AVIATION ARCHAEOLOGY OF WORLD WAR II GANDER:

AN EXAMINATION OF MILITARY AND CIVILIAN LIFE AT THE NEWFOUNDLAND AIRPORT.

by

© Lisa M. Daly

A thesis submitted to the

School of Graduate Studies

in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

Department of Archaeology, Faculty of Arts

Memorial University of Newfoundland

April 2015

St. John's, Newfoundland and Labrador

ABSTRACT

This project examines the Second World War (WWII) history of the Newfoundland Airport (Gander, Newfoundland), with a focus on civilian and military life on the base, and the potential for aviation archaeology to enhance the historical record. To accomplish this, ten WWII era airplane crash sites were examined archaeologically, using a variety of methods depending on the state of the wreck and the environment of the site. On the grounds of the original airbase, the Royal Canadian Air Force Globe Theatre was excavated to determine the viability of excavating areas of the former nearby town site and to examine the material culture of those living at the base. In particular, information was sought on potential interactions between the three main countries residing and working at Gander in WWII; Canada, the United States, and Newfoundland. The aircraft crash sites yielded information about the crashes themselves, modern reuse of sites, and the potential risk of disturbance. They also allowed for further development of archaeological methods to be used at other aviation sites around Newfoundland and Labrador.

A major conclusion of this study is that base life was less segregated than official documents indicated, and that there was a significant amount of cooperation and flow of goods between the three countries. A combination of archaeological, documentary and memory research indicated a more relaxed atmosphere to the base, but still a realization of the importance to the work being done and the impact of the war on those serving at Gander. This project has set much of the groundwork for further archaeological study in this province, where numerous aviation sites of historical importance and war-era aviation and naval bases have yet to be researched, such as the WWII and Cold War facilities in Stephenville.

ACKNOWLEDGEMENTS

I would like to thank my supervisor, Dr. Michael Deal. Thank you to my volunteers, Missy Cousins, Maryanne Baird, Kathleen Ellwood, Chelsee Arbour and Matthew Brake for helping on many of my sites. I would not have finished without your help. Thank you Eric Guiry for your amazingly hard work and collaboration, and to Dominque Kane and Courtney Merner for your long hours. A big thank you to Shannon Green for trailblazing, finding the deepest bogs, endless patience and a glass of whiskey whenever I was frustrated or stuck.

Thank you to the Thomas Howe Demonstration Forest for allowing me to survey the site, hosting talks about my field work, and getting me CBC Radio interviews. If you are in Gander, visit Thomas Howe, the trails are beautiful. While you're there, check out the North Atlantic Aviation Museum and the Gander International Airport. Both organizations provided information and permission. I would never have identified everything without the help of Megan Russell and the members of the Avalon Historic Aircraft Recovery Association, and would not have known where to look without the help of historian, Darrel Hillier. Thank you to Stephen Richey for his knowledge of modern crash mechanics and their applications to archaeological sites. I look forward to future collaboration.

On a logistics side, thank you to Memorial University and the Department of Archaeology for space and equipment, the Provincial Archaeology Office of Newfoundland and Labrador for funding and permits and T&M Associates Ltd. for transport.

Finally, thank you to the people of Gander for your interest and support. I hope we will continue to work together.

CONTRIBUTIONS TO AVIATION ARCHAEOLOGY

2009

- *The Social Effects of North American Bases on Newfoundland Perceptions and Way of Life* (public lecture). North Atlantic Aviation Museum Annual General Meeting, Gander, May 2009.

2010

- *Mapping and Memories: The Methods and Impact of Investigating World War II Aircrash Sites* (presentation). Aldrich Interdisciplinary Lecture and Conference, Graduate Student Union of Memorial University of Newfoundland, St. John's, March 2010.
- *CBC Grand Falls/Central Morning Show* (radio interview). Aviation Archaeology in Gander, NL. 18 August 2010.
- *Aviation Archaeology in Gander: A Look at the B-17 in the Tomas Howe Demonstration Forest* (public presentation). Thomas Howe Demonstration Forest, Gander, August 2010.
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2011

- *Flight Path: A Look at the Cultural Uses of Aviation Sites in Newfoundland and Labrador* (presentation). Aldrich Interdisciplinary Lecture and Conference, Graduate Student Union of Memorial University of Newfoundland, St. John's, February 2011.
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2012

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Work in Progress

- Actor-Network Theory and the Practice of Aviation Archaeology (second author with Michael Deal and Cathy Mathias). *Journal of Conflict Archaeology*. Draft accepted, expected publication 2015.
- *So You Want to Work With The Dead?* (by J.M. Bedell, interviewed as a contributor). Simon & Schuster/Aladdin Books, scheduled release fall 2015.

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ABBREVIATIONS

AHARA	Atlantic Historic Aviation Recovery Association
ASW	Anti-Submarine Warfare
ATC	Air Transport Command
ATFERO	Atlantic Ferry Organization
CDAA	Circularly Disposed Antenna Array
CWGC	Commonwealth War Graves Commission (in Gander, NL)
EAC	Eastern Air Command
GMT	Greenwich Mean Time
JPAC	Joint Prisoner of War/Missing in Action Accounting Command
NAAM	North Atlantic Aviation Museum
NAS	Nautical Archaeology Society
NEF	Newfoundland Escort Force
NL	Newfoundland and Labrador (meaning both the Canadian province and the pre-confederation country present during WWII).
PJBD	Permanent Joint Board of Defence
RAAF	Royal Australian Air Force
RAF	Royal Air Force
RCAF	Royal Canadian Air Force
RCN	Royal Canadian Navy
RNC	Royal Newfoundland Constabulary
TCA	Trans Canada Airlines
TCH	Trans-Canada Highway
THDF	Thomas Howe Demonstration Forest
USAAF	United States Army Air Force
USN	United States Navy
VLR	very long range
VMFA	Ventura Memorial Flight Association
WWII	World War II or the Second World War

CHAPTER 1: INTRODUCTION

Aviation archaeology looks at the physical remains of aircraft and the infrastructure associated with aircraft (Ford 2006). In this project, aviation archaeology, within the context of conflict archaeology, is used to explore the material culture associated with the Second World War in Gander, Newfoundland and Labrador.

Gander became a community because of the Newfoundland Airport. Prior to the start of construction in 1938, the only people who passed through the area now known as Gander were railway workers and trappers stopping at Hattie's Camp, a small railway camp designed for such transients (Hall and Vatcher 1935; Riggs and Russell 1994; Warren 1988). As the runways grew, so did the community surrounding the airstrip (Pattison 1943). With World War II, the airport took on a greater importance as a refuelling stop for aircraft going overseas and for the protection of convoys, and the town was created as part of the air base (Christie 1995; Craven and Cate 1964; Davis 1985). After the war, the town of Gander was relocated to the west of the airport, but the airport remained central to the community (Tibbo 1997). Even now, Gander's main community celebration is called the Festival of Flight. In fact, the airport is central to Gander's sense of history and sense of community.

Gander's identity is tied to its aviation history, a history still visible in the streets named for famous aviators, on the information signs on the former town site, at the international lounge of the airport, the Hudson aircraft outside the museum and the plane crashes in the bogs and woods around the town. While not everyone can access these sites, they are known and are of interest to much of the community. Many people in Gander remember them, have visited them and want to see them preserved and protected so future generations can have a physical reminder of the rich aviation history that has shaped the town.

Unfortunately, large fragments of this history are being lost. The original residents of Gander, those who moved there while it was still the Newfoundland Airport, are part of an ageing population and very few who remember the original town remain. Thankfully, some of their stories have already been collected, either written and published by themselves or by others. Examples of this include Frank Tibbo's *The Best of Aviation: 101 Tales of Fliers and Flying as Published in The Gander Beacon* (1997), John Cardoulis' *A Friendly Invasion* (1990) and *A Friendly Invasion II* (1993), C. Flynn's *I Remember When… Stories of Early Gander* (1999), and Rod Goff's *Crossroads of the World: Recollections from an Airport Town* (2005). Government documents are available on military policy, interactions between the different Allied governments and base construction (Brindle 1974). Many of these are housed at the Centre for Newfoundland Studies at Memorial University or the Provincial Archives of Newfoundland and Labrador at the Rooms. There are also physical remains of the war era, but these are being lost to time. Many buildings have already been demolished at Gander and other military bases, or are unsafe and inaccessible. The remains of aircraft that crashed flying to and from the airports in Newfoundland and now litter the landscape are under an even greater risk. More effort is needed for public education and protection of these sites if they are to be researched and preserved for future generations.

This project will attempt to address two main objectives:

1. To identify, record and analyse the history and archaeology of aviation sites in WWII era Gander;

This includes looking into the history of Gander, with focus on Gander's conception and role during World War II, the aircraft crash sites in the area, as these aircraft were all affiliated with the airbase, and the lives of the people living and working in the area. The Newfoundlanders who worked at the Newfoundland Airport went on to form the foundation of the current population of Gander. For the most part, their lives in Gander started on the Canadian side of the airbase and on the tarmac where they were in contact with Canadian, American and to a lesser extent, British servicemen and women. This interaction leads to the second question of:

2. What can aviation archaeology reveal about the influence of North American (i.e., Canadian and American) culture on Newfoundland?

This is addressed by examining the more personal side of Gander through interviews, memoirs and the excavation of the Globe Theatre on the Canadian side of the Former Town Site of Gander. The Globe was an area of socialization, particularly between Canadians and Newfoundlanders and just one of the many potential sites where Canadians, Americans and Newfoundlanders came together to share goods and ideas. The investigation of the Globe Theatre is also the first archaeology undertaken in the Former Town Site and is an experiment into the viability of doing further archaeological work in the area to augment the history of the current town of Gander.

This project is of particular interest to the public, and has been punctuated with public and academic presentations, radio interviews and public access to safe archaeological sites to both promote the work being done and to share information with the community.

Chapter 2 examines the theory behind aviation archaeology, looking at conflict archaeology in the First and Second World Wars, as well as aviation and related shipwreck archaeology. The section on memory is of particular importance to this project as the memory of

Gander's aviation importance is what shapes the town's identity and certain individuals have become keepers of Gander's history to be told through oral and published narrative.

Chapter 3 looks at the history of World War II in Newfoundland and Labrador. It details the events leading up to Newfoundland becoming an active war zone, the creation of bases and the influx of foreign servicemen to build and work on those bases and its role in the protection of North America with particular focus on its aerial role. A close look at Gander follows; from the town's creation as an airstrip to a bustling airbase housing members of the Royal Air Force, the Royal Canadian Air Force, the United States Army Air Force and Newfoundlanders, and Gander's use by Ferry/Transport Command and Eastern Air Command to aid the war effort.

The next section focuses on aviation archaeology and the specific work being done in Newfoundland and Labrador. Chapter 4 looks at methods used in aviation archaeology internationally and gives an overview of the work that has been done on the island and in Labrador. The chapter continues by examining the methods used in the ten aircraft crash sites in and around Gander examined in this project.

Chapter 5 continues the examination of the sites discussed in Chapter 4. Each site is discussed individually with a history given for each site and the analysis of the archaeological finds within that historical context. The chapter looks at the crash site and if the archaeological record can add any information to the official incident reports while also researching each site to see if other information is available, such as rescue/recovery efforts, personal memory, reuse, current use, salvaging/scavenging and assessing each site for risk of further disturbance or destruction.

Chapter 6 returns to the history of Gander, looking at the social aspects of life on the airbase. It is here where the interactions between the representatives from the three main countries present on base, Canada, the United States and Newfoundland, are examined within the historical context. A comparison is made between the official base publications, such as *The Gander* by the Royal Canadian Air Force and *The Propergander* by the United States Army Air Force, and the memoirs of those who lived and worked in Gander to get a better idea of life at The Newfoundland Airport.

The excavation of the Globe theatre on the RCAF side of the airbase in the Old Town of Gander is the basis for Chapter 7. The analysis of the excavation and artifacts recovered is framed in the history of the site as a whole as an area for socialization between Newfoundlanders, Canadians and heavily influenced by the American presence across the runway. This chapter looks at the various artifacts and their countries of origin to understand how and to what extent the people of these countries may have interacted or used the site for such effects to be found.

Chapter 8 is a discussion of the archaeological work within the historical and social context of Gander. In prior chapters, the aircraft crash sites and the Globe Theatre are examined separately, but this chapter looks at how of the overall archaeological investigation can inform on the history of Gander and the airbase. An examination of the benefit to studying aircraft crash sites is discussed here to indicate how these sites have informed on the history of Gander, but also how the work done in Gander will be of use for the future examination of crash sites around Newfoundland and Labrador. This section also examines the work done in Gander as an archaeology of non-combatants, because even though Gander was not part of the fighting, the war was an ever present part of daily life.

Finally, Chapter 9 re-examines the importance of aviation archaeology and how it can inform on not only the technical history of the war, but also the social history of an area. The chapter ends by discussing other sites of historical significance around the province of Newfoundland and Labrador and, theoretically, how aviation archaeology can be used in their research.

The ultimate goal of this project is to compile a more detailed history of Gander, its role during the Second World War, and the people who lived and worked at the airbase. While the sources for the project consist of documentary evidence, personal histories and archaeology, there is always more to learn about Gander. There are further aviation sites to be explored in the area, and many more residents, former residents and servicemen and women who passed through Gander during the war era whose memories would offer a more comprehensive history of World War II Gander, Newfoundland.

CHAPTER 2: THEORY AND METHOD

As Gander was shaped by aviation and the war, the physical remains of that conflict became a historical focal point for the residents, including the aircraft remains scattered around the town and remnants of the original airbase. Many residents still remember early Gander. They worked with the Canadians and Americans or grew up on the streets of the Royal Canadian Air Force side of the base. The people of Gander share their memories willingly, both through stories and publications, and most of Gander, as evidenced by the North Atlantic Aviation Museum and the annual Festival of Flight, want to protect that history.

The archaeological footprint of World War II Gander, the airbase, and related aircraft crash sites is fragmentary. As background research to the archaeological work at Gander Airbase a number of sources must be utilized. These include official documentation, such as incident reports and base blueprints and publications, and unofficial documentation, such as memoirs published by servicemen who served at Gander and airport employees who still reside in the area. Memories, both in primary and secondary contexts, offer a look into the mundane, the day to day operations at the base, as well as the larger incidents that remained with servicemen for years afterward, such as the first flight of the Hudsons which lead to the establishment of Ferry Command (Bennett 1958). Those serving in Gander may not have seen the European or African war theatres, but they were playing an important role in the war effort in providing aircraft, supplies, personnel and protection to convoys and the North American coast. In fact, Canadians and Americans serving in Gander were classed as serving overseas.

During and after World War II, crash sites were relocated, scavenged, and destroyed. No site was left untouched, whether by rescue/recovery crews soon after the incident, or local hunters, trappers and collectors since the crash. To research these sites they must be viewed individually, but also as part of Gander and within the context of the history of Newfoundland and World War II. Commemoration of the crash sites can help those who were involved in the incidents, their children, and the community as a whole, better understand the role of servicemen and Gander in the larger context of the war, and allows children and grandchildren of those who perished in Gander to better understand the value of their sacrifices to the war effort.

2.1 Conflict Archaeology

The study of twentieth-century military sites and material culture is a relatively new field in archaeology, and is better known today as conflict archaeology. Public interest in the topic is demonstrated by the museums that specialize solely in military history and artifacts, but much of what is housed in museums was collected outside of the archaeological context (Holborow 2003; Saunders 2004; Schofield 1999). As the participants in the world wars age and pass away, the study of the major conflicts of the first half of the twentieth-century have begun to take on a new importance (Dobinson *et al.* 1997). As researchers realize the important information provided by first-hand accounts from later wars, work has been done to preserve such history. For, example, research has begun on Cold War sites in Europe and the United States, many of which lack documentary information (as this information is often classified), and while those affiliated with the site are often still living and willing to share their stories (Schofield *et al.* 2007).

The archaeology of military material culture is as varied as the sites examined. The primary areas of focus are the major, world conflicts – World Wars I and II, and the Cold War – with some forensic work being done on the Vietnam and Korean wars. Each war was fought in different ways, with different technology and different tactics, therefore each area of study has different research goals and methods. The archaeology of the First World War focuses on the excavation of battlefields, the trenches and tunnels, and the analysis of material culture such as trench art (Doyle *et al.* 2005; Fraser 2003). Trench art is rarely recovered in excavation, but that does not mean it is not *in situ*. Trench art was created by soldiers to relieve boredom in the trenches and POW camps, and often sent home to loved ones. These pieces of trench art often became symbols of loved ones lost in battle, and were given special places in the home (Saunders 2002). To own a piece of trench art, especially of known provenience, is a method of trying to understand and participate in a world shaken by major conflict (Saunders 2002).

