be found. It also requires of archivists a sensitivity to the history of the language used in records. It may not be possible to anticipate all such research interest in language (in this case the language of climate terminology at various times in the past), but archivists can be more alert to this need, especially after being informed about particular researchers' interests. Archivists can then be more

sensitive to insights in the records into the changing context in which language is used. In these ways, archivists and climatologists can collaborate more effectively to advance historical climatological research in archives.

It is important that archivists be at least generally aware of the research methods being used in research with archival documents. They cannot understand them all in depth. As indicated by growing interest in the sciences in medical history, for example, the sciences offer an area of new research in archives. Climatologists have been among the first such scientific researchers to use archives. This past experience augers well for further scientific uses of archives. There is now an important new opportunity for collaboration between scientists, who may not know much about archival materials, and archivists, whose knowledge of the history of the records can help provide scientific researchers with both relevant materials and a better understanding of why and how they have been created.

Endnotes

[1] Alan Catchpole, "Hudson's Bay Company ships' log-books as sources of sea ice data, 1751-1870" in Bradley and Jones, eds. Climate Since A.D. 1500, p.17. For the grape study see The Globe and Mail, 18 November 2004, p. A9 and also in Isabelle Chuine, et al, "Grape Ripening as a Past Climate Indicator. Summer Temperature Variations are Reconstructed from Harvest Dates Since 1370". Nature, vol 432 (November 2004); for the glacier study, see ibid., 18 September 2004, pp. F1 and F8. Related studies of environmental conditions that use archival records include research done at the University of New Hampshire with Massachusetts fishing boat logs from the 1850s to attempt to calculate the level of cod fish stocks. The research indicates that the recent decline in cod stocks is much greater than once thought. See ibid., 1 March 2005, p. A9. See also ibid., 8 January 2005, p. F7 for an account of the "killer wave" that hit the Burin Peninsula of Newfoundland and Labrador in November 1929 after an undersea earthquake. Photographs from archives in the province illustrate the extensive damage done. This story appeared in the

aftermath of the Indian Ocean tsunami disaster of December 2004 and reminds readers that such environmental dangers have been experienced before and may happen again in any part of the world.

[2] Catchpole and Moodie, "Archives and the Environmental Scientist." p. 113.

[3] A layer or series of layers of sediment deposited in a body of still water in one year.

[4] Catchpole, "Hudson's Bay Company ships' log-books as sources of sea ice data." p. 116.

[5] Ibid.

[6] Raymond and Jones, eds. Climate Since A.D. 1500. p. 4.

[7] Catchpole and Moodie. "Archives and the Environmental Scientist." p. 116.

[8] Ibid., p.118

[9] Ibid.

[10] Ibid., p. 119

[11] Ibid.

[12] Ibid., p. 117

[13] City of Winnipeg Archives and Records Control, Photographic Collection, Box P1 File 7-16

[14] Catchpole. "Hudson's Bay Company ships' log-books as sources of sea ice data." p. 121.

[15] Catchpole and Moodie, "Archives and the Environmental Scientist." p. 122.

[16] Ibid., p. 125.

[17] Ibid.

[18] Cook, "What is Past is Prologue." p. 34.

[19] Types of Post Records. Accessed Site October 1, 2004
http://www.gov.mb.ca/chc/archives/hbca/resource/post_rec/types.html#a

[20] Catchpole and Moodie. Environmental Data From Historical Documents by Content Analysis: Freeze-Up of Estuaries on Hudson Bay 1714-1871. (Manitoba Geographical Studies 5, Atmospheric Environment Service Department of the Environment Canada, 1975).

[21] Marcia-Anne Faurer. "Reliability Testing in the Derivation of Physical Environmental Information From Historical Sources." (Ph. D. thesis, University of Manitoba, 1990), p. xi.

[22] Ibid., p. xi.

[23] Ibid.

[24] Bradley and Jones, eds. Climate Since A.D. 1500.

[25] Environment Canada. "Introduction to Meteorology and Related Sciences." Accessed: October 1, 2004.
http://pda.msc.ec.gc.ca/education/imres/glossary/glossary_p_e.html

[26] Bradley and Jones. Climate Since A.D. 1500. p. 1.

[27] Ibid.

[28] Faurer, "Reliability Testing in the Derivation of Physical Environmental Information From Historical Sources." p. 1.

[29] Bradley. Paleoclimatology: Reconstructing Climates of the Quaternary. p. 2.

[30] Ibid., p. 3

[31] Ibid., p. 6.

[32] Ibid., p. 8.

[33] Ibid., p. 439.

[34] Faurer, "Reliability Testing in the Derivation of Physical Environmental Information From Historical Sources." p. xii.

[35] Catchpole and Moodie. "Archives and the Environmental Scientist." p. 132.

[36] Bradley. Paleoclimatology: Reconstructing Climates of the Quaternary. p. 441.

[37] Ibid.

[38] Environment Canada. "Introduction to Meteorology and Related Sciences." Accessed: October 1, 2004. http://pda.msc.ec.gc.ca/education/imres/glossary/glossary_f_e.html.

[39] Bradley. Paleoclimatology: Reconstructing Climates of the Quaternary. p. 441.

[40] Faurer. "Reliability Testing in the Derivation of Physical Environmental Information From Historical Sources." p. 7.

[41] Ibid.

[42] Ibid.

[43] Ibid., p. 11.

[44] Bradley. Paleoclimatology: Reconstructing Climates of the Quaternary. p. 440.

[45] Faurer. "Reliability Testing in the Derivation of Physical Environmental Information From Historical Sources." p. 12.

[46] Catchpole and Moodie. Environmental Data From Historical Documents by Content Analysis. p. 3.

[47] Ibid., p. 5.

[48] Ibid., p. 20.

[49] Catchpole and Moodie. Environmental Data From Historical Documents by Content Analysis. p. 5.

[50] Ibid.

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[51] Houston, Ball and Houston. Eighteenth-Century Naturalists of Hudson Bay. p. 120.

[52] C.R. Harington. ed. The Year Without a Summer? World Climate in 1816. (Ottawa: Canadian Museum of Nature, 1992).

[53] Houston, Ball and Houston. Eighteenth-Century Naturalists of Hudson Bay. p. 121.

[54] Ibid., p. 27.

Chapter Three

Climate Observations of Thomas Corcoran, Hudson's Bay Company, 1827-1841

This chapter will look at the types of climate information found in the records in the Hudson's Bay Company Archives (HBCA) created by Thomas Corcoran in the early nineteenth century. Many records at the HBCA, including Corcoran's, have not been explored in any great detail and could be quite useful for environmental research. Although climate history researchers would have to examine a wide range of different post workers' records to build up an overall picture of climate conditions, this chapter will focus on one individual's records in order to see the type of information that can be gathered from them.

The Hudson's Bay Company archival collection is enormous. It occupies 1.5 miles of shelf space. It is housed in the Archives of Manitoba in Winnipeg and owned by the Government of Manitoba. The records were created by a private corporation which also served as a kind of arm of the British government, in the absence of much other British authority in northern British North America from the 1670s to 1860s. The HBC came into existence on May 2, 1670. It was established under a Royal Charter granted by Charles II to the "Governor and Company of Adventurers of England Tradeing into Hudsons Bay and Their successors."[1]

Compared with other business records, few have been kept as well as the Hudson's Bay Company's, or span as long a period of time. According to business historians John Armstrong and Stephanie Jones, the survival rate of

business documents in Britain prior to 1800 is quite low. That changed for the better through the nineteenth and twentieth centuries, but by 1800 the Hudson's Bay Company had already accumulated 130 years of records.[2] Although access to the records was tightly controlled for most of the company's history, access was gradually widened in the twentieth century. Now most records are open to the public.[3]

How should researchers approach a large archives such as this one? A researcher arriving at the HBCA can be overwhelmed by its scale. When looking at a specific subject such as historical climate data, two interrelated approaches can be employed: i) a contextual analysis and ii) a subject content search based on specially developed thematic guides. If a researcher neither knew about nor wanted to pursue a particular person such as Corcoran and was seeking a broad overview of possible sources, then the contextual approach might be used first. This approach begins by translating a subject inquiry into a question about the context in which the records were created. If the subject inquiry is, "What information on climate was gathered by the HBC during the first half of the nineteenth century?" the archivist or researcher would translate that into "Who in the HBC would have performed functions that would have resulted in the creation of records with the subject or climate information requested? and "In what specific types of their records was this information captured?" One answer is that during the period in question, officers in charge of HBC posts were required to document a wide variety of work related information, including climate conditions at the post. The researcher could then pinpoint posts of particular interest. Posts

generated (and are documented in) a wide variety of records: post journals, correspondence books, correspondence inward, account books, reports on districts, list of servants, abstracts of servants' account, district fur returns, minutes of council, district statements, scheme Index, indent books, fur invoice books, expenditure books, book debts, scheme distribution and invoices books, provision shed balance books, store balance books, servants' engagement registers, accounts current, bills of lading, servants' ledgers, London fur trade ledgers, miscellaneous items, inventories, tariff books, store transfer books, store invoice books, invoices of shipments, freight check books, cash advances to officers and servants, and fur purchasing agencies' journals. Based on knowledge of the distinctive categories of information these various types of records tend to convey, the researcher would be directed first to the relevant post journals, which could be examined with the help of whatever indexes the HBC post officers may have created for the journals.

The HBCA is about to release to the public a new Web-based descriptive system to facilitate such contextual research. Known as "Keystone," it will perform the translation of a subject inquiry into contextual leads to functions and records automatically. Archivists have created Keystone by entering in the database massive amounts of contextual information about records and the key links between related records. Researchers will enter a keyword search term such as a person's name, an administrative unit in the company such as a post name, or a subject term such as weather or climate. "Keystone" will then retrieve descriptions of all series (a body of records integrally related by their

contemporary filing arrangement) created by company entities, which contain the search term. Researchers can then examine a series description and pursue links to descriptions of related series created by predecessor, successor, superior, and subordinate entities, but which may not contain the search term. In this way researchers are directed to a particular body of records which holds information on their research interest and to other records which may also be of interest.

If a researcher already knows of and is primarily interested in a company entity such as a post, or individuals such as Corcoran, and wants to pursue them more directly, a contextual search can still be done, but a subject content search using the HBCA's search files may be more useful in this case. (The two methods can be employed to compensate for the limits of each one.) The search files form a hard copy finding aid that has subject files on events, company units, and individuals that have been researched at the HBCA. These files have been created by the HBCA staff in the course of responding to research inquiries. The files often contain correspondence from researchers and replies sent by the HBCA. (When "Keystone" is available, it will also give access to the search files.) Researchers can also consult another subject or thematic guide compiled by the HBCA staff – the post histories. They include information on each post and on the post managers. They give the service dates of the managers in chronological order. The post histories give a list of significant events in the life of the post and references to it within the HBCA collection.

Information on Corcoran can be found in the Search Files and the Post Journals. The latter record weather, daily activities of all kinds, special events, visitors to the posts, and other travel in the area.[4] There are references to Corcoran in the Correspondence Books, which contain copies of incoming and outgoing letters exchanged by company posts. He is also referred to in the Correspondence Inward, which are commercial and personal letters received by company posts. His name is recorded in the Minutes of Council of the annual meetings of the Governor of Rupert's Land, Chief Factors and Chief Traders of each district. And he is also documented in the annual Reports on Districts, which discuss district social and economic conditions.[5]

The Search Files and Post records are only two of the types of records kept at the HBCA. These two, however, seem to hold the information most relevant to this thesis, although the other records could probably elaborate more on Corcoran's whereabouts and the type of work he performed. Other possible sources include the London Office Records, Ship's Records, and Subsidiary Companies records. The HBCA also has a reference library of about 5000 books, but it does not have much on meteorology and climate.

It can be quite a feat to navigate through this immense collection. Large nineteenth-century businesses did not compile records about their employees in the same manner as contemporary ones do with the familiar personnel file.[6] Information about a person or subject can be widely scattered, but needs to be consulted in order to obtain a portrait of an individual such as Corcoran and his place or functions in the organizational hierarchy. What was required of a

particular employee? Where did the employee work within the organization? The HBC was a large and complex organization in constant evolution. Unfortunately, not all the changes are properly documented. In order to reply to research inquiries an archivist should understand this structure and how and why it evolved.

To place Corcoran in historical context, and to help underline the importance of his records to climatology today, some background information about him is needed. Born ca.1794 in Crossmolin Ballina, Co. Mayo, Ireland, Corcoran entered service with the HBC in May 1818 as a clerk.[7] Corcoran worked for the HBC for approximately 38 years and held various positions with the company. As a Clerk in Charge, his duties included the recording of daily logs for his post. His superiors described him as "very attentive and sedulous in the performance of his duty . . . conduct highly successful."[8] Catchpole says of Corcoran's records that they "represent the observations and communications of a person born and bred in the mild Irish climate, who ... lived for 18 years in the James Bay region, and who was educated, and a careful observer and a literate journalist."[9]

Corcoran was also selected for this analysis based on preliminary research done by Dr. Cynthia Wilson, a climate researcher. Wilson has identified Corcoran's writings in journals for the Hudson's Bay Company as highly important. She has used the Hudson's Bay Company Archives extensively and published articles on various topics on Canadian climate. Catchpole explains:

> The post journals written by Thomas Corcoran at Eastmain between 1834 and 1837 were ranked very

> highly by Cynthia Wilson as sources of historical climatic information. This assessment is based on her deep familiarity with the whole body of post journals kept at the various posts on the east coast of the Hudson and James Bays in the nineteenth century.[10]

Although Corcoran was not a well-known politician, a great military figure, or a man of wealth or high social status, there is a remarkable amount of information about him. Some biographical information was located in a file under his name in the search files. It holds correspondence and notes dealing with matters that date from the earliest days of the company. The Search Files contain a great deal of information compiled by company archivists since the early twentieth century in response to inquires, often from family members who were interested in their ancestors.[11] In 1928, the company received a letter inquiring into Corcoran from a Mrs. Alvina Ripa (nee Corcoran) of Providence, Rhode Island. The letter states:

> Gentlemen: - Have you any records available of the "Chief Trader" Thomas Corcoran in the old Company. We know he died in 1865 or 66 and is buried in Rawdon. However, we are interested to know more of his history and would gladly forward you charges for same if you could give us the desired information. [12]

We do not know why Mrs. Ripa wrote the company, but her letter generated research by the company archivists which aids us today. On March 13, 1929, an answer was sent to her that offered "some particulars which we have collected from our Records regarding the life of Thomas Corcoran, whilst he

was in the service of the Hudson's Bay Company. We regret that we have not been able to let you have an earlier reply, but our Records are at present in a state of being sorted and classified. However, we think that we have now got a fairly complete story of Thomas Corcoran."[13]

With the help of this research and by looking at the post journals we are able to piece together some information on Corcoran. He joined the company with his brother, John Corcoran, in May 1818. He sailed to British North America on the HBC Ship "Eddystone."[14] It left the Thames in May 1818 and arrived at Moose Factory, James Bay on 17 August 1818.[15] Corcoran was first employed as a "Clerk writer" in Moose Post in the district of Moose in 1818. Table 3[16] below, obtained from the HBCA, illustrates his various positions and postings throughout his extensive career with the HBC. He worked for the company for 38 years.