Excavations have also been done to better understand the construction of, and life in, the trenches. The First World War is best associated with trench warfare, and traditional excavation, both by trowel and excavator, conducted. In some cases it is done to remove the traces of time on battlefield tours so that visitors will achieve a better, yet sanitized, idea of life in the trenches. In others it is to rediscover the homes that were destroyed during the war or analyze life in the trenches (Fraser 2003). The excavation of First World War trenches has given new information that was not recorded in the military record. For instance, the excavation of some of the tunnels in Passchendaele, Belgium, revealed how soldiers had stapled single strands of heavy plain wire across the wooden walkways in the trenches and tunnels to give slip protection in wet conditions (Doyle *et al*. 2005). Just a small detail would have been a great improvement to the lives of those in the trenches, but so mundane that historians may never mention it.

While trench warfare dominates the mythos of the First World War, the Second World War is remembered as heavy bombers flying overhead, air raid sirens, and bomb shelters. Perhaps this is one of the reasons that the archaeology and study of material culture of the Second World War differs from that of the First. Alternatively, it may be that World War II is considered too recent for traditional excavation work, or the nature of the war does not make it feasible. In the First World War, the trenches were where soldiers lived, often for extended periods, and so are well suited for excavation, but the battlefields of the Second World War were not as trench-oriented and lend themselves better to survey rather than excavation. The naval and aerial warfare focus of World War II, and the debris left by those shipwrecks and airplane crashes has created a global landscape of warfare (Neyland 2011).

In recent years, organizations concerned with heritage have begun to see a need to survey, assess, and preserve elements of World War II (Cooper 1994; Dobinson *et al.* 1997; Holyoak 2001). The study of material culture of the Second World War focuses on structures built during the war (Mallory and Ottar 1978). A notable difference between the study of the material culture of the First and Second World Wars is that the material culture of the First World War is battlefield-focused whereas that of the Second is oriented towards defensive and support structures which may not have seen actual battle, but were part of the war effort, such as costal defence batteries (Holborow 2003; Holyoak 2001; Mallory and Ottar 1973). The focus of World War II material culture turns away from the individuals in battle to examine the architectural styles of the fortifications. The focus is on buildings of impressive or rare architectural styles, examples of buildings used for specific functions, and how buildings were altered over time, including evidence of renovation and upkeep (Bennett 1998; Holborow 2003). Similarly, architecture could not always keep up with the improvements in technology during the war, and buildings are often assessed for how they changed throughout the war (Holyoak 2001; Lake 2002). Granted there has been some discussion on how individuals modified these spaces (i.e., graffiti and how cultural concepts of construction or transplantation of cultural norms occurred), but overall the focus is on interesting, important and rare examples of architecture that should be listed under national heritage protection agencies. There is strong pressure from heritage groups to record these structures now as they were built only to survive the war and are now rapidly deteriorating (Barnett *et al*. 1998).

A popular and well-publicized aspect of World War II material culture is aircraft and shipwrecks (Gould 1983). While shipwreck archaeology has been better documented and methods better refined than aircraft archaeology, the nature of the sites are similar as is the basic methodology (Fix 2011. Even on land, aircraft sites can be surveyed similarly to underwater shipwreck and aviation sites. That is not to say they are the same, as aircraft are different in construction and materials and need different methods for collection and stabilization (Fix 2011). According to Milbrook (1998, 20), a wreck is a vessel that "has been crashed, ditched, damaged, stranded, or abandoned." Martin (2011) adds that "a shipwreck is an essentially human event, caused by the failing and misjudgments […] it is human error that causes wrecks, and human cognition, resourcefulness, courage and the instinct to survive that seeks to avoid them or mitigate their consequences." Martin is referring to shipwrecks, but the statement also applies to airplane wrecks. These sites have been of interest to archaeologists, forensic archaeologists and anthropologists, and World War II amateur historians and collectors. Amateur historians and collectors, otherwise known as military enthusiasts, refers to those who go to, and often collect from, aviation or shipwreck sites without any archaeological training or permits (Saunders 2004). Although military enthusiasts are not archaeologists, they are included in this discussion as they help shape the motivations of professional archaeologists. Amateur collectors are one of the bigger risks to aviation and shipwreck sites, next to scrap collectors who destroy sites for personal profit (Coble 2001). Military enthusiasts seek out sites, even those in remote locations, and remove objects of great interest, such as machine guns, instruments and personal effects (Cooper 1994; Milbrook 1998; Webster 1998). As sites become more accessible, often due to the construction of roads or the greater availability and accessibility of diving equipment, archaeologists are rushed to record and protect a site before many objects are removed. On the other hand, it is often enthusiasts who can best inform researchers to the location of wrecks, as all investigations have to first determine where a wreck is before it can be researched archaeologically (Neyland 2011).

Collectors also fund recovery projects, which, depending on heritage laws, can also mean having an archaeologist on staff to record the recovery process (Cooper 1994). This can often put the archaeologist in more of a cultural resource management role rather than researcher role. In areas without such laws, this means the complete removal of material culture, often to be sent to another country (see Deal 2006a for the establishment of related laws in Newfoundland and Labrador). Collectors have done the initial work in establishing research methods for aircraft recovery, which archaeologists now build on with professional techniques and guidelines (Schofield 1999). Texts such as *Wreckchasing: A Guide to Finding Aircraft Crash Sites* by Nicholas A. Veronica (1992) and *Aviation Archaeology: A Collector's Guide to Aeronautical Relics* by Bruce Robertson (1983) are popular guides, although outdated, for the research, identification, visitation and collection of aircraft wreck sites. More archaeological based guides and discussions include *Maritime Archaeology: A Technical Handbook* by Jeremy Green (2004), *Archaeology Underwater: The NAS Guide to Principles and Practice* produced by the Nautical Archaeology Society (NAS and Bowens 2009) and *The Oxford Handbook of Maritime Archaeology* edited by Catambis, Ford and Hamilton (2011). These are dominantly shipwreck based, but any underwater archaeological techniques can apply to aviation sites, and Fix (2011), in Catambis *et al.* (2011), discusses the archaeology of aviation sites in great detail. Similarly, enthusiasts are often the best acquainted with the rarity of a type of craft, and have completed inventories of historical aircraft. For example, the Indiana Division of Historic Preservation and Archaeology sent out surveys to collectors and enthusiasts in an attempt to establish the availability of historic aircraft in the area and their significance thus relying on the knowledge of collectors to establish their database (Diebold 1993). Similarly, in Newfoundland and Labrador, archaeologist Michael Deal and historian and enthusiast Darrell Hillier, have established a list of WWII crash sites of historic significance (Deal and Hillier 2007). Another list, used by the Canadian Military and Search and Rescue groups in Newfoundland and Labrador is often used by enthusiasts as a guide to find sites, but as the coordinates listed were taken from the air, it is often unreliable for ground searches.

Forensic anthropologists, such as those employed by the Joint POW/MIA Accounting Command (JPAC), are generally only concerned with the material culture that can help identify and recover missing servicemen who were involved in plane crashes or shipwrecks (Howshower 1997). JPAC methods are partially reported and the literature shows that techniques can be varied and depend on the specifics of each excavation. Generally, the techniques used by these operations focus on speedy recovery and not on detailed recording and recovery of objects on site. Material culture recovered by non-archaeologists (often people from nearby towns and communities) is important only if it leads to the positive identification and recovery of the missing servicemen (Webster 1998). Gridding is done, but typically in large squares which match the layout of the land instead of small, regular 1x1 metre squares often used by North American archaeologists and some trenching may be done to determine the boundaries of the site. Debris is mapped to determine the crash pattern and probable location of human remains (Howshower 1997; Moore *et al.* 2002; Webster 1998). Later, the analysis of material culture only goes so far as to determine if it belonged to, and identifies, the human remains (Webster 1998). Personal effects are sometimes passed on to the next of kin or descendants, but the treatment of that material culture is not analysed in detail by the forensic anthropologists or archaeologists.

From an archaeological point of view, little work has been done on the material culture of WWII air crashes and shipwrecks and what has been done is poorly published (Gould 1983). Techniques for both land and underwater sites are similar in that it is mostly large pieces that are recorded, often under a large grid. In underwater sites, new imaging technology has allowed for the detailed mapping and recording of wrecks (Church and Warren 2008). In other cases, aviation sites have been recorded by mapping the debris field, and even hand excavation in areas with the potential to yield small and personal artifacts (Moore *et al.* 2002). More work could be done on wreck sites, such as examining the material culture for evidence of battle, repair, personalization, reuse and recycling (Gould 1983). This is frequently seen on aviation sites in Newfoundland and Labrador, such as factory graffiti (DfAo-01, see Section 5.2.3, Figure 5.23), patching (FgCb-01; Deal 2010), reuse (DgAo-01; see Section 4.3), and recycling (DfAp-16; see Section 5.2.6). Both archaeological and forensic sources agree that wreck sites are variable and often spread over large areas, so methods tend to be more guidelines and the specifics for recording and excavating a wreck site must be made on a site by site basis.

Finally, Cold War sites are acquiring greater interest to archaeologists. Unlike most military information from the First and second World Wars, much Cold War documentation is still classified (Schofield and Anderton 2000). This makes the historical research difficult to conduct. At the same time, the purpose of the Cold War sites analysed is often that of protest, or, in the case of the Berlin Wall, identity (Schofield *et al.* 2003). Work on Cold War sites rarely looks at the military structures, except for where protest has damaged them (Holborow 2003; Schofield and

Anderton 2000). The much greater focus is on camps near the military sites where protesters would live, and the traces they left behind. Cold War archaeology also relies more heavily on oral histories than other archaeologies, as often this is the only voice available. This is particularly true in researching the people who went undocumented, like the protesters (Schofield and Anderton 2000).

Cold War studies also look at how people perceive material culture. Certainly this is done with all material culture, particularly that housed in museums, but Cold War places and things are often more controversial. For instance, the preservation of Checkpoint Charlie and parts of the Berlin Wall raise varied emotions from those who lived during the Cold War and remember the wall coming down. Some Berliners believe that it should be preserved, that it is part of their history and heritage and should be a reminder to the world, while others would rather destroy the wall completely so as to allow the people to forget that dark period in their past (Schofield 1999). These opinions come out in the public debates about what and how to preserve the past and interviews with individuals on either side of the wall.

A striking difference between World War II archaeology and other twentieth-century military archaeology is that the study of World War II material culture tends to focus on structures and machines, not people. Excavating trenches from the First World War explores where soldiers lived. It looks at their personal effects and clothing, how they moved about the space, and what they did in their leisure time (Doyle 2005; Fraser 2003). Cold War archaeology interviews the people who were affected by the site, getting personal experiences and stories, to complement the architectural analysis and excavation (Schofield *et al.* 2003). Forensic work on all of the twentieth-century wars is completely focused on the individual, especially their identification (Webster 1998). However, the majority of World War II archaeology studies the architecture and the technological and engineering data of planes and shipwrecks of the war (Cooper 1994). Shipwreck and aircraft archaeology of the period is often more focused on locating notable wrecks than analysing the people involved in the incident (Neyland 2011). The personal side of the war is left for the historians to recount; the individual is absent from the archaeological research. Thus, a major recommendation from Neyland (2011) for the study of World War II by archaeologists is to examine the individual along with the architecture and wreckage. There are detailed documents that list who served in an area, or on a ship or aircraft. Their personal effects can be identified, their jobs analysed, their sacrifices honoured and in many cases, they, or at least their descendants can be contacted and interviewed (Cooper 1994). In many cases, personal publications can be found. These may recount the details rarely seen in official documents, such as common problems with aircraft (see McVicar 1983, 6, for common problems with taking off from Gander Lake), the climate (see Bennett 1958, McVicar 1983 and *The Gander* all dates, for talk about the weather), or the physical and emotional difficulty associated with search, rescue and recovery of wreck sites (see Armstrong 2008, for winter search, rescue and recovery). Similarly, modifications made by individuals can be identified, such as notations made near machinery or graffiti drawn by servicemen and POWs (Pollard and Banks 2008; Thomas 2003b). Such an approach brings the lives of individuals into focus and has the ability to better examine the mundane as well as the major activity of a site. The public often enjoy the individual and personal stories of a site, giving the potential for site visitors and possible tourism development of an area (Dobinson *et al.* 1997; Dore 2001).

2.2 Recent Archaeology

One of the flaws in archaeological training is that it is assumed that the people and culture being investigated are long dead. Although it is rare for archaeologists to study a currently occupied site or building, it has been done (Buchli 1999). When studying twentieth-century material culture it is possible that the people who lived or worked in the area of study are still alive. The archaeology of the twentieth century differs from other eras because the material culture can be explained by those who used it (Glassie 1999; Pocius 2000; Saunders 2002). The recent past is assumed to be well-documented, and researchers and the public alike sometimes believe that archaeological study may not be necessary and should be reserved for the less-documented, distant past (Fairclough 2007; Saunders 2007). Even with the extensive documentation that can be found on the World Wars of the last century, there is much that is undocumented or even incorrect. Often the mundane objects and actions of everyday life are not documented nor are the thoughts and minds of most of the people who were involved in creating that past (Carman and Carman 2007; Myers *et al.* 2008). In other cases, there are periods that are assumed to be well-documented and may have a great deal of documentation available, but were recorded with a significant bias, with the result that elements are left out of the historical discussion (Fix 2011). In still other incidents, elements in the past can be ignored, only to be encountered in the archaeological record or personal memories. And lastly, the historical record may be unclear and leave room for debate (Freeman 2001). Archaeology has the potential to find these voices in a manner that is not possible when examining the recorded history alone. If the archaeological methods reveal something about people then there is no reason for it to not be used (Myers *et al.* 2008).

Archaeologists approach the study of twentieth-century material culture in much the same way they approach material culture of almost any other time period (e.g., Rathje 1981). Artifacts are recovered from a cultural context, analysed for function and style, and interpreted. What differs with twentieth-century material culture is that researchers are often more familiar with the function of an item, particularly those from the mid to late twentieth-century. This does cause researchers to put their own biases of use into their interpretations (Galloway 2006; Rathje 1981). Even objects whose design has changed significantly are generally recognizable. Certainly there will be objects that are no longer in use in the present, and their use and functionality may need to be further researched (Forty 1995).

Most material culture recovered from the archaeological context is fragmented, broken, and not necessarily found in context with other objects to indicate alternate uses. Archaeologists of twentieth-century material culture have an excellent opportunity to use the techniques often employed by anthropologists and folklorists, and question people who have used, first-hand, the material in question. In this way, archaeologists can verify their own interpretations, but can also learn of other uses, beliefs, practices and meanings associated with the material culture recovered that might represent individual, cultural, or a common usage that was simply never expressed in the historical record.

In many cases, there are events for which there are no survivors either due to the events that transpired on site, or due to time (Freeman 2001; Lees 2001). Wartime aircraft crashes may leave no survivors so the actual mechanics of the crash are inferred from the statements of witnesses and the brief investigation by rescue/recovery teams. Archaeological investigation can potentially reveal what actually happened in the incident or at the least add more information. This can apply to tactics used in battle as well, as seen by the investigation of the Little Bighorn site (Scott and Douglas 1995) and more recently, the Tudela site, a World War II battlefield where archaeologists discovered evidence for the use of pre-invasion incendiaries which was hardly commented upon in the written record (Bulgrin 2006). In the case of the Little Bighorn battlefield, the written record for that site was an interpretation made by those who saw the aftermath, and who choose to ignore the testimonies of those of non-European descent who were involved in the battle (Scott and Douglas 1995). Looking at this site archaeologically, not only could the paths of individual soldiers be followed to give a different view of the battle, but following the individual changed the overall perspective of the battle from a general one to that of the soldiers. This provided an opportunity to challenge the written history by seeing the battle from the inside and bringing the events to a personal level (Carman and Carman 2007; Freeman 2001; Lees 2001; Scott and Douglas 1995).

2.2.1 Overview of Techniques for Conflict Archeology

Even though shipwreck and aircraft crash sites may be different from prehistoric, medieval or colonial sites, the investigation should not be very different. Archaeology continues to have its basis in survey, excavation, landscape interpretation, mapping and laboratory analysis (Renfrew and Bahn 2000). From this basis, other aspects can be added, such as historical research and interview. Documentation of the twentieth century is extensive, and given the recent age, much survives. Photographs can indicate the site boundaries and indicate what survives on site (Schofield and Johnson 2006). Knowing what might be found on site based on historical documents can allow for better identification and on-site conservation, and lessen the amount of work needed to be done later in a laboratory setting. This is of particular importance for fabrics, metals and plastics, as a great deal of reinventing of these materials happened in the twentieth century. Of particular importance, for on-site conservation, is the identification of alloys as these can deteriorate rapidly when excavated and exposed to the elements (Light 2000).