Table 3: Thomas Corcoran's Postings for the HBC

Appoint-ments and Service Outfit Year[17]	**Position**	**Post**	**District**
1818-1822	Clerk Writer[18]	Moose	Moose
1822-1824	Clerk & Accountant	Albany	Albany
1824-1825	Clerk & Accountant	Moose	Moose
1825-1827	Clerk & Accountant	Albany	Albany
1827-1828	Clerk in Charge	Martins Falls	Albany River
1828-1830	Clerk	Moose Factory	Moose

1830-1833	Clerk in Charge	Martins Falls	Albany River
1834-1837	Clerk in Charge	Eastmain	Ruperts River
1836-1837	Appointed Clerk in Charge	Nichiquon	Ruperts River
1837-1841	Clerk in Charge	Big River (Fort George)	Ruperts River
1841-1842	Chief Trader[19]	Big River (Fort George)	Ruperts River
1843-1851	Chief Trader in Charge of District	Albany Factory	Albany
1852-1855	Chief Trader in Charge of District	Albany Factory	Albany

During his employment at Moose Factory in 1819 he was described as "Employed at the writings ever since his arrival at Moose and appears to be very correct and perfectly competent to the duties of his station."[20] When researching weather descriptions made when few scientific standards were being followed, it can be quite important to know as much as possible about the individual who has gathered the information. Therefore, character descriptions found in these records that help us understand his intellectual ability, his work ethic, and overall personality help us to gauge the accuracy of the data that he gathered. In the literature on climate history, little mention is made of the individuals who gathered the environmental information. It may be difficult to obtain information about these individuals, but they should be recognised as significant contributors to the reconstruction of climate history and of future climate predictions. As Timothy Ball states, "Any observational study is only as valid as the data on which it is based, so it is essential that the nature and source of those data be clearly

explained."[21] Looking at the graphs and statistics created by using the historical written record to understand past climates is important, but knowing and understanding their origins is an essential part of assessing their validity.

Several comments written about Corcoran's abilities demonstrate his good character. When he was assigned to Albany Factory in 1822, he was described as "extremely correct, active, industrious, sober and possessing excellent natural abilities with good education."[22] In 1827, his superiors also note, while still in Albany, that Corcoran was: "A steady correct man, good Clerk and Accountant, but has little experience as an Indian trader, he is however one of the most promising men in the department and looks to promotion in due time."[23] Although we do not have precise information on his education, Corcoran had to have been schooled in the basics of reading, writing and arithmetic, as these are the abilities he was required to possess in his employment. This is supported by company reports on his accounting work at Albany. He was deemed "An active intelligent Officer and finished Accountant." [24]

Corcoran was married. He and his wife Charlotte (nee Sutherland) had four children plus responsibility for the daughter of a deceased brother.[25] In addition, he was known as a man of great Christian faith. Père Laverlochène wrote to Mgr. Signoy on Dec 25, 1848: ". . . Le commandant du fort Albany Thomas Corcoran est un gentilhomme irlandais catholique, qui depuis 32 ans habite les bords de la Baie d'Hudson. Venu d'Irlande a l'âge de seize ans, et seul catholique de cette place, il a toujours conservé une fois intacte et une piété fervente."[26] One can assume from this varied testimony that Corcoran was hard

working, consistent, and reliable. He was, though, also a man who could act on his own accord and even disobey orders if he believed it just. Falling ill and requesting a leave in 1841 to see a doctor at Moose, he was refused leave by Chief Trader Miles. He nonetheless went, disobeying the Chief Trader: "As I am in this instance acting contrary to orders, I trust the sad necessity which [?] me do it, and the long period (23 years) I have served the Honorable Company will be duly considered by the Governors and Council."[27] This incident does not seem to have hurt Corcoran's career, as he was promoted to Chief Trader in the following year.

Given his many skills and these accolades, it is not surprising that Corcoran continued to ascend the company ranks, becoming a Commissioned Officer[28], at Fort George in 1841. For health reasons he and his family left Fort George for Montreal on 5 July 1841. He continued working in Albany Factory from 1843 until his retirement in 1856. Prior to his retirement and following his recurring health problems, Sir George Simpson, Governor of the Hudson's Bay Company, sent a letter to Corcoran that can be found in the Corcoran search file. It is dated at Lachine 7 May 1853, and throws light on his health:

> I will from hence briefly reply to your favours of 18 and 19 January by which I learnt with much pleasure that since the severe attack you had on your way inland last autumn your health has been tolerably good, and I sincerely trust you may be spared a return of the severe suffering you experienced when down here. I notice what you say about the possible necessity of your withdrawal from active duty, but whilst your health continues good,

> we need not look forward to that contingency – Sufficient to the day is the evil thereof – and I would fain hope the concern will yet have the benefit of your experience management for many years to come.[29]

Corcoran must have had a significant illness. It is of interest that the company governor (no less) wished him good health in hope of keeping him on active duty. Simpson noted the benefits of his experience and post management, which underscores again Corcoran's respected administrative abilities. Corcoran died on 17 April 1865. He is buried in Rawdon, Quebec. [30]

When we turn to the records that Corcoran made, we can see that of the types of evidence mentioned in chapter two, the records fall within the category of historical documents and contemporary factual accounts. They are also chronicles, a more useful form of the factual account, as they give information over an extended period of time. We can also add that the Corcoran records can be divided into two types of chronicles. Some of his writings can be considered non-instrumental chronicles, such as the records described in Appendix A, and others are instrumental chronicles, such as those listed in Appendix B.

The post journals written by Corcoran are extensive. There are over 700 pages written by Corcoran in various journals. Table 4 shows the post journals from the various forts where he was stationed. We can see that there are some gaps in these records. The gaps were caused by wars (between France and England), fires, and files simply lost or otherwise destroyed. Archivist Deidre Simmons states that: "not all of the great records of the earliest years of the

company have survived. Many were destroyed and a few have strayed into other archives."[31]

Table 4: Hudson's Bay Company Forts for which the HBCA holds Records and Where Thomas Corcoran was Stationed

Establishment Name	Time Period of Records	Total Years of Records
Moose Factory	1730-1904, 1912-1941	203
Albany	1705-1707, 1711-1868	157
Martin Falls*	1794-1812, 1818-71	80
Eastmain*	1736-1837	101
Nichiquon (Nichikun)	1834-70	36
Fort George (Big River)*	1805-07, 1816-42, 1837-54, 1857-58, 1862-71	55

* Posts where Corcoran wrote daily in the post journals

In Table 4, we see how many records are available for areas where Corcoran was posted. From 203 years of records for Moose Factory to 36 years of records for Nichiquon, there is an impressive amount of written documentation on various aspects of northern North America's human and natural history, travel, exploration, Aboriginal people, accounting information on goods purchased and sold through the company and their prices, and HBC employees.[32]

The reasons behind such intensive record making are suggested by Catchpole. In an effort to gain an edge in commercial competition, the HBC took it upon itself to create a vast record on various aspects of its territories.