People familiar with the site can be interviewed. Local people who have visited sites often also have an idea of what might be found, can give advice for reaching the site, might have personal stories from when the site was in use, and may have some artifacts that they, or others, previously removed. Interviews can also allow researchers to get to know the local people who may be able to help, and may be able to answer questions about the site as research progresses (Webster 1998). For instance, few photographs of the inside of the Globe Theatre in Gander (DfAo-12) could be found, but long-time Gander resident and former patron of the Globe, Peter Hoyle, described to archaeologists how he remembered the inside of the building (Peter Hoyle, pers. comm. 2011). The architecture of domestic and military sites can be researched prior to investigation. Maps and architectural plans will give an idea of what the structures initially looked like, and the initial layout considerations.

Architectural surveys, similar to those done by Schofield (2002) on World War II and Cold War sites can be done to determine architectural styles and changes in the structures. Changes may be deliberate acts of defiance, alterations and additions to structures, repair, or deterioration over time (Holborow 2003). Structures, whether a house or a pillbox, can be photographed, recorded, and, if accessible, the interior investigated for material culture remains, or tested to determine if there is a need to excavate (Schofield 2002). Twentieth-century military structures are at risk as structures are destroyed as they are abandoned or become obsolete, or reused (Schofield 1999; Thomas 2003a). In Stephenville, Newfoundland and Labrador, a Cold War scramble station is currently being used as self-storage units (Figure 2.1), and many of the hangars used for various forms of industry or shipping warehouses. In Gander, the war-era terminal building proved to be inadequate for the commercial flights of the 1950s and 1960s, and so the structure was destroyed to make way for the current terminal (Tibbo 1997). There is a certain pressure to do large scale surveys of sites, and even countries, to ensure that at least structures are mapped and photographed, prior to destruction (Hoborow 2003; Thomas 2003a). Structures that have been destroyed would be approached in a slightly different manner. Such structures would be identified, their foundations uncovered, test pitting done to determine if there are the remains of material culture, and if so, the area excavated. Testing and excavation does not stop at the walls of the structure. As with protest sites in the Cold War, activity may be found outside of the building, or even some distance from the site (Schofield *et al.* 2003). Interviews with people familiar with the site can give greater insight into how the areas may have been used, sometimes beyond what the archaeological record can tell. Such areas may have been areas of leisure activity, for example, a lake or stream where people swam, or what was once a sports field. These structures and areas can all be assessed for their cultural significance and tourism benefits (Dore 2001; Schofield 2002).

Figure 2.1: A cold war scramble station converted to U-Haul storage units in Stephenville, NL. Photo by Shannon K. Green

Aircraft and shipwreck sites would be approached a little differently as there is no need, and often it is impossible, to excavate the entire site. Similarly, it is not practical to recover all of the pieces of an aircraft or ship, unless the intention was to restore the craft (Moore *et al.* 2002). Such sites can be mapped, the site thoroughly investigated, uncovering and looking under wreckage, and pieces or instruments of importance removed, similar to a forensic or contemporary aircraft incident investigation (Hacker 2006; Moore *et al.* 2002).

Once the fieldwork component is complete, the material culture and information about features can be analysed. Again, documentation may be necessary to identify objects and military museums can offer reference material. Much of the technology of these vessels has evolved over the years, but current aircraft engineers and mechanics can still recognize the function of older aircraft parts, and can greatly assist in the identification of material (Robert Mahr pers. comm. 2010). Analysis of the maps and objects can be conducted, and members of the community, or informants who were alive during the period, can be asked about what was recovered, how it was used, and in what ways it would shape a home or be used in a work (i.e., military) environment (Cooper 1994). Getting the community and people affiliated with the site involved brings a greater understanding of material culture to the archaeologist, and generates more public interest, which may bring forth further information (Holborow 2003).

2.3 Documentation

Archaeology can go further than the documentation of a battle. The amount of official documentation for an area varies depending on the usage and importance of a site. Areas of strategic or logistical importance, areas which were frequently fought over, and areas which saw a number of battles tend to be better documented. For others, military documents might remain for a site, and little supplemental material may be available. Personal documents sometimes exist, such as letters, diaries, and log books, and many can give insight into the day to day workings of a site and of the individuals there, but are not always publicly available or are published independently or by small publishers and so are not easy to find or access. (Schofield 2002). Classified material may still be secret, released, or destroyed when no longer needed. Even if a period or event is well-documented those documents may not always be completely accurate. For instance, all nations' casualty rates for the First World War are inaccurate with numbers varying between different official organizations and sometimes within the one group (Price 2005). As well, archaeological investigation has the potential to verify the written word, or correct it, as in the example of the *USS Arizona*, which was wrecked at Pearl Harbour. The events and the aftermath of the Japanese attack are very well-documented, and research of the site indicated that all of the guns on the ship were removed soon after the attack, but archaeological investigators discovered three 14-inch guns still mounted in the no. 1 turret, which contradicted the documentary evidence (Delgado 1991). Archaeology can fill in the areas where documentation is lacking and can tell the smaller stories which make up the greater, more heavily documented manoeuvres of major conflicts (Bulgrin 2006). What is more, archaeology can trace the individuals or teams as they crossed a battlefield. Such research can corroborate what was recorded in history, or, as in the case of the archaeological survey of the Little Bighorn site, can uncover a battlefield very different from that which was documented (Bulgrin 2006; Scott and Conner 1995). Documents are also biased products, and are not necessarily true. They are a point of view and can be manipulated, whether intentionally or not, to tell a story which differs from what happened (Fairclough 2007). Archaeologists may interpret a site through their own biases, but the evidence from the sites do not have the same problem. Even sites or events which are cleaned up or hidden can still leave traces in the material record. Therefore archaeology can tell a different story from the historical record (Gorman 2005).

2.3.1 Documents as artifacts

More information can be taken from documents if they are looked at not only from the perspective of what is written, but also how it is written and what may have been added (Hicks 2003). Official instruction manuals, field manuals and operating procedures give the basics on how to operate a machine or site. These guidelines are generalised and are not always specific to each site, battalion or machine. Although there may be official rules for conduct or operations, these cannot always apply to every environment, location, or group of people, so there will be unofficial rules, or different methods based on different situations or environments. Therefore, such documents should be taken as guidelines for conduct rather than certainty and any notations on such documents should be noted as they can give the instructions needed for that specific situation (Gordon and Malone 1994; Passmore and Harrison 2008). Coupled with this is the training received prior to a conflict. Terminology may be used in written documents that need further explanation for those who did not have the same training experiences. In such cases, notation on documents, or verification with those who followed the instructions could clarify ambiguities. Many of these problems can be solved by consulting individuals from the period who worked or lived on the sites and who used the items while the resource of living memory is still available (Saunders 2007).

As for actual work, the problem with the documentary record is that much that survives would be the official documents on how work was to be done. Procedure manuals do not always reflect how people actually did the work. Simply because it was the official method does not mean that it was the preferred method used by employees (Holyoak 2001). Evidence of different procedures used can sometimes be found on or near machinery demonstrating actual work methods (Pollard and Banks 2003).

2.4 Memory

The major conflicts of the first half of the twentieth century, namely the two world wars, are beginning to fade from living memory as the veterans of these conflicts age and die. The preservation of these memories is not only important from a historical perspective, but also from a cultural one. Looking at World War I as an example, it is still considered a modern event, but it is now far enough in the past that it is virtually beyond living memory (Freeman 2001; Price 2003). Memory of these conflicts may have been altered over time, or withheld because it did not fit the official memory (Fairclough 2007). However, these memories still resonate not only with the individual that experienced them, but also with their family members who did not directly experience the conflict. As the original proprietors of memory are lost, the secondary recipients are looking to history and archaeology to better understand what they have been left with. In many cases, those without secondary memory, whose family member perished in the war, look even more for answers and the "true" story which may be outside of the official documentation (Ashplant *et al.* 2004).

The public and researchers alike may look for one true history, but such a thing does not exist, particularly when dealing with memory. Memories differ from person to person, but can also differ depending on the role, class, and gender of the person. The memories of a soldier in battle will differ from that of generals, the memories of workers will differ from employers, and those of adults will differ from children (Walker 2003).

There are arguments that the preservation of the physical remains of the past can delay the healing process of painful memory (Schofield 2002). This is particularly apparent in the destruction of the Berlin Wall. Objects, buildings and landscapes which recall painful memory are often destroyed as soon as the public has that ability, and attempts at preservation are highly emotional and controversial (Feversham and Schmidt 2007; Knishcewski and Spittler 2007). Other voices against the preservation of conflict-associated memory across generations argue that the physical remains have the potential to glorify war and tend to gloss over the horror (Saunders 2007; Schofield 2002).

2.4.1 Living Memory

No veterans of the First World War remain and those of the Second World War are well over 80 years old (Dobson *et al.* 1997; Saunders 2007). This means that the archaeology and the sites of the recent past are also highly emotive, particularly for those who experienced the events of the site (Holyoak 2001).

Memory is possibly one of the more convincing reasons for an archaeology of the recent past. Along with written documents and material culture, the recent past is maintained through various forms of memory. Memory can be official, public, individual, altered, faded, and nostalgic and thus it may be difficult to find the story within the memory (Garton 2004). Most knowledge of the major occurrences of the first half of the twentieth century, like world wars, are passed on through history and memory, with the latter being the more poignant mode of transmission. As those who maintain the world wars in living memory age, the world loses those memories; this has made people feel the need to memorialize the wars (Gilchrist 2003). The preservation of living memory is difficult as there are those who prefer to keep memory private so that it will remain intact for them and not be influenced by official or dominant memory (Ashplant *et al.* 2004).

One of the problems with interview is the availability of people. In the context of Gander, Newfoundland, there are a number of individuals who worked on the air base during the war who are still alive. A number of these people have also written books about theirs and other people's lives in Gander during the Second World War. The books are a great resource, and often discuss leisure activities, which are rare in official histories, but they rarely talk about the more domestic aspects of life. Being able to interview these individuals and to ask about the material culture found on site will help in a greater understanding of the use and importance of objects. Such narrations must be used with caution, particularly when informants are relating subjective or difficult topics or memories.

The author has encountered such an issue when researching a site with fatalities. In interviewing one individual about an aircraft accident, she refused to give the same details to researchers as she had given to family. The memories were painful and turned out to be too difficult to divulge to virtual strangers. Thankfully, in this case, a family member relayed the stories, but researchers could not ask questions and had to rely on this secondary memory. The histories may differ based on who tells the story, but are still important as they create the social history of a place and people (Hecht 2002; Pocius 2000). The interview resources available are primarily individuals who were born in Newfoundland and worked as civilian staff on the base. They then continued this work as air traffic controllers, radio operators, and in other civilian jobs. This perspective will give insight into the lives of the civilians on base, and how domestic life and leisure may have changed with the arrival of the Canadian and Americans but will not give the point of view of the servicemen. There are servicemen that served at Gander who are still alive, but being able to contact them is often difficult. Most records are only available in the United States or at Archives Canada. As this research could only be done in Newfoundland, research has relied on servicemen contacting and communicating with the author. Most of these people have served in Goose Bay, not Gander, and only for short periods of time. However, their perspectives were found in war-era publications such as *Progergander* and *The Gander*, and published memoirs (such as Armstrong 2008; Bennett 1958; Goff 2005; McVicars 1983; Torgerson 1974; Warren 1998). Newfoundlanders who were employees of the airbase offered invaluable information, especially in the investigation of the former town site of Gander (see Section 6.0).

2.4.2 Secondary Memory

Individual memories, unless written down, tend to change and fade over time, but sometimes living memory is actively passed on to subsequent generations (Ashplant *et al.* 2004; Jelin and Kaufman 2004). This is often enabled with heirlooms such as photographs or war souvenirs like trench art (Ashplant *et al*. 2004). When memories are passed on to the subsequent generations they can be fragmented. Certain elements may be deliberately eliminated from secondary memory as the primary memories may not fit into the official memory or the individual may be ashamed of certain actions and thus not pass them on (Ashplant *et al.* 2004). Those with secondary memories, who did not experience the world wars first hand, are becoming further and further disconnected from the actual events and have begun to want more information about the events beyond the memories passed on to them. This has resulted in pilgrimages to war sites, and a growth in recent conflict archaeology (Gilchrist 2003; Lees 2001). In aviation archaeology, descendants of crash victims often want to visit crash sites to try to better understand the tragedy. Sadly, given the nature of aviation sites in Newfoundland, the difficult terrain does not allow for easy access. This is where aviation archaeologists can fill in the blanks left in secondary memory, through on-site and documentary research, and offer answers, descriptions and images of sites. In many cases, even if not all questions are answered, the archaeological research of crash sites can provide a level of closure to family members (Neyland 2011). The archaeology of a world war site can tell the individual stories of crash survivors and rescue/recovery teams, individuals or families living on bases, in trenches and on the front line. Twentieth-century conflict archaeology can also tell the lesser known stories of the civilians, women and minorities involved in the war effort who are not always featured as prominently in historical texts or official memory (Ashplant *et al.* 2004).

2.5 Commemoration

As anniversaries of historically important events approach, in particular the centennials for the two world wars, there is an increased desire to commemorate and memorialize the recent past. This is not a new phenomenon, but seems to occur in cycles. Soon after the world wars memorials were erected and battlefields preserved. Again, around the 75th anniversary of the First World War and the 50th anniversary of the Second World War there was a public movement to revisit the past and examine the need for the conservation of these periods. Currently, as we approach the 100th anniversary of the start of the Great War, work is being done to preserve what is left from both of the conflicts. In some cases, veterans of the conflicts have noticed the interest of the current generations in the preservation and commemoration of sites and have become actively involved in helping (Raivo 2004). The number of physical remains of these events is beginning to dwindle, and, even though they are well-represented in the written record, there is a need to conserve and protect these sites before they disappear (Gilchrist 2003). In many cases, archaeology is beginning to be seen as a method for commemoration in its own right (Saunders 2007). The documentation, discovery and preservation of sites, along with long-term management, is arguably a form of memorialization and commemoration (Neyland 2011).

When interpreting and presenting a site it is important to present it from various viewpoints. This means trying to look at a site from the official perspective, as well as the perspectives of those who acted on that area, and used the space differently depending on their rank or civilian status, their country of origin, and their individual role on the site. The public will have their own interpretations of the place and the landscape depending on their own history and perspectives (Carman and Carman 2001; Saitta *et al.* 2005). Official histories may only focus on one area, or a site determined to be of importance for one nation and may ignore the efforts made by other nations. For example, the Parks Canada site at Beaumont-Hamel only interprets the battles fought by the Newfoundland Regiment, and ignores the conflicts fought by the 51st Highland Division, the South Wales Borders and Border Regiment and the German divisions (Saunders 2002). These events are of great importance to the public therefor it is important for the presentation to be in the hands of the many instead of singular academic or heritage establishments (Gough 2007; Price 2005). This is where a multidisciplinary approach comes in. A combination of archaeology, history, anthropology, geography and other disciplines can give a greater understanding of a site by bringing different academic interpretations and views (Hicks 2003; Saunders 2002; Saunders 2003). By using only one interpretation of a site the other layers of social, economic, political and national history can be lost (Gough 2007).

Returning to the *USS Arizona*, before the ship was designated as historically important in itself, objects were removed to be shipped throughout the country to instil patriotism and support for the war. The site was monumentalized in 1962 as a visual reminder of the war experience at

Pearl Harbour but in a manner dictated by the government and National Parks Service (Delgado 1991). The monument is designed in such a way that it only tells the story from the American point of view, and leaves no room for varying interpretations (Aulich 2007; Delgado 1991). Contrast this to the Smithsonian's attempt to display the *Enola Gay*, the Boeing B-29 which dropped the atomic bomb on Hiroshima in 1945, as part of an exhibit to mark the fiftieth anniversary of the end of the Second World War. Politicians and the public commented that displaying the *Enola Gay* was not appropriate, and coupled with the plan of director Martin Harwit to display the aircraft with close up images of ground zero at Hiroshima, led many people in power, including the commander of the Hiroshima mission, to complain that the Smithsonian was planning a "revisionist" exhibit and not celebrating "technological ingenuity and human derring-do" as was expected (Post 2013: 15). Rather than allow an exhibit that would cause visitors to question the bombing of civilian targets to break the Japanese into surrendering and using the images of the devastation to cast doubt on the act, Harwit was fired and his exhibit never produced (Post 2013).