> The climatic severity of the Company's lands was thus matched by the hostile commercial climate which prevailed, especially in its first century of business. The Company responded to this by developing a strategy of secrecy whereby its servants were forbidden to convey to outsiders information about its affairs or about the geography of the bay. While the Company thus restricted the flow of information to its enemies, it strengthened its own hand by instituting policies that ensured this flow to the Governor and Committee in London. They required its servants to keep detailed written records and to submit them regularly to the Governor. These policies, sustained over three centuries, brought into being and preserved the rich collection of written correspondence, reports, journals and account books that exists today as the HBC archives.[33]

The HBC often pressed for more information from its officers. In 1814, for example, it reorganized its trade policy and gave new instructions on information it wanted from its overseas operations. Archivist Joan Craig explains that the London officers called for more streamlined district reports to keep them up to date on company activities:

> They called, in addition, for transmission to London of District Reports to remedy the situation in which they found themselves with 'information of which we ought to be posses'd, with respect to the present state of our establishments [...] in many points imperfect, and that to which we have access [...] too much scattered to be easily collected together.' The reports were to include

> sketch plans of Districts, description of navigation, nature of the country, climate, details of post buildings, ground under cultivation, particulars regarding company employees, Indians and the 'Canadians' and of the trade.[34]

The post journals written by Corcoran can be a bit overwhelming because of their extent. Because of a scarcity of paper, among other reasons, writing needed to be neat and compressed. His daily entries contain vast amounts of information about different aspects of life in early North America. To demonstrate this I have divided the following section into three parts. The first looks at a single excerpt from Corcoran's journal entries. The second looks at three separate entry years of three days each and compares the information kept to see whether it is similar. The final example looks at how data from these excerpts can be viewed separately from their entries. These tables will reflect what researchers looking for climate data might require when doing statistical documentation.

The journal entry by Corcoran on 29 April 1835 at Eastmain contains a variety of information in just one paragraph:

> Very disagreeable weather occasioned by rain and snow throughout the day – winds variable. All hands employed much the same as yesterday. A single goose has been seen this morning for the first time this season: it was fired at by the Indian [Chiro?] but missed.[35]

We can observe different activities that Corcoran recorded, such as weather observations, employee activities, interaction with Native people, and observation of animal migration. This type of information was recorded on a daily basis in these post journals. Climate history researchers, however, might well ask a couple of questions. Was Corcoran consistent with his recordings? Where does this climate information appear in his documents? As Ball notes, "The reference to individual styles needs comment because any variations in the record would tend to reduce the homogeneity of the data."[36] These matters are also important because the information recorded is not only on climate conditions but on all activities at the posts. Researchers looking for climate information will find their labour eased by detecting patterns of information recording that localize their search through the variety of information in the entries.

There is thus a need to become familiar with the writing style of the recorder. Corcoran was repetitive in his writing methods. His entries were made consistently. He either wrote the weather observations at the end of the entry at a post where he was stationed or at the beginning. This information was never mixed into the entry, which would make it harder to locate. Corcoran appears to have followed the general administrative orders and specific recordkeeping requirements of his superiors meticulously.

If we look at a random selection of excerpts taken from the various post journals written by Corcoran we may get a better understanding of what he was recording, the method he used and how consistent he was in recording climate data. Although Corcoran worked for the company from 1818 to 1856, it is only

when he was Clerk in Charge at a post that he wrote daily entries. Looking at Table 2 we see that Corcoran was Clerk in Charge at three different posts throughout his career: Martins Falls, Eastmain and Big River (Fort George). As we go through the different excerpts taken from his writings we can also use the Post History, which gives information on the post's location and its managers. The location of the post is obviously important when looking for information about climate.

In the second part of this section we look at the random excerpts that have been chosen from various post journals that Corcoran wrote in. This will help show the type of information he recorded and the degree of consistency of his writings. The years chosen are 1827, 1834, and 1841. This gives us a period of 14 years. The first excerpt was written when Corcoran was located at Martins Falls, which is situated in what is now Ontario on the west branch of the Albany River. This post was first established in the summer of 1794. On 24 July 1827 Corcoran writes his first entry as Clerk in Charge:

> Thursday. Mr. Mowat and Myself look at Inventory of all the goods remaining in the store as well as of all the articles in use. [?] The men employed in making nets and fishing and the apprentice boys employed working in the gardens. The Indian call the Crow and family arrived here on the 21st [?] left us in the afternoon. The men got 30 fish from the nets this morning – weather sultry.[37]

On 25 July 1827 he writes:

> Wednesday. Weather cloudy but Sultry, Thermometer about 3 pm 80 above zero several light showers of rain

> fell throughout the day. All the men except [?] Scollie who was employed in repairing an old Boat left here last year by [?] McKenzie and Finlayson, and that is intended for the [?] of [?] and family to Albany were employed in a similar manner to what they have been yesterday the boys were employed in the gardens, [?] hoeing potatoes and weeding them. The number of fish procured to day much the same as yesterday.[38]

Corcoran writes on 26 July 1827:

> Thursday. Thermometer 81+ The men got 34 fish this morning from 8 nets, the quality of which is but very indifferent. The men and boys employed in the gardens. 5 nets which the men began to make on the 20th: Instant were finished this morning.[39]

Corcoran's next post was at Eastmain, located in what is now northern Quebec, Lat. 52.10' north Long. 80.50' West. This post was originally settled in 1723 at North Point and moved to Georges Point closer to sea.

Excerpts from 29 October 1834:

> Wednesday. Fine clear weather wind variable. All the men at work on the new Building. The Cripple attends the Cattle.[40]

Excerpts from 30 October 1834:

> Thursday. Fine clear weather but cold for the time of year wind SE. All the men employed at the new Building. The Indians of the 25th [?] are still here – and as they belong

> to the N. Side of the River it is impossible to say when they will be able to cross it to get to their hunting ground.[41]

Excerpts from 31 October 1834:

> Friday. Clear cold weather wind at East [?] and Loutill, Watt and Flett went down to Woody Island to look out for logs for Beams and a Ridge Pole for the New Byer. They could only find 3 or 4 of the dimensions required. Stevenson, who has not enjoyed many days of sound health since the 10th July last and from that I can learn for a considerable time before that period, is confined to his bed by a complaint on his lungs. [42]

The final excerpts are from Fort George (Big River) in what is now Quebec. Corcoran closed the Eastmain Post and moved its operations to this location in 1837. Fort George was settled in 1803, on North Shore Big River, two miles from the sea. Excerpt from 29 June 1841:

> Tuesday. Cloudy showery weather. Wind Variable. All the new [?] employed in the store packing furs and shipping all the packages hitherto completed on board the Schooner.[43]

Excerpt from 30 June 1841:

> Wednesday. Wet foggy weather. Wind S.W. [?], Soutill, Sinklater and Dearness laying sleepers for platforms that

> are to lead from all the new buildings to the bank of the River for the convenience of rolling casks and thereon.[44]

Excerpt from 1 July 1841:

> Thursday. Boisterous weather caused by heavy rain and a strong Westerly Gale. The vessel and all matters connected with her are in readiness for proceeding on the voyage to Ruperts House, as soon as the wind and weather permit.[45]

Looking at these three sets of excerpts taken from different locations and times, it is apparent that Corcoran did write consistently. He writes about a variety of topics at the post, but weather is mentioned in all of the entries, with various details -- from cold, wet, and windy conditions to sultry and clear weather. In the first post he has access to a thermometer and takes readings from it. His records provide insight into the resources available to his community for hunting, fishing, and gardening, and of the available lumber for post construction and maintenance. Geographical sites such as "north side of the river" and Woody Island are mentioned. These pieces of information may well also be useful to climate researchers.

When we consider the usefulness of the Corcoran records for climate history research, we can note first the great value of regular, dated entries. Ball describes various categories of climatic phenomena that can be used in content analysis. These include: location, date, year, time, temperature non-instrumental and temperature instrumental, wind direction, precipitation, cloud cover, thunder,

weather general, melting, frost and drifts. Corcoran provides many of these types of information.

In the third part of this section, we can analyze the climate information in Corcoran's journal entries by looking at an entire month of his entries. To outline the types of climate information that can be gleaned from the Corcoran journal entries, two tables were created using some of the above categories of climatic phenomena. Again, random dates were chosen to demonstrate that the recordings done by Corcoran are regular and consistent. The first table (see Appendix A: Categories of Climatic Phenomena for Eastmain April 1834) is divided into six columns. The first column contains the entry day. The second column has the general time of day (in this case the evening) when the entries were recorded. Ball notes that for such journal entries, "It is difficult to determine exactly when during the day the journal entry was made, a problem that is complicated by the time of entry varying from one journal keeper to the next."[46]

The Corcoran journal appears to have been written in the evening, at least for the entries made at Eastmain, but the precise time of day is not recorded. The third to sixth columns record the phenomena of wind, precipitation, cloud cover and weather general. The weather general column includes information related to non-instrumental temperature, which can be quite subjective. It is interesting to note that Corcoran at least uses similar words, such as mild, cold, and moderate, to describe these phenomena. This can ease the work of categorizing these observations. Quite a lot of information can be gleaned from reading the table,

which presents us with the only written climate record for that area of Canada in 1834. Ball observes:

> Obviously phrases or terms such as thick, mild, fine, moderate, are all qualitative comments of each individual observer and present different problems of interpretation than the more specific narrowly defined phrases, such as wind direction or the occurrence of a precipitation even. When climatic data are so scarce it is important that nothing is left unused.[47]

When we look at the second table (Appendix B: Categories of Climatic Phenomena for Martins Falls April 1828) we find that another column, temperature, has been added. This column includes information on instrumental temperature measurements. One must be aware that such early instruments had limits. Historian of meteorology A.E. Holler explains:

> The instruments and their location lacked the sophistication and accuracy of present-day installations. The thermometer for example, was two to three feet long with a two inch spherical bulb at the base containing spirit. Because the spirit in the thermometer was not standardized, the glass not annealed, the bore holes not consistently of the same diameter and the scale tended to change with time, these instruments were obviously not entirely reliable.[48]

When looking over the Corcoran entries it was noted that the observations for Martin's Falls (1828) include thermometer readings taken up to three times a

day, based on a twenty-four hour clock. It is rare to find this level of detail in historical climate information for this time period. Again, we notice a very methodological Corcoran recording at 6 am, noon and 6 pm, on most days. When comparing the two tables, the first with non-instrumental data and the second table with instrumental data, it is easy to see which information climate researchers would prefer. Hourly recordings of temperature allow quantification of the scientific data. Nonetheless, the use of non-instrumental data may be the only information available and, when used in conjunction with other forms of proxy data, can be quite useful. Written documents are a good source of evidence useable by researchers, but their value augments considerably when used with other forms of evidence, such as proxy sources. Holler notes: "General chronicles have been used to augment instrument and natural proxy data in the reconstruction of the climates of southern Manitoba, Quebec and eastern Canada."[49]

The Hudson's Bay Company Archives holds a rich body of records related to climate. While it has not been ignored by climate researchers, much more research can and should be done at this archives. North American climate records are considered to be quite recent, especially when compared to those from Europe. Much of the earliest climate research was done in Europe by climatologists such as H. H. Lamb, founder of the Climate Research Unit at the University of East Anglia in England. Most of his studies involve the European climate. In North America, climate history research has increased greatly in the second half of the twentieth century. Between 1965 and 1992, twenty-three

historical climatological studies were done using the Hudson's Bay Company's records alone. Reports, journal articles, master's and Ph. D. theses have all been written using this rich resource. This research goes as far back as 1705 in the 1981 work of G. N. Madison,[50] who looked at the dates of first snow and first frost using post records. In comparison with the amount of records held at the Hudson's Bay Company Archives this is a miniscule amount of research and much more needs to be done if we are to reconstruct past climate more fully.

The cross-disciplinary use of these records by historians, anthropologists, mathematicians, and biologists creates a need to make the records available and intelligible. The archivist is able to play a key part in this effort. The work archivists do to appraise, arrange, describe, preserve, and make records available through reference services becomes vital in preparing them for research. All of these activities reflect an understanding by the archivist of the context in which the records should be placed if they are to be retrieved and interpreted effectively. It is important that we understand why the records were created and who created them. Knowing who Thomas Corcoran was, for example, what he wrote and why, can help researchers use the evidence he created to examine past climate. Users of the archives can assist archivists in these responsibilities. A cross-disciplinary approach here can be important. Archivists have a good understanding of the history of records, but they cannot know the needs of all of the different types of researchers who may use archives. As archivists take on a new and active approach in attempting to understand the

history of records, they must try to draw on this history to understand the needs of future researchers in climatology and other fields.

This contextualizing archival work is a key to the transformation of mere information into knowledge. We must contextualize the records if they are to be bearers of knowledge rather than information. Making records available with very little understanding of their context would prove to be almost worthless to most researchers. For example if we found the writings of Thomas Corcoran and could not link them to the Hudson's Bay Company and its related records their usefulness would be greatly diminished. If a very limited amount of description of these documents had been done, without noting any past research on them, the value of the records would be lessened. This would limit access to the records in ways that can weaken the development of research fields such as climatology. It would also be limiting to focus solely on the HBCA. The HBCA is not the only important repository of archival records that hold climate information. A. E. Hoeller, who acknowledges the richness of the HBCA for climate information, also mentions other key sources of climate records such as those of the Royal Canadian Mounted Police, Dominion Land Surveyors, the Church Missionary Society, the Oblates of Mary Immaculate, and the Sisters of Charity.[51]

With such a vast wealth of knowledge available to us in archival records, and only a small amount of it being utilized, Hoeller points out the importance of preserving such information for future research. Indeed, this may very well be one of the largest tasks ahead of us:

The identification and analysis of all Canadian historical sources of potential climatic value, though a massive undertaking, can provide a wealth of information that will be especially useful in reconstructing the climate of specific areas where other proxy data provide only a general picture. Perhaps a more crucial task at this time would be to ensure that any potential source of historical climatology is preserved.[52]

Endnotes

[1] Deidre Simmons, " 'Custodians of a Great Inheritance': An Account of the Making of the Hudson's Bay Company Archives, 1920-1974," (M.A. thesis University of Manitoba: 1994), p. 8.