2.6 War Dead

One area of importance in the study of recent conflicts is the presence of human remains on battlefields and crash sites (Price 2005). During the conflicts, efforts were often made to recover all of the dead, but it was not always possible. War dead are still missing in the No Man’s Land of World War I battlefields, and individuals from aircraft and naval incidents are missing the world over (Price 2005; Saunders 2007). The discovery of the remains of victims of world wars has a great impact on the public, and in particular on individuals who may be related to or affiliated with the deceased.

The treatment of the war dead varies from country to country and culture to culture and so the excavation of these sites has the potential to allow archaeologists to explore the ethical issues surrounding archaeological research (Schnapp 1999). War sites are often the places of death and, in many cases, unofficial graveyards and must be treated as such based on the practices of the culture they are affiliated with. For instance, the United Kingdom and Canada choose to bury their fallen soldiers on or near the battlefield in the country of conflict, but would still like to identify them to give them proper burials (Saunders 2007). Contrary to this, the United States feels that it is important for war dead to be returned to their home soil for burial. As such, the Joint POW-MIA Accounting Command (JPAC) and the Central Identification Laboratory Hawaii (CILHI) were created to identify and recover the remains of missing American personnel lost in all past military conflicts (Holland and Mann 1996; Hoshower-Leppo 2002; Webster 1998). JPAC teams are a combination of military personnel, archaeologists and forensic anthropologists who work alongside local communities on foreign soil to identify American fatality sites and recover the remains and personal effects of those who died at the site (Webster 1998). The remains are then brought to Hawaii where they are, when possible, identified to the individual. JPAC uses a variation of archaeological and forensic techniques to ensure proper recovery, but are not as detailed as traditional archaeological or forensic investigations (see Section 3.1; Holland and Mann 1999; Webster 1998).

The identification of sites and recovery of war dead is also of great importance to individuals with affiliation to a site. Sites have taken on a new importance for children and siblings of those involved in a battle or aircraft crash, particularly those who perished in the event. During the war the events concerning the deaths of service people were often sanitized to help the individuals on the home front better deal with the loss. But secrecy regarding cargo and missions often left unanswered questions, and pictures of “nice” crashes often made it more difficult for families to accept the loss (William Dolan Jr., per. comm. 2009). Being able to view the crash site or battlefield gives family members a better understanding of what happened, and in some cases can bring closure, even if it is over 60 years after the incident (Crossland 2000; Saunders 2007). For others, the sight of the wrecked aircraft was not as important as the image of the physical marker of their burial. In the RAAF documents associated with DfAp-11 (see Section 5.2.4), a copy of a letter forwarded to First Officer Burrows' wife states how individuals will send in pictures of grave markers to be forwarded to family members. In this case, George R. Williams of St. John's sent photographs and a letter to the Australian Prime Minister's office to be forwarded to Burrows' widow in an effort to show her the care with which her late husband's marker is treated, even 16 years after his death (RAAF 1942). This would potentially allow some form of closure for the widow who would likely never be able to travel to Gander to see the site herself.

Archaeology has also been able to discover the fate of missing battalions and field burial practices which often went unrecorded (Price 2005). The discovery of a mass grave at Saint-Rémy-la-Calonne answered the mystery of what happened to French author Alain-Fournier and the twenty soldiers of the 288th French Infantry Regiment which he lead (Saunders 2007; Wilson 2007). Using paleopathological techniques, researchers found that many of the soldiers died in combat (Freeman 2001; Wilson 2007). Even the soldiers with gunshot wounds to the head showed extensive injuries, indicating that the Germans shot them out of mercy rather than as an execution. The fact that they were buried head-to-foot by rank instead of thrown into a mass grave tells a great deal about the burial practices and the respect for comrades and enemies during wartime (Wilson 2007).

In 2009, a mass grave containing a number of Australian and British soldiers who died in a July 1916 battle near Fromelles, France, was discovered. The whereabouts of approximately 400 soldiers had been unknown until they were discovered by exploratory excavations. The mass graves are being excavated and researchers hope to identify and rebury the men in individual coffins with full military honours in a new Commonwealth War Commission cemetery. To date, hundreds of Australians who are believed to have ancestors who have yet to be recovered from Fromelles have contacted the Australian Government Department of Defence and many have been asked to give DNA samples in the hopes of identifying the remains (AAP 2009; Scully and Woodward 2012). Over 2000 individuals came forward to offer their DNA, with Y chromosomal DNA collected from potential male relatives and mtDNA collected from potential female relatives. As of March 2012, DNA comparison lead to the naming of 119 of the 250 Australian soldiers exhumed, allowing their identification to be placed on their individual grave (Scully and Woodward 2012). This shows that although this battle is documented, there are still gaps in the record that the public, in particular, want filled. The public want to know where their ancestors are buried and want them to be identified, even over 90 years after the event.

Although most documents from the First and Second World War are no longer classified and are accessible to the public, many people are unaware of the methods used to obtain these documents, and historical and archaeological study can bring this information to the public in a more concise manner than individuals having to sift through reports and documentation regarding specific sites (Schofield 2002; Spencer 2008). Online forums are a great help for information relating to specific subjects, and helpful to researchers trying to navigate foreign archives and documents.

2.7 War and the Public

Unlike many time periods of study in archaeology, most people have some form of a connection to the world wars of the last century, whether it was a relative who served or the impact on their community, and people generally find the artifacts of World War I and II sites to be recognizable (English Heritage 2003; Gilchrist 2003; Schofield *et al.* 2007). The public tends to be interested in its own past, a past that is familiar and that involves their locality, community and ancestry (Symonds 2004). The recent past has the potential to tell us about ourselves, making it publicly appealing (Harrison and Schofield 2009). This can foster a greater sense of community within the area and will often cause local people to be receptive to further archaeological work. In many cases, the idea of archaeology interests the public and the approachability of the well-documented, recent past gives the public a means to better learn about the practice and application of archaeology and can create an intimacy unlike archaeological investigation of other eras (Lees 2001; Saunders 2007)

More recent sites tend to be more newsworthy and the subject of documentaries which puts the actions of the archaeologists in the public eye. This also indicates that there is a great deal of public interest in recent conflict sites, meaning that the public is looking for more information. Archaeology, like many areas of research, is often supported through public funding, and the interests of the public can be a factor in determining which projects receive funding (Saunders 2007). Therefore, it is not only archaeologists who can affect the views and histories presented to the public, but the public who can aid in determining what work should be done. In some cases, particularly with television shows and documentaries, the producers of the programs may attempt to influence the methods in which the archaeologists work, and can sometimes prevent researchers from publishing until after the television work has aired (Saunders 2007). Archaeologists need to be careful about how their work is portrayed and, although they are being paid by those producing the films, must attempt to maintain their professional standards and not allow the more interesting, photogenic and publicly appealing finds to overshadow their research.

Public interest can also be detrimental to the preservation and archaeology of the recent past. The public are interested in the world wars and tend to collect objects affiliated with the events. Those enthusiastic for that period of history may visit battlefields, aircraft wreck sites, and other areas of historical importance and remove items (English Heritage 2003; Saunders 2002). These sites are rarely protected under archaeological laws due to their recent age, so many collectors see nothing wrong in removing items (Hoshower-Leppo 2002; Saunders 2007). These items lose their archaeological context and, even if later acquired by an archaeologist studying the area, cannot contribute to the knowledge of the site as they once could. This artifact removal is a form of antiquarianism where those who have an interest in the past remove recognizable and interesting objects for their own collections, or in some cases, to sell (Saunders 2007; Schnapp *et al.* 2004; Zorich 2009). In contrast, collectors and enthusiasts may be helpful for archaeologists studying airplane wreck sites. In many cases, the exact location of wrecks was not recorded, and many that were documented are imprecise (Holyoak 2001). Crash sites near communities are often well known, even those that are difficult to access (English Heritage 2003). Working with the public will allow archaeologists to locate these areas more easily, and in some cases will be able to guide researchers to the sites, or at least indicate the best route to reach the site (Hoshower-Leppo 2002; Webster 1998).

The public can play an important role in the presentation of the recent past and archaeologists must work within the communities they are studying to plan, execute and present their work (Symonds 2004). One aspect that is common to twentieth-century conflicts is the recovery of souvenirs. War souvenirs can be recovered during or immediately after a battle, as was often the case in the First World War, or can be recovered at a later date, as is common with isolated aircraft crash sites (Saunders 2007). Such souvenirs of war can be presented in different ways and have different meanings for the presenters. For instance, WWI trench art sent home by soldiers later killed can take a place of memorial in the homes of their family (Saunders 2007).

Overall these public presentations of recent historical objects tell researchers how the public would like to see objects presented. Researchers and enthusiasts can work together to ensure that accurate information is presented in such a manner that is publicly appealing (Schofield and Johnson 2006). As well, it is the public who are the most enthusiastic about the history of a site, who bring added cultural meaning to it, and encourage community interest (Gough 2007; Wilson 2007).

As seen with the sheer number of visitors to Beaumont-Hamel[1] and organized travel tours of WWI and WWII battlefields, preservation and presentation of the recent past, especially that of the world wars, is a large tourism draw (Dore 2001; English Heritage 2003; Holyoak 2001). Communities can benefit financially and culturally with the preservation of local war related sites (Holyoak 2001). Even if visitors do not need to pay to access the site itself, the influx of visitors, based on currently developed battlefield sites in the United Kingdom, will often generate enough money in the community to make the cleaning, preparation and presentation economically worthwhile (Dore 2001; Woodward 2004).

Even if the public has no interest in the history or archaeology of a site, some work does need to be done just for public safety. The archaeology of World War I tunnels are of public

[1] Gough (2004) states that approximately 250,000 people visit Beaumont Hamel each year.

importance on a more practical note as many of the tunnels are poorly recorded, and it is not always known which tunnels were filled in. Many tunnels are supported with wooden beams which may now be weak and threatening to collapse. Prior to any form of construction, such as buildings or roads, these tunnels need to be investigated to determine their integrity, to protect surface structures and the public from collapse and accidents due to weak tunnels (Doyle *et al.* 2002).

2.8 Conflict Archaeology in Gander

Conflict archaeology can be an important element in the memorialization of the war in the community. Gander already features an aviation museum, the North Atlantic Aviation Museum, which was updated in 2012 to better reflect the aviation history of the area from Captain Fraser's first landing on the airstrip to the influx of people and aircraft when American airspace closed on September 11th, 2001. Annually, the town has the Festival of Flight, which generally features outdoor activities, many with an aviation theme. A quick drive through Gander will reveal the aviation pride as seen through sculptures of aircraft and aviation-themed street names.

Aviation history is important to Gander and aviation archaeology can help uncover, preserve and protect it. For instance, there is a B-17 in the Thomas Howe Demonstration Forest (DfAp-09), a teaching forest with a set of hiking trails and a picnic area overlooking Gander Lake. This site was investigated as part of this project (see Section 5.2.7) in 2010. By 2011, the research for the site was compiled and a preliminary report was given to the THDF. It was said in 2010 by director Ed Blackmore that they knew very little about the aircraft site so a copy of the original crash report, complete with war era pictures, was given to the Demonstration Forest's collection. While the archaeology could not add much to the record, besides an inventory, the historical research was of great value to the site, especially as a training tool for current and future staff, and the inventory allows for improved site monitoring.

Gander has a rich folklore, and as younger people are getting involved with the museum, some of the stories are being passed on. Similarly, many original Gander residents came to public talks and excavation sites with the goal of sharing information. The memories of these residents are of incredible value to researchers and anyone interested in the history of aviation. As their stories are being told, they are being passed to the next generation. For instance, there are very few first hand recollections about the 1946 crash of the commercial Belgian airliner, the *Sabena*, but almost everyone in the town has a second-hand story about the crash and the aftermath.

To achieve the goals of this project (Chapter 1), it is important to work with interested members of the community to better understand the physical remains of World War II in Gander. Through documentary and archaeological research, with the help of primary and secondary memory, a clearer image of the Second World War history of Gander can be created for the benefit of archaeologists, historians, aviation enthusiasts and the Town of Gander.

CHAPTER 3: HISTORY OF GANDER

Gander is an airport town. Prior to the establishment of The Newfoundland Airport, it was a hunting camp called Hattie's Camp located at Milepost 213 on the Newfoundland Railway. Circumstances came together to transform this small airport, originally designed to speed up mail delivery, into the largest airport in the world. World War II was the catalyst that put Gander on the map, although not literally because the location of the airport was a military secret for a period during the war. With the American and Canadian governments concerned with the defense of North America, and the British government needing North American supplies to fight the war, Gander was transformed from forests and bogs to a vibrant airport community in less than a decade.

This chapter looks at the government deals which lead to the establishment of the Gander Airbase, its development and growth, and its use for defense and transport. It discusses the establishment and transformation of Ferry Command to Air Transport Command and the use of Gander's bombers to protect the convoys and hunt U-boats. It establishes the role of Gander during the Second World War to better understand how the aircraft crash sites were created, the importance of the sites, and their impact on the base.

3.1 The War Effort

At the outbreak of the war, Newfoundland was in a difficult financial and political position. In 1934 Newfoundland was in severe debt and about to default on loans from Canada and a number of banks. Rather than allow the dominion to default, Britain acquired Newfoundland’s debt, but also suspended representative government, leaving the colony to be run by a Commission Government. The Commission Government was a system of three representatives from Britain, three from Newfoundland, and the governor of the colony, ensuring that Britain always had the majority vote (Neary 1988). Even with the appointed government running the colony, Newfoundland was in an economic depression with much of the population unemployed[2] and living on the dole (welfare). Newfoundland did not have sufficient defence resources at the start of the war, as whatever funds the island had access to went to solve the social and economic problems (MacKenzie 1986; 2004). With Newfoundland's colonial status, Britain should have been responsible for the colony's defence, but, as Britain was engaged in war, the resources could not be spared. The other option was to look to North America, first to Canada, and later to the United States.

In 1937, the Canadian Chiefs of Staff noted the lack of defence in Newfoundland and the suggestion was put forward that the defence of Newfoundland should be tied to the defence of Eastern Canada (Mackay 1974; MacKenzie 2004; Neary 1994). With the outbreak of war in 1939, Canada took on the protection of Newfoundland as part of its own national defence, and in part to assist the British war effort (MacKay 1974; Milner 2006). This also allowed Canada to dispatch a small number of troops to the colony and to request permission from London and Newfoundland for the Royal Canadian Air Force (RCAF) to have fly-over rights and the use of the colony's airport facilities (Bridle 1974; Mackay 1974; MacKenzie 2004; Stacey 1970). Canadian Forces were soon stationed in Newfoundland as part of the Newfoundland Escort Force (NEF) and Eastern Air Command (EAC), a means of protecting ships crossing the Atlantic Ocean from German U-boats. With the fall of France, Britain had no allies remaining on mainland Europe, so

[2] In 1939, 75,144 Newfoundlanders relied on the dole (government relief) (Hillier 2007).

many supplies had to come from North America (Sarty 2002). U-boats patrolled the Atlantic Ocean in an attempt to cut off this supply route (Hadley 1985). To protect ships, a convoy system was put in place, where groups of ships would leave from various Canadian ports and rendez-vous with Royal Canadian Navy (RCN) warships departing from St. John's harbour and aerial patrols provided by the RCAF. This was later taken over by the United States Navy (USN) and the United States Army Air Force (USAAF) as the United States entered the war.

3.1.1 Permanent Joint Board of Defence and the Anglo-American Leased Bases Agreement

In the summer of 1940, the defence responsibilities for Newfoundland changed with the establishment of the Canadian-American Permanent Joint Board of Defence (PJBD). The role of the PJBD was to "review and study the defence requirements of the northern half of North America and to make recommendations to the two governments" (MacKenzie 2004, 55). The Board had no real authority, but rarely did either government reject their recommendations (MacKenzie 2004). The first act of the PJBD was to establish two defence plans for North America, one purely defensive and the other primarily offensive. In both of these plans, the defence of Newfoundland was imperative. In fact, a review by the Chiefs of Staff and reported to the Cabinet War Committee concluded:

> Finally, the Chiefs of Staff Committee desire to make it very clear that in their opinion Newfoundland represents a most important outpost, and is in fact Canada's first line of defence in this hemisphere, the preservation and protection of which is absolutely vital to her interest (Stacey 1970).