[2] John Armstrong and Stephanie Jones. Business Documents: Their Origins, Sources and Uses in historical Research, (London/NewYork: Mansell Publishing Limited,1987) cited ibid., p. 1.

[3] Ibid. p. 18.

[4] Hudson's Bay Company Archives. "Introduction to Meteorology and Related Sciences." Accessed: February 28, 2005. http://www.gov.mb.ca/chc/archives/hbca/index.html

[5] Ibid.

[6] Elizabeth Briggs and Anne Morton. "Biographical Resources at the Hudson's Bay Company Archives," Volume One, Winnipeg,Westgarth, 1996. p. 2.

[7] Clerk: A title used both in the North West Company and the Hudson's Bay Company for the employees one step below the partners (NWC) or Officers (HBC). Clerks varied in salary and responsibility, but it should be noted that they could be more important and more adventurous than their title would suggest. See Briggs and Morton, "Biographical Resources at the Hudson's Bay Company Archives," Volume One. p. 182.

[8] Alan Catchpole. "Weather Descriptions of Thomas Corcoran Clerk in Charge" (Unpublished Notes), p. 1. Dr. Catchpole made a copy of these notes available to the author.

[9] Ibid.

[10] Ibid.

[11] Briggs and Morton, "Biographical Resources at the Hudson's Bay Company Archives," Volume One. p. viii.

[12] Hudson's Bay Company Archives: Thomas Corcoran Search File, Letter No. 5234.

[13] Ibid.

[14] Hudson's Bay Company Archives: Number: C.1/289-322.

[15] Hudson's Bay Company Archives: Thomas Corcoran Search File. Letter No. 5234.

[16] Thomas Corcoran Search File, HBCA.

[17] An Outfit year ran from 1 June to 31 May.

[18] Writer: an early term for a Clerk; see Briggs and Morton. "Biographical Resources at the Hudson's Bay Company Archives," Volume One. p.187.

[19] Chief Trader: is the title of the person in charge of a post; see Briggs and Morton. "Biographical Resources at the Hudson's Bay Company Archives," Volume One. p. 182.

[20] Ibid.

[21] Timothy Ball. Climatic Change in Central Canada. p. 81.

[22] Hudson's Bay Company Archives: Thomas Corcoran Search File, Letter No. 5234.

[23] Ibid.

[24] Ibid.

[25] Letter from Corcoran to his brother, from Moose Factory, August 10, 1829, E204/1. Thomas Corcoran married Charlotte Sutherland in Albany. She was the daughter of John Sutherland. Based on reference to Warren Sinclair, "Metis Genealogies" (HBCA E.235) and Gail Morin, Metis Families. (Pawtucket, RI: Quintin Publications, 2001) Although it is not clear from sources such as Sinclair and Morin, John and Charlotte were likely of Aboriginal descent.

[26] Quoted from Father Carrière's, "L'honorable compagnie de la Baie d'Hudson et les Missions des Oblats de Marie dans l'Est du Canada 1844-1900" p. 28. Source Found in Thomas Corcoran Search File.

[27] Hudson's Bay Company Archives: Reference: B77/a/15 July 3, 1841.

[28] Commissioned Officer: The Royal Charter of 1670 gave the HBC authority to appoint and establish governors and all other Officers to administer the company's administrative units. The first Commission was granted in 1682 and the last in 1905. The custom was revived in the 1920s but the appointments were honourary. See Briggs and Morton, "Biographical Resources at the Hudson's Bay Company Archives," Volume One. p. 182.

[29] Ibid.

[30] The HBCA has the last will and testament of Thomas Corcoran, something one would not likely find in a corporate archive today. Corcoran Search File HBCA it could also be located in File A36/5 fos. 76-77, 1855.

[31] Simmons. " 'Custodians of a Great Inheritance' ." p. 9.

[32] Hudson's Bay Company Archives. "Classification System." Accessed: October 1, 2004. http://www.gov.mb.ca/chc/archives/hbca/about/holdings/classify.html

[33] Catchpole. "Hudson's Bay Company ships' log-books as sources of sea ice data, 1751-1870." p. 21.

[34] Joan Craig. "Past 100 Years of the HBC". The Beaver (Autumn 1970), p. 67.

[35] Post Journal Eastmain B.59/a/120 fos. 35-39.

[36] Ball. Climatic Change in Central Canada. p. 91.

[37] HBCA. Post Journal, Martins Falls, B/123/a/26.

[38] Ibid.

[39] Ibid.

[40] HBCA. Post Journal, Eastmain Post, B59/a/120.

[41] Ibid.

[42] Ibid.

[43] HBCA. Post Journal, Fort George Post, B77/a/15.

[44] Ibid.

[45] Ibid.

[46]Ball. Climatic Change in Central Canada. p. 94.

[47] Ibid. p. 89.

[48] A. E. Hoeller. "The Role of Environmental and Historical Evidence in Climate Reconstruction: A Preliminary Review and Appraisal." (Ottawa, Canadian Climate Centre), Report No. 82-83, 1982, p. 81.

[49] Ibid. p. 92.

[50] G. N. Madison. "Reconstruction and Testing of Historical Dates of First Frost and First Snow." (M.A. thesis, University of Manitoba), 1981.

[51] Hoeller. "The Role of Environmental and Historical Evidence in Climate Reconstruction: A Preliminary Review and Appraisal." p. 92.

[52] Ibid. p. 93.

Conclusion

> ... whereas all experiences are of the past, all decisions are about the future . . . it is the great task of human knowledge to bridge this gap and find those patterns in the past which can be projected into the future as realistic images.[1]

An understanding of the environment has been important to humanity throughout human history. For thousands of years people have documented climate using various methods. These recordings have benefited scientific research in our contemporary world. There are numerous ways in which archivists have participated in this activity. Given their commitment to preserving human knowledge, archivists understand that answers to many future questions lie in the records that we are archiving. Kenneth Boulding's statement, quoted above, describes what I believe archivists actually do. The archivist's knowledge of the history of the record helps researchers develop the knowledge that Boulding describes. I believe that archivists can be such a bridge between the past and the future.

A new way of looking at archives is emerging. Understanding the history of the record is fundamental to this new method. This means that the archivist will look more closely at the overall record-creating process, which includes the history of the record during archival care.[2] It is important to understand that a great variety of researchers now require information found within the overwhelming volume of archival holdings. In order to help these researchers, whose specific interests and the specific location of information relevant to them,

archivists cannot possibly know in depth or always anticipate, archivists must be able to link a research inquiry to knowledge of the history of the record – or knowledge of actions of records creators which produce information of likely interest to the researcher. In so doing, archivists can help researchers, such as climate researchers, to recontextualize or re-create records as carriers of new meanings and thus uses.

If we look at the Corcoran records as an example of a new way of seeing record creation by the archivist, we can note how the archivist becomes involved in this process. When doing the research on Corcoran, it was interesting to learn that some prior research had been done on him at the HBCA. This was done with the help of the archivists who amassed the Corcoran search file, which has about one hundred pages, thus creating a new record related to Thomas Corcoran. This made the task of understanding his biography easier. The search file was first created in response to a genealogical inquiry. Climate data is not mentioned in it. Obviously the search file had not always existed. When the first research request came in about Corcoran in 1928, a series of steps were taken to find out information about him. Using their knowledge of the history of the company's records and tools such as indexes and finding aids, the archivist located the appropriate post records and Corcoran's place in the book of servants character. What is important to note here, and which touches on contemporary archival thinking, is that the HBCA created a new record about him, the Corcoran search file, which it then kept. The file reflects the archivists' contextualization of Corcoran's work and the nineteenth-century records he created. This new record

then enabled this researcher, assisted by the prompts of climate researchers such as Cynthia Wilson and Alan Catchpole, to contextualize Corcoran and his records again, with climate history research in mind. This researcher has added more knowledge to the Corcoran record, and in doing so has helped created the Corcoran material anew, as documentation more definitely related to environmental studies than known before.

With knowledge of past research done on Corcoran I was able to gather information on him quickly and begin studying his writings. From the original record, three other records can be added to his research. With these three types of records at my disposal, the first being the original record, the second the search file create by the HBCA, and the final record being the summary and notes by Cynthia Wilson,[3] I was able to do a small biographical study of the man. Looking further at Corcoran's writings I was able to create two tables that demonstrate their great potential in climate history research. The original record has thus evolved from its original company purpose. Future researchers, if these various recreations are included with the Corcoran records, will be able to use four distinct records to look at this individual. The archivist would be responsible for linking them with the original record. The records now support a very different area of study than they were originally created to document. As Cook explains, a very different or postmodern form of record description can arise from this:

> Postmodern description would reflect, in short, sustained contextual research by the archivist into the history of the records and their creator (s), and produce ever changing

> descriptions as this records-creating and custodial history itself never ends.[4]

This is one possibility for the archival profession. The archivist becomes an active participant in records creation, and not just a retriever of documents. As Cook explains further, archivists will also need to be conscious of their actions when undertaking such activities:

> And this makes the archivist an active mediator in shaping the collective memory through archives. Archivists inevitably will inject their own values into all such research and activities, and thus will need to examine very consciously their choices in the archive-creating and memory-formation process.[5]

Another aspect of this new conception of the archival profession is that, in choosing climate research as the main focus for this work, I have taken a group of records and created a specific narrative for them. Records which for one era and user had only genealogical interest, when examined decades later with climatological studies in mind, were able to tell us a new story, and one different again from the one that they were first created to tell us about. Unlike the perhaps still common assumption that records in archives are static documents, waiting for researchers to copy passively the one correct narrative from them, they are active texts, activated by the recontextualizing process which reframes them in constantly evolving new narratives:

> No text is a mere innocent by-product of action as Jenkinson claimed, but rather a consciously constructed product, although that consciousness may be so transformed into semi- or even unconscious patterns of social behaviour, organization process, and information presentation that the link to external realities and power relationships is quite hidden.[6]

Looking once again at the records created by Thomas Corcoran we can see that we are recreating his records by adding different perspectives to them. Researchers tend to look at only a specific part of a record, selecting the data required for their specific interest. One researcher using the Corcoran material might be content with information on post construction, for example, while another may be happy to look at climate data exclusively, or how post workers interacted with Native people. These are all valid uses of the records, and each researcher may have little knowledge of other uses of this same record. The archivist should attempt to see the larger picture, to understand that researchers may have a limited understanding of the multiple uses of the records and why they were created in the first place. The archivist can help bridge these gaps in knowledge of the uses of the records. As a result, new stories can emerge from them. Our own perspectives become part of the record. This insertion of our views may even happen subconsciously. For example, when the HBCA staff first wrote about Corcoran in reply to the genealogical inquiry in the 1920s, it seemed important to the archivists to highlight that he was the only Catholic man in the area and a moral one at that. They included a quote from the local Catholic priest, which put Corcoran in a positive light. This tends to emphasize the

biographical character of the records, and the religious dimensions of that biography. These archivists understandably did not highlight Corcoran's weather recording activities, as that perspective on them had not emerged. When it did, these records also became scientific evidence. Selecting certain passages from the record can reshape it. One must be aware that such changes can take place.

In viewing these records as records about climate research, we created a new narrative for them. The narrative I created for Corcoran was based mainly on looking at the climate information he created. This is just one way to look at the record. As Cook comments, "... there is not one narrative in a series or collection of records, but many narratives, many stories, serving many purposes for many audiences, across time and space."[7]

When we look back over the history of the Corcoran records, we can see that they were initially created as corporate business records, documenting the transactions between him and his employer. Upon transfer of these records to the archives a new life, so to speak, was created for them. Corcoran's writings can be used for multiple purposes and can create multiple narratives including: Corcoran the weather observer; Corcoran a loyal employee of the HBC; Corcoran a family man in the New World; Corcoran the nation builder; and Corcoran a liaison between Native people and Europeans. These are just a few of the possibilities.

Can we create climate archives specifically to help further climate research? Of course we can, and some climate archives already exist, although they tend to

hold contemporary data such as at Environment Canada. Most developed nations have such climate data archives. But should records such as Thomas Corcoran's be in them? Should they be transferred to such an archives? I believe the answer to be no, though splitting of archival records has been done and still is being done today. The reasons for not splitting the collection are numerous. First, these records already belong to an archives and, following the concepts of respect des fonds and provenance, archivists need to protect the integrity of the record. One can recreate the records in the conceptual ways discussed above, but one should always respect the original creation. Losing this information would destroy their context.

This context reflects the fact that the Corcoran records hold more than climate data. By placing what we believe is a climate record within a specific institution devoted to climate archives we could limit other uses of the record. Also, other records not yet classified as climate records might be overlooked for that purpose if such definitions of records were rigidly maintained. If we researchers become complacent, believing that all the records of a certain type are held within one institution, we will limit future discoveries. It is better to protect our understanding of the initial point of creation of the records and to approach records with an imaginative view of their varied possibilities, grounded in knowledge of their history, than assign them to one use, and to one specialized repository. A better approach would see students of the environment and archivists pursue greater understanding of the environmental record, whether an older one or a current one still in active use in some office or laboratory, and then

focus their efforts on ensuring that these records are archived by the most appropriate archives, as most records fall within the responsibility or jurisdiction of a particular archives. It is hoped that this thesis will help sensitize archivists to the value of that project and to the importance of identifying the environmental record in the usually highly varied holdings of most archives in better general descriptions of records and in more specific thematic guides to particular bodies of significant environmental records.