One of the greatest impacts of the PJBD on Newfoundland was the decision that the defence of Newfoundland was integral to the defence of the United States, so, without yet being officially at war, the United States could begin to fortify the colony and protect the convoys as part of the protection of American interests (Bridle 1974; MacKenzie 2004). The American defence of

Newfoundland became a reality with the Anglo-American Leased Bases Agreement, better known as the Bases for Destroyers Deal, between President Roosevelt and Prime Minister Churchill in 1940 (Craven and Cate 1964; MacKenzie 2004; Neary 1994). This agreement granted the United States 99-year leases to construct naval and air bases in Newfoundland, Bermuda, British Guiana, Trinidad, St. Lucia, Antigua and Jamaica in exchange for fifty aged four-stack destroyers to aid in British defence (MacKenzie 2004; Milner 2003; Neary 1994). In Newfoundland, the United States acquired six leased areas under the agreement. In St. John's they gained two areas at Quidi Vidi Lake where the army post Fort Pepperrell was established, an area on the White Hills for emergency landings, and a dock installation on the St. John's Harbour. In addition, they obtained land for a naval base at Argentia, named Fort McAndrew, and an airfield site in Stephenville, called Port Harmon (Stacey 1970).

When the negotiation of the Leased Bases Agreement occurred, France had just fallen and the threat of Britain being invaded was very real. Although the fall of Britain would have had an impact on the United States, it would obviously be much more dire for Britain. The United States had the advantage in negotiations, and using Britain's fear of losing their country to the enemy they pushed for greater advantages. Thus the United States ended up with a number of rights:

> The United States shall have all the rights, power and authority within the Leased Areas which are necessary for the establishment, use, operation and defence thereof, or appropriate for their control, and all the rights, power and authority within the limits of territorial waters and air spaces adjacent to, or in the vicinity of, the Leased Areas, which are necessary to provide access to and defence of the Leased Areas, or appropriate for control thereof (Bridle 1974, 1393-4).

This advantage carried throughout negotiations, and set the tone for the relationship between Americans, Canadians and Newfoundlanders throughout the war (Neary 1988).

The most common complaint of the Newfoundland Commission Government was the lack of consultation throughout the negotiations, and the sovereignty issues raised by American demands (Bridle 1974; MacKenzie 2004). The Leased Bases Agreement gave the United States rights such as the removal of customs duties on the import and export of goods necessary for base construction and maintenance (duties being the main source of income for the Commission Government), the establishment and operation of their own postal service within leased areas, waived immigration laws (allowing them to bring in military and civilian employees as deemed necessary), and legal jurisdiction (Neary 1988; MacKenzie 2004; MacKenzie 1992). The United States wanted to be able to try crimes committed on base and any committed by United States servicemen outside of the leased areas. The legal jurisdiction was the most difficult for the Commission Government to accept as it was seen as a threat to the sovereignty of Newfoundland and had the potential to put Newfoundlanders at risk (Neary 1988). One of the few points that Newfoundland had the opportunity to negotiate was the issue of legal justice, and it managed to retain certain rights and jurisdictions to serve justice for crimes committed outside of the leased areas.

At the outset, the Commission Government expected more benefits from the Leased Bases Agreement. In their view, the United States was taking a great deal from Newfoundland in terms of land and potential revenue, and Newfoundland should be compensated for that whether financially, by lowering American tariffs on goods, particularly fish, or relaxing immigration laws for Newfoundlanders (MacKenzie 2004). The United States, on the other hand, felt that they owed nothing to Newfoundland, that it was the colony’s duty to support anything necessary for wartime defence, and that the relationship between the two countries would be unchanged after the war

(MacKenzie 2004; Neary 1988). In the opinion of the United States, Newfoundland was a ‘mortgaged property,’ and they owed them nothing for the use of the land (Neary 1994).

Although the Commission Government was not pleased with many aspects of the Leased Bases Agreement, the public offered no protest. Much of this may be due to the Commission Government and Winston Churchill encouraging public acceptance of the Agreement as part of the war effort (Neary 1988). The United States did arrive under mixed feelings. The public welcomed them, as in the case of the *Edmund B. Alexander*, a troop ship, arriving in St. John’s to great fanfare, but when their presence began to impact people directly and negatively, tensions arose (Cardoulis 1990; MacKenzie 2004). This was most evident with Newfoundlanders who were relocated to make space for the bases, which occurred in Stephenville, Placentia and St. John’s. Relocation and construction began before the compensation formula was finalized between Newfoundland and the United States, so locals did not even know how they would be remunerated (Neary 1994). The process was difficult, sudden and confusing for many of the locals, particularly the French speaking Newfoundlanders living in Stephenville. The relocation began in winter, so people could not move their entire house, as was common practice in Newfoundland. The first home to be destroyed in Stephenville was burnt to the ground by the Americans, which upset the community to the point where later homes were destroyed by less dramatic means (High 2009). For most locals relocated during base construction, they could only remove their possessions and watch as their houses were destroyed (Cardoulis 1990). When compensation was finally paid, it was often unfair, because the United States did not understand the generations of work often required to make Newfoundland soil arable and the value of such farmable land. In addition, compensation was only for the value of land and buildings, not for the disruption in the lives of inhabitants, or, as in the case of Archibald Stacey of Woodley Estates in Pleasantville, St. John's, a farmer and butcher who lost not just his land, but also his livelihood (Cardoulis 1993).

Gander was treated differently because it did not fall under the Leased Bases Agreement. Instead, it was a negotiation involving the PJBD. The Newfoundland Airport at Gander was operational prior to the arrival of the Americans and was under the control of the RCAF, but not leased, so ultimately belonged to Newfoundland (MacKenzie 2004). The Leased Bases Agreement stated that American Forces stationed outside of the leased sites would have the same rights as those on base colonies. With their rights assured, the United States were free to negotiate with Canada the ability to use the Gander airbase and to construct semi-permanent facilities there (MacKenzie 2004). This fact seems to have been forgotten at times by the Canadian and American Forces. The Commission Government of Newfoundland found it necessary to remind the outsiders that the airbase at Gander, like those at Botwood and Gleneagles, belonged to Newfoundland. Any expansion or development could not be done on those bases without consultation with London or Newfoundland (Bindle 1974; MacKenzie 1986).

The Newfoundland Commission Government was not the only government to feel as if their rights and needs were being ignored in the negotiations. Canada also felt that they had given up much to the United States Forces, particularly once the Americans entered the war (Lund 1982). Up to 1941, the RCAF was responsible for air support and the RCN for naval protection of the convoys as part of the Newfoundland Escort Force (Greenhous and Halliday 1999; Lund 1982). Throughout Canadian control of the NEF, the RCN often felt as though the Royal Navy would never accept them in terms of success and methods (Douglas 1986; Milner 2006). Although the RCN had supplied 82% of the escort services, when the United States Navy entered the war they took over with little consultation with the RCN (Lund 1982). The Royal Canadian Navy was unhappy about this arrangement, but did not protest enough, as the USN saw no serious difficulty in their takeover of the NEF (Craven and Cate 1964). Overall, the RCN wanted to be treated as an equal partner with the USN in the protection of North American waters (Lund 1982). Instead, the Canadians continued to provide most of the support while the NEF was an American operation. Negotiations also took a different tone when Canada was attempting to gain the right to build an airbase in Goose Bay, Labrador. Newfoundland had much more say in the establishment of the base, and the British government did not consider the airbase to be as important for their defence, so many fewer concessions were made and more responsibilities were placed on Canada (MacLeod 1986; Neary 1988). Most importantly to Newfoundland was that Canada did not own the land outright, thus avoiding giving Canada a foothold in the colony, which was seen as a threat to Newfoundland sovereignty by both London and Newfoundland.

3.2 Gander – The Crossroads of the World

Air travel was only three decades old in 1936 when Canada, the United States, Britain, the Free Irish State and Newfoundland decided an airport should be built in Newfoundland. They could all see the potential for air travel and mail delivery that the new aviation technology provided (Christie 1995; Meaney 1937). Using aircraft to cover some of the distance between Canada and Britain was already making mail delivery more efficient (Christie 1995). In 1935, surveyors looked along the Newfoundland railway for a suitable spot for an airport. Railway workers at Cobb's Camp suggested that they should try railway milepost 213, locally known as Hattie's Camp (Warren 1988; Hall and Vatcher 1935). Hattie's Camp was uninhabited, but was used seasonally for logging and rabbit hunting (Riggs and Russell 1994). The area was described by Hall as ideal for an airport as the land was fairly level, had suitable gravel to support the construction of runways, and overlooked the surrounding country, making it clear of obstacles and maybe even cause less snow accumulation (Hall and Vatcher 1935). The area was large enough to support four runways, three 1300 yards (1189m) long and 200 yards (183m) wide, and another one 1600 yards (1463m) long and 400 (366m) yards wide (Meaney 1937). As well, the site was located near Gander Lake, a suitable area for a flying boat base (Christie 1995; Meaney 1937). In June 1936, a crew of 40 workmen arrived and tented at the side of the railway, clearing land to prepare for an airport without really understanding what an airport was (Pattison 1943). The following year, crews began work clearing the land and constructing the runway, and by early 1938 the runways were operational. On 11 January that year, Captain Douglas Frazer landed the first aircraft at Gander, a single engine Fox Moth (Cardoulis 1990; Riggs and Russell 1994; Warren 1998).

The construction of the airport was a joint project between Newfoundland, Britain, Canada and the United States with Britain funding the work, but Newfoundland maintained jurisdiction of the airport (Christie 1995; Powell 1982). When it came to the initial survey work, and later construction, the Newfoundland Commission Government and Britain were both apprehensive about allowing Canadian professionals to oversee the work. There was fear that Canada would use it to have some form of ownership over the airport, or, from the British perspective, Newfoundland might start to think about having stronger relations with Canada (Christie 1995). In the end, Canadian contractors did oversee much of the work (Christie 1995; MacLeod 1999).

With the outbreak of war, activity changed on the airport site. Initially it was thought that the construction of the airport in Newfoundland would not be a priority during the war, but the RCAF quickly realised the potential and construction continued. At the time, the Newfoundland Airport was the only airport in Newfoundland. In February of 1940, the first RCAF aircraft landed in Gander and a few months later the RCAF took over the airfield. Construction proceeded rapidly to complete the runways and infrastructure (Town of Gander 1992; Cardoulis 1990; Pattison 1943). Newfoundlanders worked in a variety of roles at the airbase, predominantly in construction, but also including work as cooks, engineers and surveyors. Canadians – often French-Canadians – supervised many of these jobs (Bridle 1974; MacLeod 1999). French speaking regiments were stationed in Gander, which consisted of French-Canadians who were often home defence draftees or volunteers who could not be sent to an active fighting front. The Newfoundlanders who volunteered for service were visibly resentful because Newfoundlanders who volunteered with the Imperial Army or the Royal Navy were on the front lines, in danger, and earning only 50¢ a day while these volunteers were in the general safety of Newfoundland earning $1.30 or $1.50 a day (Bridle 1974).

3.2.1 ATFERO – Ferry Command – Air Transport Command

The rush to complete the runways at Gander was an attempt to expedite the shipment of United States-made bombers to Britain (Cardoulis 1990, 70). This was to be accomplished by the newly formed Atlantic Ferry Organization (ATFERO). Canadian-born Lord Beaverbrook, appointed by Prime Minister Winston Churchill as Minister of Aircraft Production appointed D.C.T. Bennett of the Royal Air Force (RAF) to determine the feasibility of flying bombers to Britain (Davis 1985; Douglas 1987). The alternative was to ship bombers, a slow and risky venture, as the waters of the Atlantic Ocean were full of German U-boats who would prey on convoys crossing to Britain in an attempt to stop the flow of supplies (Christie 1995; Douglas 1987; Smith 1941). Bennett picked the crew and oversaw the refitting of seven Hudson bombers to hold more fuel for the long journey and their transport from Montreal to Gander (Ministry of Information 2005). The need for aircraft was so great that Beaverbrook believed the experiment would be successful if three of the seven aircraft could safely cross the Atlantic. Bennett believed that careful preparation would grant a higher success rate (Bennett 1958; Ministry of Information 2005). On 10 November 1940, seven crews made of up to twenty-two men, and seven Hudson bombers, led by Bennett, left Gander and arrived safely on 11 November 1940 in Scotland. This proved that ferrying planes by air could be a successful alternative to shipping aircraft (Christie 1995; Davis 1985; Douglas 1987).

Although Bennett himself was RAF, most pilots of ATFERO were not military (Powell 1982; Smith 1941). To find sufficient pilots, ATFERO recruited from the United States, offering high wages to the American pilots who enlisted (Christie 1995; Smith 1941). The United States was not at war at that point, so potential pilots had to cross into Canada to apply (Torgerson 1974). RAF and Canadian pilots received lower wages, which caused some minor problems with newer pilots (Christie 1995). The ATFERO applicants came from a variety of backgrounds, many being bush pilots, airline pilots, stunt flyers, crop dusters, explorers and flight instructors (Davis 1985; Torgerson 1974). The money held great appeal for many to try out, but for others, such as Captain Kirk Kerkorian, it was preferable to work as a civilian with the RAF instead of waiting for the United States to join the war and be drafted into the restrictive military (Torgerson 1974). ATFERO pilots were civilians, but were issued service-style uniforms, mostly as a means for the Canadian Ministry of External Affairs to identify them on their missions (Powell 1982). As the United States entered the war, Ferry Command became somewhat of a morale issue, as it saw no combat, and the work could seem dull. Younger pilots often complained that Ferry Command offered little room for advancement, promotion or military recognition (Craven and Cate 1964). Some of the original Ferry Command pilots were relieved by the lack of combat, as ferrying aircraft was dangerous and difficult enough without enemy fire (Smith 1941). Most often, pilots understood the importance of their role in the scheme of the war (Craven and Cate 1964).

As ATFERO became successful, more officials in the British government and the RAF wanted to be involved. Eventually, this led to ATFERO becoming RAF Ferry Command and a number of RAF and RCAF staff entering the chain of command. This led to conflicts between Bennett and some of the Canadian personnel in particular, ultimately causing Bennett to leave Ferry Command (Bennett 1958; Davis 1985). As time went on the role of Ferry Command changed sufficiently to merit another name change. Ferry Command was no longer just ferrying aircraft to Northern Ireland and Scotland, but was also performing transport duties. The organization's responsibilities changed to:

> a. The ferrying of all aircraft within the United States and to destinations outside of the United States as directed by the Commanding General, Army Air Forces.
>
> b. The transportation by air of personnel, materiel, and mail for all War Department agencies, except those served by Troop Carrier units as hereinafter set forth.
>
> c. The control, operation, and maintenance of establishments and facilities on air routes outside of the United States which are, or which may be made, the responsibility of the Commanding General, Army Air Forces (Craven and Cate 1964, 363).

These changes, along with the USAAF takeover of operations changed the organization to Air Transport Command (ATC; Christie 1995; Craven and Cate 1964; Davis 1985). By May 1944, the ATC "had become the largest air transport and ferrying service in the world" (Thompson 1944, 16).

Ferry Command was short on pilots when the RAF took over. This was not due to poor planning, but rather the high standards required by Bennett and ATFERO for the pilots, crew and staff. These high standards caused a number of meteorological and radio staff to lose their jobs immediately after his arrival (Sholto 1960). Very few pilots who applied for Ferry Command were accepted. For instance, in 1942 when Capt. Kerkorian took the RAF course, only three out of one hundred men graduated as captains (Torgerson 1974). In addition, within six weeks of Bennett leaving Ferry Command there were a number of fatal crashes, three of which were B-24s, including two on return flights ferrying pilots back to North America (Christie 1995; Bennett 1958). Only five planes were destroyed while Bennett was in charge with the loss of four lives. Early ATFERO runs were very successful from that point of view (Sholto 1960; Smith 1941). Ferry Command after Bennett may have ferried more aircraft in a shorter period, but they also lost more planes and had a higher death toll than while under the scrutiny of the perfectionist Bennett (Sholto 1960).

3.2.2 Eastern Air Command

Often less discussed in relation to the war effort in Gander is the role of Eastern Air Command in Anti-Submarine Warfare (ASW). Gander itself is an inland community and the only U-boat 'incident' in the area was a reported sighting in Gander Lake that turned out to be a couple of Newfoundlanders bringing a heavy oil drum across the lake. The weight of the drum sank the dory to a level where, in the fog, it had the appearance of a submarine (Tibbo 1997). Nonetheless, Gander played an important role in the protection of the convoys and hunts for U-boats in the Atlantic Ocean.

Eastern Air Command consisted of RCAF bases at Sydney, Nova Scotia, Gander and Botwood in Newfoundland, Charlottetown and Summerside, in Prince Edward Island, and Gaspé, Quebec (Douglas *et al.* 2002). The goal of EAC was to provide air support to the convoys crossing the Atlantic to complement the efforts of the escort service. Added to this, EAC had a greater role in searching for and hunting U-boats away from the convoys, as the Corvettes of the RCN were better suited to remain with convoys for the crossing.