An understanding of the knowledge stored in archives is the result of a never ending evolutionary process of thinking about archives and their uses. It should not be limited by dogmatic belief in a single or very few narrative possibilities or meanings for the records. Knowledge and study of archives need to be open ended if they are to enhance society's memory:

> Archival concepts are themselves not universal truths to be defended in all times and places as a sacred metanarrative, but rather are constantly evolving, ever mutating as they reflect changes in the nature of records, record-creating organizations, record-keeping systems, record uses, and the wider cultural, legal, technological, social, and philosophical trends. Archival ideas formed in one time and place reflect many of these external factors, which ideas are often reconstructed, even rediscovered in another time and place, or reshaped across generations in the same time place.[8]

So where do we go from here? Throughout this thesis we have seen how we are able to gather new information from records. How can the archivist help the

climate researcher locate more of this information? One step that archivists can take when relevant is to recreate and re-describe the records with new contextual information that includes climatic information. The Corcoran records can be used as an example of the potential climatic information that may lie within the archives. By understanding the process of recreating such records, researchers may gain new knowledge from archives and, in turn, participate in the creation of more contextual information for the narrative they are attempting to create. As Cook observes,

> ... records collectively and individually have a history, before and after crossing the archival threshold. A significant part of that history reflects interventions by the archivist and, behind that, professional assumptions, concepts, and processes . . . This history of the record is a never ending, dynamic process, the archives (and the records) always being reborn, re-imagined, re-invented, even for records long in the archives.[9]

Like the records of Thomas Corcoran, all records have a past and records kept in archives will continue to have a future. It is important that researchers be made aware of the evolution of records so that they are better able to understand the multiple meanings they can possess. As climatologists help us to establish a better awareness of our environmental space, so too can archivists help us have a better awareness of the evolving archival space.

Endnotes

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[1] Alverson, Bradley, and Pederson. Paleoclimate: Global Change and the Future. p. 11.

[2] Cook, Terry. "Archival Science and Postmodernism: New Formulations for Old Concepts." Accessed: October 1, 2004. http://www.mybestdocs.com/cook-t-postmod-p1-00.htm. p. 9.

[3] Catchpole. "Weather Descriptions of Thomas Corcoran Clerk in Charge."

[4] Cook, Terry. "Fashionable Nonsense or Professional Rebirth: Postmodernism and the Practice of Archives." Accessed: October, 2004. http://www.mybestdocs.com/cook-t-postmod-p2-00.htm. p. 10.

[5] Cook. "Archival Science and Postmodernism: New Formulations for Old Concepts." p. 11.

[6] Ibid., p. 3.

[7] Ibid.

[8] Cook. "Fashionable Nonsense or Professional Rebirth: Postmodernism and the Practice of Archives." p. 8.

[9] Ibid., p. 11.

Appendices

Appendix A: Categories of Climatic Phenomena for Eastmain
Reference: HBCA, B.59/a/120 fos. 35-39
April 1834

Date	Time	Wind	Precipitation	Cloud Cover	Weather General
1	Evening [?]	Variable		Cloudy	Mild
2	Evening [?]	East	Occasioned rain and snow		Very disagreeable
3	Evening [?]	Variable	Occasioned by rain the greater part of the day		Very disagreeable
4	Evening [?]		Great quantity of snow has disappeared since the commencement of the mild weather		Mild
5	Evening [?]	Variable			Mild
6	Evening [?]	Southerly		Clear	
7	Evening [?]	North West		Clear	Much colder than it has been those few days past
8	Evening [?]			Clear	Rather cold
9	Evening [?]	North West			Cold
10	Evening [?]				
11	Evening [?]	South East			Mild
12	Evening [?]		Heavy rain		Warm weather
13	Evening [?]	North East	Snowing heavily all day	Cloudy	Cold
14	Evening [?]	North West	Snowing occasionally throughout the day	Cloudy	Cold disagreeable
15	Evening [?]	Westerly			Considering the time of the year. Continues very cold
16	Evening [?]	Boisterous. West and blowing strong			Cold
17	Evening [?]	Boisterous. Gale of Westerly wind	Occasioned by snow		Cold

Date	Time	Wind	Precipitation	Cloud Cover	Weather General
18	Evening [?]	Variable			Cold disagreeable
19	Evening [?]	South West and blowing violently			Cold
20	Evening [?]	Variable			Cold
21	Evening [?]	Variable		Clear	Cold
22	Evening [?]	Westerly		Clear	Cold
23	Evening [?]	Variable		Clear	Cold
24	Evening [?]	South East			Cold
25	Evening [?]	South West blowing violently particularly in the afternoon			Cold
26	Evening [?]	North West		Clear	Cold
27	Evening [?]	East		Clear	Cold
28	Evening [?]	Variable			Warm
29	Evening [?]	Variable	Occasioned by rain and snow throughout the day		Very disagreeable
30	Evening [?]	South West			Cold disagreeable

Appendix B: Categories of Climatic Phenomena for Martins Falls
Reference: HBCA, B.123/a/26 fos. 18d-20
April 1828

Date	Time	Temp F	Wind	Precipitation	Cloud Cover	Weather General
1	6 am / noon / 6 pm	0 / 27	West		Clear	Pleasant
2	6 am / noon / 6 pm	4 / 24 / 18	Variable		Clear	
3	6 am / noon / 6 pm	0 / 20 / 16	Easterly Boisterous			
4	6 am / noon / 6 pm	2 / 17 / 10	North East		Partially clear	
5	6 am / noon / 6 pm	4 / - / 17	North West	Snow / drifts	Heavy gale	
6	6 am / noon / 6 pm	6 / - / 23	North West		Partial clear	Moderate
7	6 am / noon / 6 pm	1 / 34 / -	Westerly		Clear in Afternoon	Mild in afternoon
8	6 am / noon / 6 pm	3 / 35 / -	South West		Cloudy	Mild
9	6 am / noon / 6 pm	29 / 40 / -		Wet		Disagreeable
10	6 am / noon / 6 pm	4 / 25 / -	West		Partially clear	
11	6 am / noon / 6 pm	3 / 17 / 14				Mild
12	6 am / noon / 6 pm	10 / - / 16	East		Clear	Cold
13	6 am / noon / 6 pm	0 / 18 / 15	Easterly		Very clear	Cold
14	6 am / noon / 6 pm	12 / 25 / 24	Easterly		Clear	
15	6 am / noon / 6 pm	3 / 41 / 37	Easterly		Clear	Fine
16	6 am / noon / 6 pm	8 / 46 / 40	Easterly		Clear	Fine
17	6 am / noon / 6 pm	15 / 52 / -	Easterly		Clear	Remarkably fine
18	6 am / noon / 6 pm	20 / 56 / 50	Southerly			Very mild and pleasant
19	6 am / noon / 6 pm	30 / 60 / 55	Southerly		Clear	Warm for this time of year
20	6 am / noon / 6 pm	29 /56 / 49	South		Clear	Remarkably warm
21	6 am / noon / 6 pm	26 / 46	Easterly		Clear	
22	6 am / noon / 6 pm	31 / 42 / 36	Easterly		Clear	Rather cold

Date	Time	Temp F	Wind	Precipitation	Cloud Cover	Weather General
23	6 am / noon / 6 pm	25 / 40 / 37	Blowing moderately from the North East	No snow now remaining even in the woods	Clear	Rather cold
24	6 am / noon / 6 pm	27 / 40 / 36	North East		Cloudy	Rather cold
25	6 am / noon / 6 pm	30 / 41 / 35			Cloudy	Cold. North creek Ice partially broken up and several holes are open in the lead of the River
26	6 am / noon / 6 pm	33 / 50 / 47			Cloudy	Warmer than it has been since Sunday last
27	6 am / noon / 6 pm	32 / 45 / 36	Easterly		Partial clear	Cold
28	6 am / noon / 6 pm	34 / 50 / 35	Easterly			Cold and unpleasant
29	6 am / noon / 6 pm	25 / 48 / 41	Easterly Cold wind		Clear	
30	6 am / noon / 6 pm	27 / 60 /51	South West			Remarkably fine and warm

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