Early in 1941, the RCAF 10 (Bomber-Reconnaissance) Squadron based at Gander consisted of fifteen Douglas Digbys, aircraft with a maximum patrol range of 350 miles in clear weather. This was a small distance considering the amount of ocean to patrol. The RCAF were understaffed and limited in the amount of crew they could have for EAC, having to send all but "136 pilots, thirty-four air observers, and fifty-eight wireless operators (air gunner) every year to RAF or RCAF squadrons overseas" leaving few personnel for squadrons based in Canada and Newfoundland (Douglas 1986). The RCN also did not give EAC high priority, and did not understand that the aircraft were there to protect the convoys, even if that sometimes meant not being present at the convoy itself. For instance, Douglas (1986) mentions an incident where the RCN complained of the lack of aircraft over the convoy not for protection reasons, but because the aircraft made a good point of reference for the ships to gather. In this particular case, 10 (BR) Squadron were searching for U-101 as a means of protecting the convoy, which illustrates the lack of communication between the two forces, and the misunderstanding by the RCN of the actual role of EAC.

The RCAF in Gander was not always considered to be a priority by the decision makers who allocated crew and supplies. Gander often suffered from a lack of facilities and experienced crews. Added to this were the difficulties of living at the air base in Gander. Similar to the Ferry Command pilots who would get stranded in Gander for days waiting for clear weather, EAC crews also had weather-related downtime (Douglas 1986). Unlike Ferry Command, EAC were in Gander permanently, and would have to regularly face poor weather. Many battles between U-boats and the escorts received no aerial support because the aircraft were grounded due to fog, harsh winds, or heavy precipitation. Once in the air, aircraft again had to battle the elements, often facing strong headwinds when returning from the North Atlantic. Fuel had to be closely monitored to ensure that, even in the strongest winds, Gander and, in case of heavy fog in Gander, the secondary airbases, were within range, thus reducing the effectiveness of the bombers (Douglas 1986; Douglas *et al.* 2002).

Eastern Air Command often pushed to have long range bombers stationed in Gander as such aircraft became available (Douglas 1986). However, because Gander was not seen as a priority early in the war, it continued to operate with Digbys and Catalinas, even though the British Cabinet's Anti-U-Boat Committee had designated the Liberators as the most suitable heavy bomber for ASW (Douglas *et al.* 2002). Even when the RCAF had the opportunity to utilize the Liberator stationed in Iceland during the winter months, when operations ceased at the Icelandic base, they had to turn it down. There were no facilities to house the large bomber, and those facilities planned were to be used by Ferry Command, not EAC (Douglas 1986). Eastern Air Command often had to utilize the less efficient equipment, such as Catalinas, when Liberators were being constructed. Both aircraft had similar ranges, but the Liberators were faster and could carry eight depth charges, instead of the two carried by Catalinas. As improvements were being made to the Liberators, eventually turning them into very long range (VLR) aircraft, the size of the Atlantic was reduced, giving the convoys air support for most, if not all, of their journey, but it was not until 1943 that Gander was allocated such aircraft (Douglas 1986).

As previously mentioned, personnel were also not a priority for the base. Many of the pilots were inexperienced, received poor training, and suffered from long periods of inactivity due to U-boat stillness and poor weather. New policies were not always enforced concerning tactics and instructions, and standards for the professionalism of crew was often low. The low standards were often blamed on the lack of training and training facilities for the crew, but in some cases were blamed on the harsh Newfoundland environment. Many of the early base diaries for

Newfoundland, Gander included, seem to focus less on tactics and warfare, and more on social and environmental distractions, such as social events, weddings, and the weather. Some of this may have been influenced by the civilian nature of Ferry Command, operating from the same base. According to Douglas (1986), the inadequate facilities, boredom and inhospitable environment seemed to be more of an enemy. This sometimes led to mistakes being made in the air, such as basic mistakes in dropping depth charges and unsuccessful prolonged searches, errors that more experienced pilots, or better equipment, should have prevented (Douglas 1986; Douglas *et al.* 2007). The RCAF attempted to exchange pilots with the RAF Coastal Command units, but, as the RAF saw Coastal Command as priority, nothing came of this (Douglas 1986). In contrast, Captain H.C. Fitz of the USN found that the RN considered the Canadians to be inefficient, mostly because they "would not take advice or would not benefit from British experience" (Douglas *et al.* 2002, 531).

The relationship between the groups of outsiders at Gander also changed in relation to ASW with the attack on Pearl Harbour. Prior to Pearl Harbour, the USAAF were focused on the protection of convoys, not on the hunt for U-boats (Douglas 1986). This distinction came from the fact that they were not at war, and therefore were acting to protect their own interests, meaning the shipping lanes, without committing acts of warfare (MacKenzie 2004). Therefore, the USAAF could not be counted upon to aid in the sweeps for, or attacks on, U-boats. The Canadian and American air forces had little means of communication. Their codes and radio frequencies differed, and discussions for the future of the NEF in 1941 happened between the RCN and RCAF, excluding the USAAF (Douglas 1986). After Pearl Harbour, the Canadian and American forces at Gander began to work more closely. As they were now part of the war effort, the USAAF were willing to join the hunt for U-boats, sometimes more enthusiastically than the RCAF. In 1943 the motto of the 25th Anti-Submarine Wing of the USAAF Anti-Submarine Command was “to seek and to sink.” This was later changed to better fit with the USN and the RCAF, for whom the protection of the convoys was priority, with hunting U-boats being a close second (Douglas 1986).

Eastern Air Command gained importance both when the United States entered the war and began to focus more on hunting U-boats and when enemy attacks shifted further west, into the St. Lawrence. By 1943, Gander was equipped with fifteen B-17s and a squadron of B-24s (Liberators), and five VLR Liberators. By the end of 1943, so much equipment, facilities, aircraft and experienced crew had been allocated to Gander that Air Vice-Marshal Johnson claimed that there were more VLR aircraft in Gander than necessary which caused further problems for the base (Douglas 1986). This influx of facilities did result in a number of improvements to the Gander airbase, including construction of the 19th Sub Repair Depot. This was an excellent maintenance team that with the help of supplies from the USAAF could easily modify aircraft to fit the needs of the base.

By the end of the war, the role of aircraft (and even dirigibles) in ASW had been recognised, giving airbases such as Gander more than adequate facilities to escort convoys and hunt U-boats in the North Atlantic. By the height of operations at Gander, aircraft were responsible for half of the U-boat sinkings, thus providing safety for the convoys (Douglas *et al*. 2007). For Gander in particular, there were a number of failed attacks on U-boats and enemy ships, and a number of incidents where they failed to even respond, but there were also a number of successful campaigns, such as the sinkings of *U-520* and *U-341* (Douglas 1986; Sarty 2002).

3.3 End of the War

After the war, the RCAF disbanded their station in Gander and control of the airbase was returned to the Commission Government of Newfoundland in 1945 (Higgins and Doran 2007). As Gander was always under Newfoundland control, and not part of the Leased Bases Agreement, American withdrawal was rapid in comparison to other bases around Newfoundland. For instance, The United States maintained their bases in Stephenville and Argentia until 1966 and 1994, respectively, long after they had left Gander and the land was under the control of the Department of Transportation (DOT; Higgins 2007).

The control of the Gander Airport was returned to Canada and the DOT with Newfoundland Confederation in 1949. The airport is still active for commercial and military flight, but the town was relocated in the 1960s (see chapter 6).

Chapter 4: Aviation Archaeology in Newfoundland and Labrador

It is only in the last decade that aviation archaeology has been practiced in Newfoundland and Labrador. In the past, aircraft recovery was conducted without the benefit of archaeology, such as the removal of the fuselage of RCAF Liberator B-24 586 in 1988 from a site near Goose Bay by Tom Reilly and the removal of an RCAF Hurricane near Gander in the 1970s by Ken Beanlands, for restoration and parts respectively (Deal 2013). Today, significant aircraft wrecks, based on a list compiled by Deal and Hillier (2007) are given protection under the *Historic Resources Act.* This act requires a permit to investigate archaeological sites, and forbids the removal of artifacts from a site without a permit and the selling of artifacts. Penalties, such as fines or imprisonment, can be applied to anyone who damages or removes objects from these archaeological sites (Government of Newfoundland and Labrador 2008). This chapter gives an overview of aviation archaeology activities to date in Newfoundland and Labrador.

4.1 Site Formation

An aircraft crash site is formed differently than most other archaeological sites. Site formation is a rapid, often violent occurrence, which immediately results in a debris field (Buck *et al.* 2004; Moore *et al.* 2002). A debris field is "the area from the point at which the first piece of the aircraft or evidence of contact between the aircraft and the ground, a building or vegetation occurs to the point where the last piece of the aircraft or its contents comes to rest" (Richey 2013). Human activities on isolated sites are limited to the rescue/recovery operations immediately after the incident, and rare and occasional visitors to the site (Buck *et al*. 2004). Accessible sites are visited much more frequently for a variety of reasons. Human activity on site can be divided into rescue/recovery, scavenging and enthusiasts. Rescue/recovery operations for WWII sites had specific instructions from the USAF or the RCAF to rescue living crash victims, recover the bodies of the deceased, to destroy any sensitive equipment and to determine the class

Table 4.1: Examples of crash categories used by the Royal Air Force (RAF) during World War II. From Robertson 1983.

Years	Abbreviation	Category	Years	Abbreviation	Category
1939-1940	U	No damage	1941-1945	U	No damage
	M	Repairable at unit		A	Damaged but repairable on spot by nearest RAF unit
	R	Repairable but beyond unit's capacity to repair		AC	For repair by contractor's working party
	W	Write-off, repairable or lost		B	Damaged but repairable at Maintenance Unit or contractor's work
				C	Destroyed but of salvage value
				D	Burnt out but salvage value
				E	Complete write-off and no value except metal salvage

of the crash. This subsequently determines if a wreck is to be recovered and recycled or abandoned (Table 4.1; Hollis 1960; Robertson 1983). Rescue/recovery operations often had to set up camp at remote sites, leaving evidence of their activity. Scavengers come to the site in the hopes of finding material to reuse or sell (Buck *et al*. 2004; Deal 2004; Gould 1983). Parachute material could be used for sails, rope and cord reused, and aluminum, copper and steel recovered and sold to scrap dealers. Perishable items, such as textiles, have to be recovered within a couple of years after a crash, but the metals tend to still be in salvageable condition decades later. Fortunately, many scrap dealers around Newfoundland, particularly in Gander, have agreed to no longer buy scrap from aircraft wrecks.

Finally, there are enthusiasts. Aviation enthusiasts are known to visit crash sites, sometimes in remote locations, and remove pieces of interest such as machine and hand guns, personal effects and recognizable instruments. Popular texts used as aviation guides encourage this activity by telling visitors that unless a wreck is on private property, one must always take home a souvenir (Veronico 1992). Many of the objects end up in private collections which may be kept in personal museums or may be kept in the individuals' house, shed or yard. Enthusiasts are often very helpful and are willing to show researchers what they have collected, but, even if objects are recorded, the original provenience is lost, and in many cases the memory of exactly which site an object came from is lost. Many of these personal collections are under threat of being lost as many collectors age with no family interested in keeping or maintaining the collection.

Although aviation sites are recent within the perspective of archaeological research, there is still sufficient time for natural taphonomic processes to have an impact on the site. Aluminum is the most common material found on a typical crash site, and whether buried or exposed, tends to be in a good state of preservation. On the other hand, in Newfoundland and Labrador, iron tends to corrode quickly, and in wetter environments, such as on the surface of a bog, is greatly deteriorated. In a bog, pieces can sink, and while they are well preserved, if the depth of the bog is too great the pieces may be inaccessible and can only be recorded as metal detector finds (Deal 2009). Forested areas have different problems, such as root activity, the growth of moss and animal activity. Sphagnum moss is common in Newfoundland and Labrador, and will cover smaller and

Figure 4.1: Aerial view of an RB-45C crash site near Goose Bay. Source Google Earth.

flatter pieces. The moss does preserve materials, such as textiles and paper, which, if exposed, will weather over time. Paint, fabrics and other materials and information will deteriorate due to elemental exposure. In other cases, the accident can be so violent that nature has not yet had an opportunity to retake the area and the wreck can still be seen from the air, and in a few cases via satellite, as is the case with a USAAF RB-45C, a jet bomber used from 1948 until 1959, which crashed near Goose Bay, Labrador in 1951 (Figure 4.1).

4.2 Identifying Site Disturbance

A significant problem at the outset of this project was being able to assess the level of disturbance to a site. In particular, crash sites are created in a single, violent event, and pieces will be burned, buried, torn and shattered. Being able to distinguish crash damage from that created by site visitors becomes easier as more sites are visited. The Eagle crash (DgAo-01; see Section 4.4) was a good starting point for identifying post-crash damage. As the site became better known more people were coming to the site and causing disturbance. For instance, a nearly complete turret was located on site, but was too large for the team to transport back to St. John's. Later in the year, when archaeologists returned to finish mapping the site and to open excavation units, the turret was found to be badly damaged and no longer salvageable as a museum piece. Seeing the various ways in which damage can be done to aviation materials without breaking the metal and exposing a shiny surface illustrated that damage can be easily missed on aviation sites.


Figure 4.2: Typical evidence of crash related damage seen here atDfAp-07. Photo by author.

The greatest risk and problem with crash sites involves the metal being scavenged for scrap. Generally, if an area has been scavenged, the only material remaining would be that which cannot be sold for scrap in Newfoundland and Labrador, such as the case with the B-17 off the Trans-Canada Highway (TCH; DfAp-08; see Section 4.5.9). Pieces removed and transported around the site, or evidence of pieces removed, are often clear on aviation sites because the tools used to take apart the metal can leave clear marks. Axes seem to be favoured on such sites, and any cut made in the past few years will often leave sharp, jagged edges that differ from the straight sheering or almost zippered separation that can happen during a crash (Figure 4.2; see Figure 5.7). Similarly, aircraft are often marked when visited (see Figures 5.15 and 5.16), as can be seen in the case of the Digby (DfAp-10; see Section

5.1.2), Ventura (DfAo-01; see Section 5.3.2), and other aviation sites around Newfoundland and Labrador, such as the B-36 Peacemaker, a strategic bomber which crashed in poor weather, in Burgoyne's Cove (DbAj-01) and an RB-45C outside of Goose Bay (Figure 4.3). Sites that do not show much, if any, graffiti, were salvaged shortly after the crash and not by subsequent visitors to the site. Just because there is little on site, does not mean that the site was visited to be scavenged. The B-25 and A-20 sites gave no indication of later site visitors, no evidence of the removal of either metal or any odd pieces lying outside the boundaries of the site, except of course the B-25 engines removed from the site (Figure 5.14; see Section 5.9.1). The closer and more accessible a site to the Gander Airport, the more likely it was that the military had removed useable and sensitive material from the site. One clear indicator that objects were removed by the military and not the public is the nature of scavenged material. Scavenged sites are characterized by rusted iron and steel and most, if not all, of the copper and aluminum has been removed. A site cleaned after the crash by official personnel will have pieces of aluminum of varying sizes which could, even on the most isolated sites, be removed and sold. Looking at pieces of interest can also indicate the level of scavenging or visitation. Aircraft

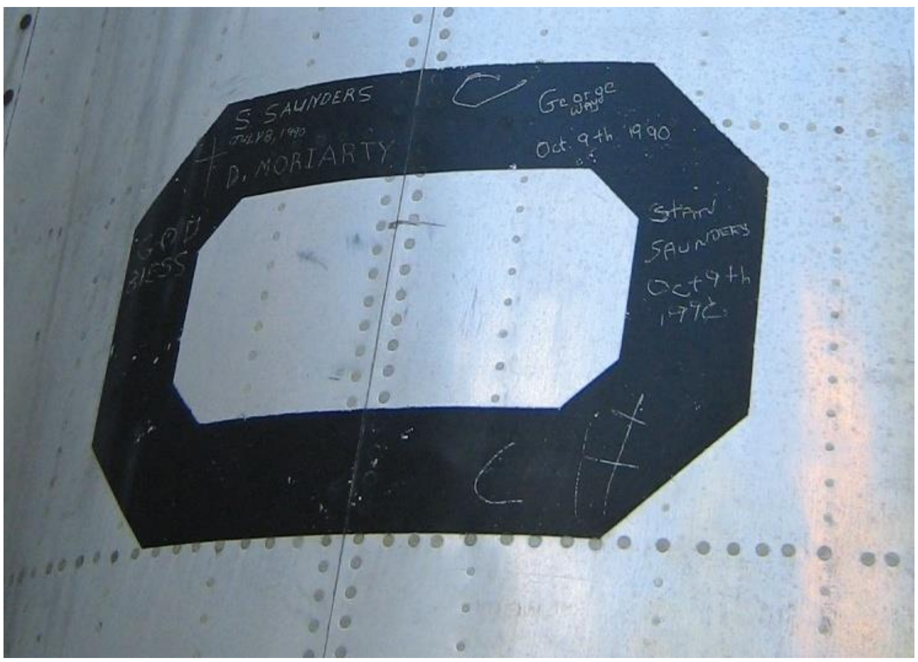


Figure 4.3: Graffiti scratched into the paint on an RB-45C which crashed near Goose Bay. The site is relatively isolated and difficult to access, but evidence shows a number of visitors. Photo by author.

enthusiasts will often visit sites and will not recover material to sell as scrap, but instead will collect objects for their own personal collections. Certain objects are of greater interest to enthusiasts, such as machine guns, bomb release mechanisms and personal effects. Therefore the aircraft remains must be examined for their condition, their material and collector value to determine if the site is at risk.

4.3 Identifying Sites and Aircraft

Records are vague for exact locations of aircraft, even when details are given for the crash location. For instance, according to the reports available at www.aviationarchaeology.com, the B-17 in the Thomas Howe Demonstration Forest (see Section 4.7.9) is located two miles south-west of Gander. The assumption is that Gander means The Newfoundland Airport, but the specific building to take direction from is not indicated, nor is it still standing. As well, two miles is an estimate, as is the direction. In most cases, only the nearest town to the crash is identified, with no indication of where the aircraft landed within that area. As aircraft are often difficult to locate and identify, positive identification often comes from aviation enthusiasts who remember the site when it contained more material that could be used in identification. The Hudson discussed in section 4.7.4 was narrowed down by enthusiasts from a list of RAF crashes in Gander in Christie (1990) then identified through records in the RAAF archives. Most sites are identified through local informants. Many people in the area have visited these sites before they were destroyed, and have collected the stories and recollections of others who remember the site and could positively identify them. Without such information, it would be impossible to identify some aircraft because so little remains that could identify the specific craft.

4.4 Previous Work in the Province

The first example of aviation archaeology in Newfoundland and Labrador was the recovery of a B-24 bomber by Underwater Admiralty Sciences (UAS), a Washington based company, with the archaeological assistance of Roy Skanes. This project involved the location, and recovery of a submerged B-24 Liberator from Dyke Lake near Labrador City. The archaeology in this project was relatively limited, seeing as the aircraft itself was underwater, but the camp used by the crew was located and recorded and the recovery operation was monitored and recorded (Skanes 2005). UAS returned in 2008 to recover an A-20 Havoc (FbCj-01) 73 km outside of Goose Bay. This time they were accompanied by an archaeological crew from MUN and the site was surveyed in detail, taking care to record the location of the aircraft and get aerial photographs prior to its removal. The debris field was recorded by archaeologists, and some artifacts of importance (e.g., a survey camera that had been mounted to the underside of the wing of the aircraft) were recovered for conservation and potential museum display (Deal 2009).

In 2005, Michael Deal led the excavation of CjAe-61, the remains of a Ventura near the St. John's airport[3]. This site involved smaller pieces in a more concentrated area, and was recovered by marking the site out in a 31 square meter grid and collecting from each grid by 20 cm units (Deal 2006b). Deal, with Bob Maher of Atlantic Historic Aviation Recovery Association (AHARA), surveyed the crash site of RCAF B-24 Liberator 586 (FgCb-01), located outside of Goose Bay. Much of the fuselage of this crash was removed in 1988 by Tom Reilly of the Flying Tigers Warbird Air Museum, Florida, but recovery was halted due to lack of a permit. The pieces

[3] St. John's, as the capital of Newfoundland and Labrador, has a higher population density than the rest of the province, and a greater likelihood that crash sites have been visited and scavenged. Plus, the area is fairly rocky and barren, although boggy, which would have made recovery easier during the war. Gander was still the largest airbase at the time, with the greater number of aircraft using the area, leaving the Gander Airbase with the higher number of crashes.

removed sat in Goose Bay for a number of years before being shipped to Gander and placed in storage on the Gander International Airport Authority (GIAA) property. This aircraft is of significant historic importance, having two confirmed U-boat kills in the Battle of the Atlantic, and features scars from these and other battles (Deal 2010). Given the state of the recovered pieces, the aircraft is of interest to AHARA as a potential restoration project. In 2008, a survey was done of the site, more of the aircraft was recovered and stored in Gander, and, whenever the wings are recovered, restoration of the aircraft can begin (Deal 2009). An extensive archaeological survey project, supervised by Deal, was undertaken in 2007 on a B-24 Liberator (DgAo-01, also referred to as the Eagle site or Dolan site) near Gander. This site was recorded, mapped, and analysed to fill in some of the gaps in the accident report, namely, some of the mechanics of the crash and what happened to the APQ-7 radar equipment which the aircraft was transporting. Much of the radar, which was not mentioned in the incident report, was recovered by archaeologists. The research was also shared with the son of the pilot, William Dolan Jr., who came to Newfoundland to learn about his father's crash. The Dolan family was never given straight answers about the crash at the time and for years later, nor were the other family members of the dead crew. The official documents the family were given did not explain the crash, and because it carried top secret material, details about the flight could not be released. The archaeology answered many of the questions the Dolan family asked since the crash, and while not all questions were resolved, the research and site visitation did give Mr. Dolan closure. In addition, Dolan’s memories of his father, including remembering watching the aircraft depart and the trouble the family had finding information about the crash through official and unofficial channels, helped researchers better understand the personal side of the crash and the impact that it had on one of the then families who lost loved ones in the crash (Dolan, pers. comm. 2009). In 2009, a crew from the American Joint

POW/MIA Accounting Command (JPAC) worked in Botwood in an attempt to locate and recover human remains still on the Excalibur, a VS-44A which crashed 03 October 1942. Two of the four sets of MIA remains were located and some personal effects recovered (JPAC 2009).

Finally, some brief comments are in order on post-war sites outside of Gander that have been visited by the author. In 2008, after the recovery of FbCj-01 was completed, a hike was made to the location of an RB-45C[4] bomber that crashed near Goose Bay in 1954. This site was located and recorded, but not surveyed. Pieces of research interest and museum quality were marked, recorded and removed for conservation and preservation. In 2012, a 1946 American Overseas Airline (AOA) DC-3 (DbBo-02) civilian crash site in Stephenville was located, and surveyed to a limited extent. GPS readings were taken throughout the site, and some pieces were recorded and recovered (Daly and Green 2013). In both of these cases, the site locations were very isolated and very difficult to access, but the photographic records, and knowledge of the location and condition of the wreck are of benefit to the archaeological and aviation community. A USAAF C-54 (DcBt-01) that crashed on 12 November 1944 on the Port-au-Port Peninsula was briefly surveyed in 2013. The site is on a marked trail and minutes from the road and very little remains on site.

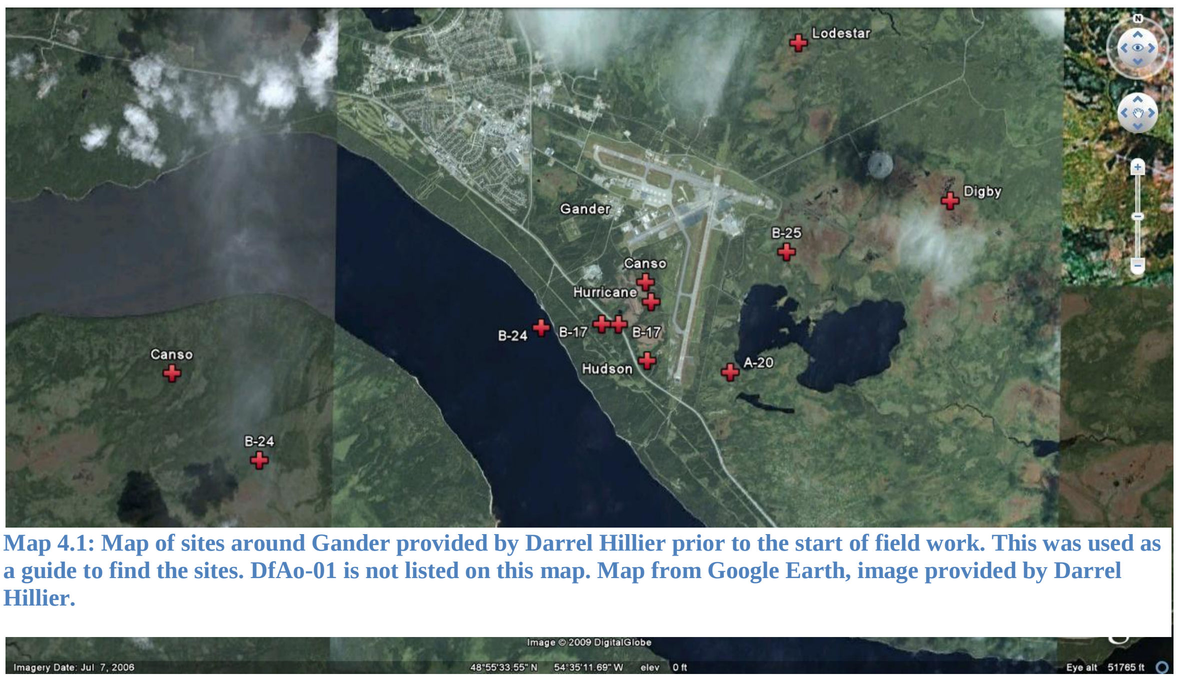
4.5 Future of Aviation Archaeology in Newfoundland and Labrador

Aviation archaeology is still a new field, and with the high number of crashed aircraft and other aviation resources such as airstrips and infrastructure buildings, around Newfoundland and Labrador there is still a great deal of work to be done. The next chapter discusses the sites covered

[4] See Appendix B for a list of the aircraft types in this paper, including images and aircraft specifications.

in this thesis, but these are only some of the sites that are known around Gander. Still relatively well-known in Gander alone are two USAAF B-24s and a RCAF Canso on the other side of Gander Lake, an RCAF B-24 in Gander Lake, another B-24 that was a return Ferry Command flight west of DgAo-01, and the aforementioned RCAF Havoc that was recovered for scrap (the engines are rumoured to still be on site). There are rumours of other sites around Gander, often found on hikes or hunting trips, and further research could find and identify these sites (Map 4.1).

Outside of Gander there are still many aviation resources. A similar survey to this one could be undertaken in relation to the Stephenville airport, with a number of aircraft around



Map 4.1: Map of sites around Gander provided by Darrel Hillier prior to the start of field work. This was used as a guide to find the sites. DfAo-01 is not listed on this map. Map from Google Earth, image provided by Darrel Hillier.

Stephenville and the Port au Port peninsula surveyed and recovered. Stephenville is only now starting to look into the history of the airport and the aircraft wrecks in the area, and has recently opened the Stephenville Regional Art and History Museum, dedicated to the area's history. Research conducted so far has been shared with the museum and they are keen to work with archaeologists to further enrich their library and collection.

There are also aircraft of historic significance that should be recorded. For instance, although there is very little that remains, surveys of the USAAF B-26 that crashed in Saglek Bay on 10 December 1942 would preserve what is left of this site. The survivors of this crash lived for almost two months waiting for rescue before succumbing to the elements (Cardoulis 1993). A diary relating to this crash is on display in the Military Museum in Goose Bay, but the site itself has not been surveyed. Similarly, the site where Dr. Frederick Banting died has not been surveyed. The site has been heavily scavenged, with the aircraft having been removed and pieces distributed to private collections, but the site itself could potentially yield further information. Even if little information can be recovered from the site, the publicity of archaeologically investigating the site could bring some of the recovered pieces of the aircraft into the care of the province of Newfoundland and Labrador. The context of these items may be lost, but as it is such a historically significant crash (not only for the death of Banting but also because it represents the first airplane crash fatalities in Newfoundland), having any artifacts related to the crash in the care of the province would benefit the public as a whole.

Crashes are not the only resources available, and, if safety allows, abandoned areas of airbases can also be examined, such as Elliston Ridge in Bonavista, a USAAF base that was reportedly buried when it was abandoned, or the anti-aircraft batteries that were scattered all around the province[5]. Ideally, all aviation archaeology sites around Newfoundland and Labrador should be surveyed and recorded, to obtain an idea of the quantity of aviation sites around the province, to better monitor and protect them from scavenging, and to better preserve them.

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[5] While not the location of aircraft, anti-aircraft batteries could be considered to be part of aviation archaeology as they were built to defend from aerial attacks, making them dependant on aviation and therefore under the heading of aviation archaeology.

4.6 Investigating the Wrecks of Gander

The crash investigation aspect of this project began with a list of sites around Gander, NL, provided by Darrell Hillier in the form of a GoogleEarth map and brief description (Map 4.1). The locations for these sites were approximate, since they were visited before the easy availability of handheld GPS units. Based on the list given, the sites nearest to the Gander International Airport Authority (GIAA) would be the most likely to be investigated. The sites on the western side of Gander Lake would be significantly more difficult to access. The Ferry Command Ventura (AfAo-01) was one of the furthest sites from the GIAA, but the site had been recently visited by Michael Deal and members of AHARA, so coordinates and general directions were available. In the end,

Map 4.2: Location of all of the sites investigated in this project. See Map 4.3 for insert. From MapSource

10 aircraft crash sites were chosen for the present survey (Maps 4.2 and 4.3). They are reported below based on the date of the crash.

Map 4.3: Close-up of the locations of the sites closest to the Gander International Airport. From MapSource

4.6.1 Recovery Methods

Methods for aviation archaeology are varied and poorly documented. An aircraft can crash anywhere but those in accessible locations were recovered during the war. Those that have become accessible with the construction of new roads have been stripped for scrap metals and other useful materials. In the United Kingdom, aviation archaeology sites are often aircraft that have been found along coastlines or recovered from lake beds. In the United States, Cold War sites are often in isolated desert or forested areas. JPAC reports that their work in South East Asia brings them to dense jungles that are miles from the nearest villages. In Gander, sites are in forested areas, bogs, or on the border of bogs and spruce forests. Therefore, there can be no set methods to use for aviation archaeology. Instead, methods are derived from the previously mentioned documented sources, as well as modern accident investigation methods and archaeological techniques that the author and team have determined, on a site by site basis, to best document aviation sites.

This section will outline the methods used for aviation archaeology in Gander, followed by a site by site description of the methods and justification for any deviation from this formula. The main methods relied upon have come from Deal (2006b; 2008; 2009; 2010; Deal *et al.* 2012) and forensic investigations of WWII and Cold War aircraft (Buck *et al.* 2004; Holland and Mann 1999; Hoshower 1997; Hoshower-Leppo 2002; Moore *et al.* 2002; Webster 1998) as these sites are the most similar to those in Gander in that they are relatively remote, generally surface crashes, generally high impact, and have been later disturbed by site visitors. Underwater and coastal techniques used by British archaeologists have been consulted, but in general, do not offer methods useful for these specific sites. Similarly, techniques used by the Federal Aviation Administration and the National Safety Board have been reviewed and used where possible. However, the level of man power and technology used in a modern aircraft disaster is not available for this project and because these sites are approximately 70 years old, such detailed analysis would not add much to the investigation (Hacker 2007).

4.7 Recovery at Gander

The principal goal of this project was to record and inventory the aviation archaeology sites around Gander, Newfoundland. Therefore, the methods focused more on the recording and history of sites, and less on the recovery of artifacts. The main survey goal was to establish the spatial parameters of each site, the level of site disturbance, and assess the stability of the artifacts *in situ* (Tuttle 2011). In most cases, few artifacts have been recovered and most of the aircraft pieces have been left on site and recorded as features.

As the main goal was to map and inventory sites, aviation sites were first located using local knowledge as a primary source. Locations were often refined using Google Earth as some sites are visible with this program (e.g., DfAp-10; see Section 4.7.1) or informants provided approximate locations using the program (see Map 4.1). Once a site was located, it was walked over by researchers to establish the boundaries and the best location for a datum. A datum was established to best view and map the site. On larger sites, a secondary datum could be established along the grid line to ensure accurate mapping of the entire site. Measurements were then taken from the datum using one of three methods: first, a surveyor's level and stadia rod were used for open sites, or sites where trees can be removed for accurate measurements; the second method was for sites of either high or low artifact concentration, where a line and compass were used to measure points. The third method was for extremely inaccessible sites with dense forest where neither a surveyor's level nor measuring line could pass through the trees clearly. In these extreme cases, features and artifacts were recorded using a 2007 Garmin etrex Venture HC handheld GPS.

As each aircraft fragment was measured and recorded, it was photographed, and wherever possible, turned over. In many cases, more fragments or instruments might be located under pieces, or turning over a piece would reveal markings to identify the aircraft or other points of interest. Not all pieces could be turned over, due to their size (e.g., aircraft wings), weight (e.g., engine components), or danger (e.g., pieces on unstable ground). In the case of larger pieces, multiple points of measurement were taken to get a better indication of the site distribution.

After each field season the data collected was compiled in a feature and artifact catalogue using Excel. A field reference point was assigned for each piece until a Borden number was assigned to the site. Each feature and artifact was recorded along with a description and its location on the site. Later, an image was inserted for each piece. Information was then converted and plotted on an X-Y axis using Surfer 8 or MapSource for GPS coordinates. Depth was recorded, but in most cases it does not add extra information to the map besides the layout of the terrain (sites are all one event therefore depth does not give a timeline). In the case of the more complete sites, the map gives information to add to the historical record and to determine the crash mechanics. In the case of sites that have been heavily recovered and scavenged over the years, the map serves as a visual reference for the inventory of the site and a tool for locating and identifying features on the sites.

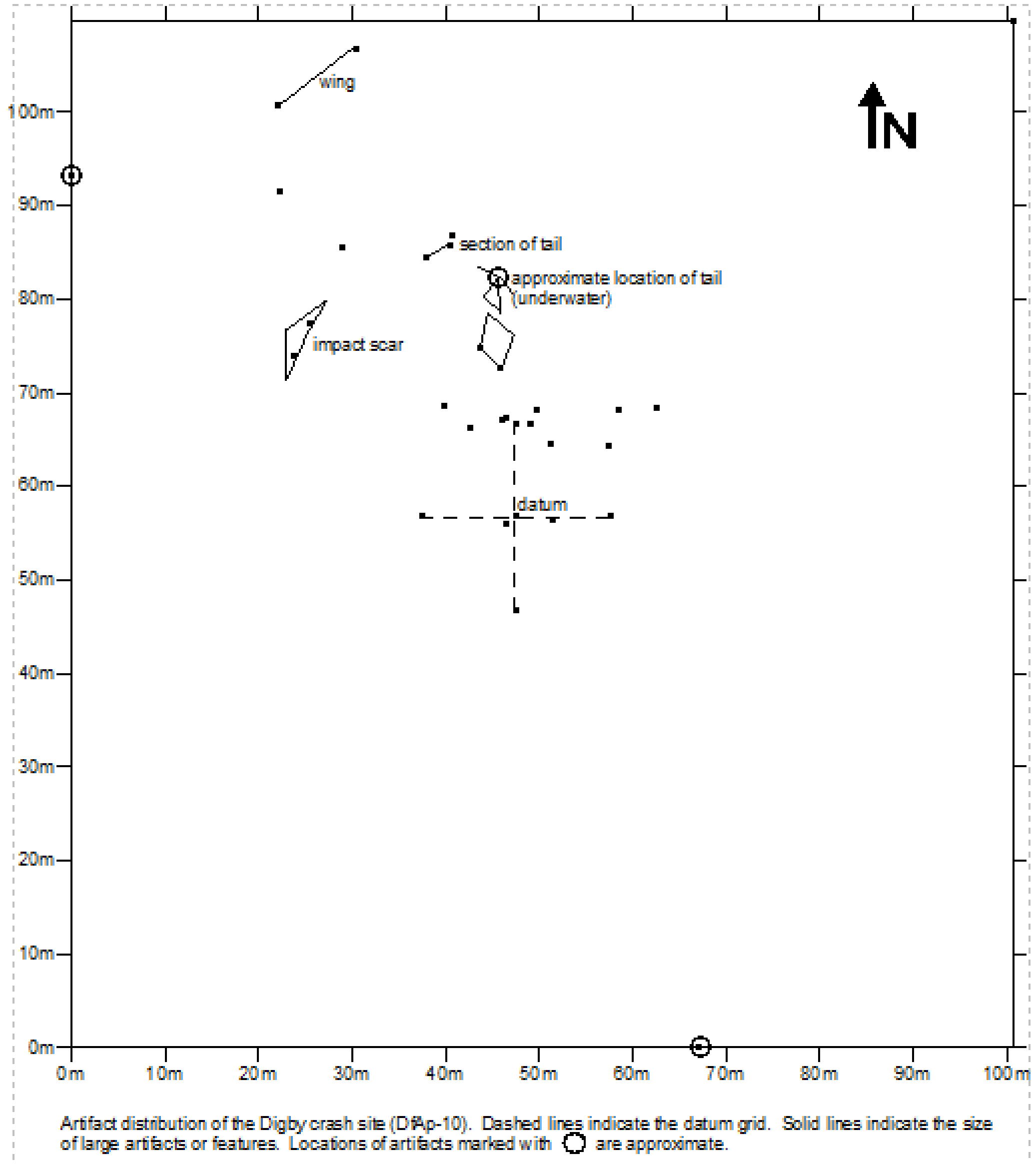
This basic methodology was the basis for each site visited in Gander, but was often not followed exactly. Each site had different features which meant that the methods were a guideline and each site required specific methods to ensure the most complete recording of possible artifacts. Variations in methodology will be described in detail for each site.

4.7.1 RCAF Douglas Digby 742 (DfAp-10)

The site is located in a bog beyond the Circularly Disposed Antenna Array (CDAA), locally known as the Turkey Farm, and must be accessed carefully. The area around the aircraft is unstable and damage done by the crash is still visible. These areas, especially where the wing struck and the fuselage landed, are very unstable and in some areas cannot be reached safely. The area is very flat, and with a small amount of wind it was impossible to hold the measuring tape straight enough to get an accurate measurement. Therefore, all measurements except those immediately next to the surveyor's level were taken from the stadia rod. The surveyor's level was set up away from the main area of wreckage and away from the larger concentrations of artifacts. This was contrary to the methods used at every other site in this project due to the unstable nature of the bog. The datum point was chosen for stability rather than convenience for artifact measurement. The bog was still unstable even around the datum, and with every measurement the level was checked for accuracy. The instrument height was also checked to make sure the level was not sinking with the weight of the surveyor.

This site was problematic. Essentially, what was visible was floating on the bog. Small pieces were light aluminum and larger pieces were wide enough that they had not yet sunk into

Figure 4.4: Measurements for the fragments of the Douglas Digby found where the wing struck the bog had to be estimated due to the instability of the area. Photo by author.



Map 4.4: RCAF Digby 742 distribution. From Surfer 8.

the bog. Standing on some of these larger pieces in an attempt to get multiple measurements, such as from both ends of the wings, was difficult because the pieces would shift and sink under the weight of the archaeologists. Many measurements had to be approximated due to the shifting pieces. In the case of the pieces in the cut made by the wing and the tail of the aircraft the direction could be read off of the surveyor's level but distance had to be estimated (Figure 4.4). Similarly, there was a single piece in a pond 75m from the datum. This piece could not be clearly seen through the level, so rather than estimate both distance and direction, the piece was measured using Google Earth from the datum coordinates. A grid line was established taking measurements in each compass point at 10m to have a baseline for the elevation of the site, but measurements taken with the measuring tape beyond 10m would have been inaccurate due to the winds. The elevation did not change much around the site. A site map was created to show the distribution of debris (Map 4.4).

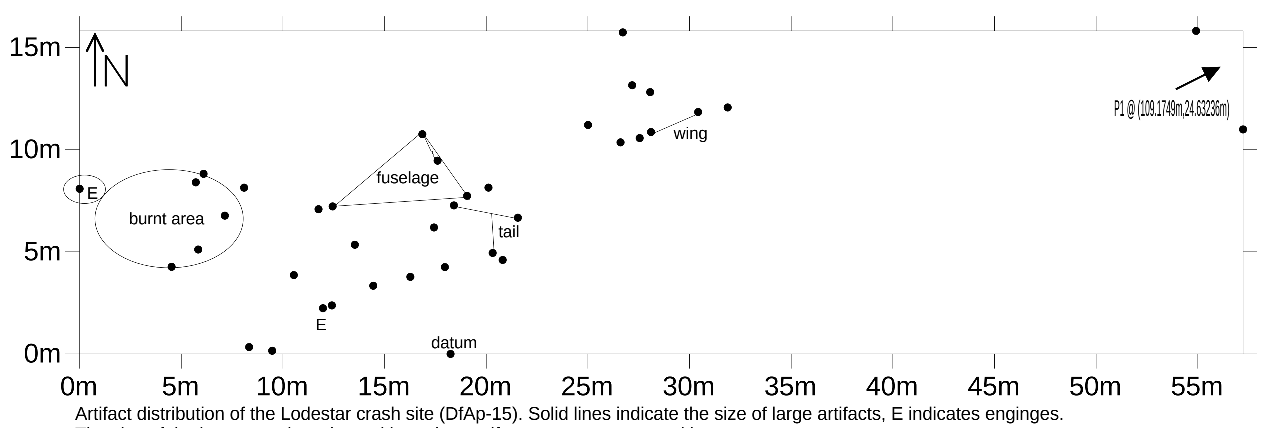
One artifact was collected from the site. A control panel was visible near the fuselage on a small clump of vegetation in a pond (Figure 4.5). Its position was measured as closely as possible, and the control panel was removed. As of 2013, it is being stored at the Department of Archaeology, Memorial University.

Figure 4.5: Pictured centre is the Digby control panel *in situ*. Photo by author.

4.7.2 RCAF Lodestar 557 (DfAp-15)

The Lodestar is located on the edge of a bog between Radio Range Road and Boot Pond Road. It is at the treeline and no aircraft fragments were located beyond the trees. The datum was located in a small grove of trees on the edge of unstable bog, therefore a gridline was not established. Extending the gridline into the bog would have been of no benefit to researchers, and there were enough fragments within the other compass points to negate a specific gridline. The site was then photographed and mapped using a surveyor's level and measuring tape. A couple of pieces were outside the 30m of the tape, and these were measured directly from the stadia rod. All other pieces were measured using the methods above and in the case of large pieces multiple points were taken (Map 4.5).

The only area that was not treated like this was the burnt area at the front of the aircraft. This was a roughly circular area of burnt metal and fragments. It was very wet and contaminated with fuel. The area was searched with the use of long, heavy duty gloves to ensure protection of the skin. Pieces within the burnt area were lifted from the water, photographed, and examined for their value as artifacts. Not everything was picked up for examination as the water would have passed over the gloves. Instead of trying to measure in every piece and burnt fragment in the area for the inventory, it was decided that points of measurement would be taken around the area, and



Artifact distribution of the Lodestar crash site (DfAp-15). Solid lines indicate the size of large artifacts, E indicates enginges.
The size of the burnt area is estimated based on artifact measurements and images.

Map 4.5: Lodestar site distribution. From Surfer 8.

large, identifiable pieces, such as engines, would be measured separately. The area was extensively photographed to give a clear view of the entire burnt area (Figure 4.6).

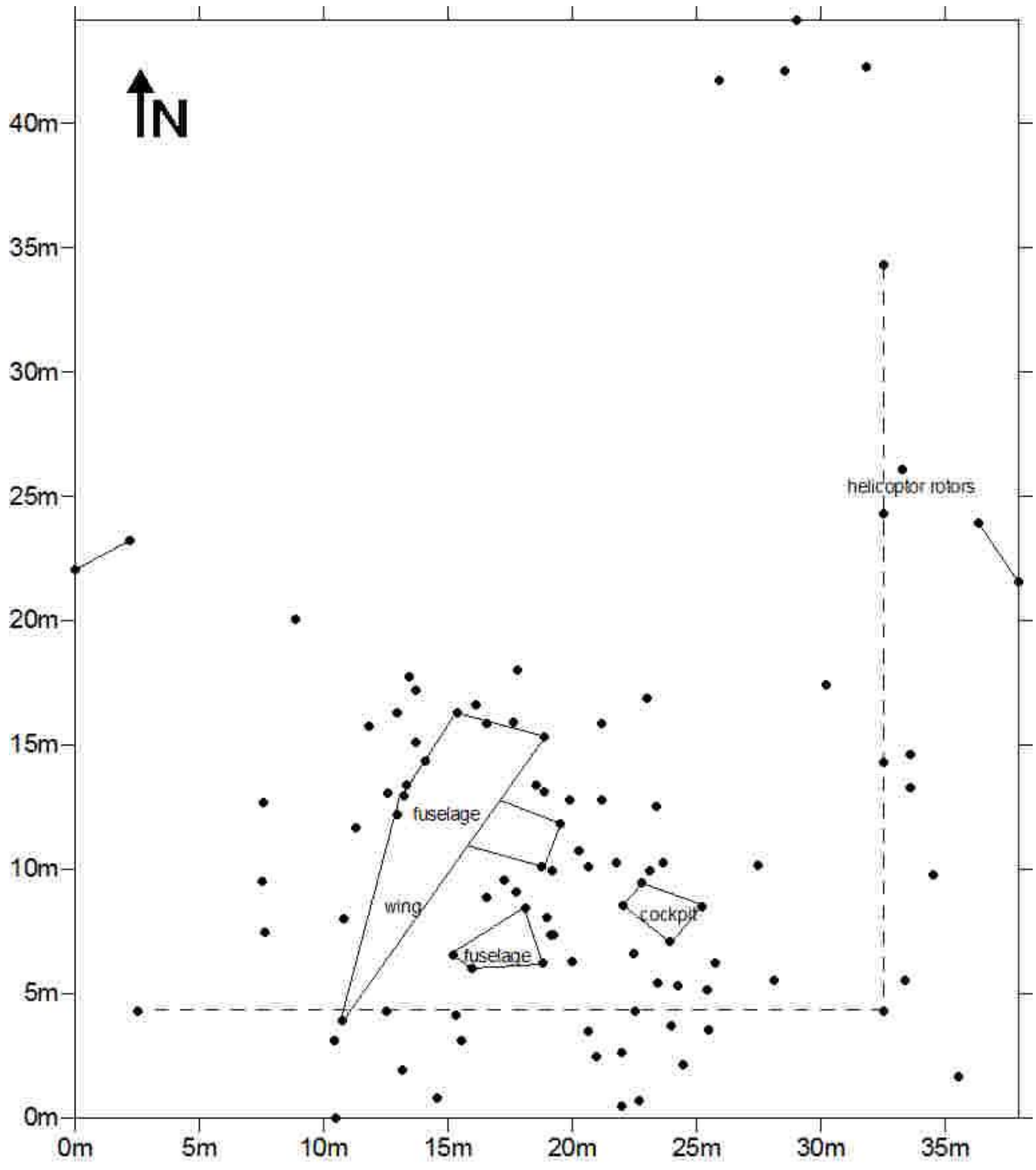
Figure 4.6: Area where the Lodestar impacted. Every individual piece in this area was not measured as the water was fuel contaminated. Photo by author.

4.7.3 Ferry Command Ventura AJ471 (DfAo-01)

The Ventura is in a relatively dry bog, very open and easy to survey. This was the first site to be tested with a Fisher Labs CZ-21 Deep Search Land and Underwater Target I.D. Metal-Detector[6]. While two researchers were setting up the initial gridline (as it was flat, the grid was only extended in two compass directions, the two that best suited the needs for measuring the site),

[6] This was the only metal detector used during this project. From here on the term "metal detector" will be in reference to this specific Fisher Labs CZ-21 Deep Search Land and Underwater Target I.D. Metal-Detector .

a third was testing the area with the metal detector. Once calibrated the metal detector was passed over the majority of the site (except for the pieces that were over 30m from the main body of the wreck) and each hit was marked with a peg. These areas were then dug up until the metal item was uncovered and removed from the bog. These measurements were marked as metal detector finds in the catalogue. Of the 91 measurement taken on site, 25 were metal detector finds. The site was measured using a surveyor's level and measuring tape. There were a few items outside of the 30m that could not be measured from the tape. These were measured directly off the stadia rod, except for a large piece of fuselage that had been cut away and removed from the site. This had been previously measured using a GPS by Michael Deal. Large pieces, such as the fuselage and wings,



Artifact distribution of Ventura (DfAo-01) site. Dashed lines are the datum grid and each point represents an artifact or small cluster of artifacts. Helicoptor rotors are a recent addition to the site and are not from the original crash.

Map 4.6: Ferry Command Ventura AJ471 site distribution. From Surfer 8.

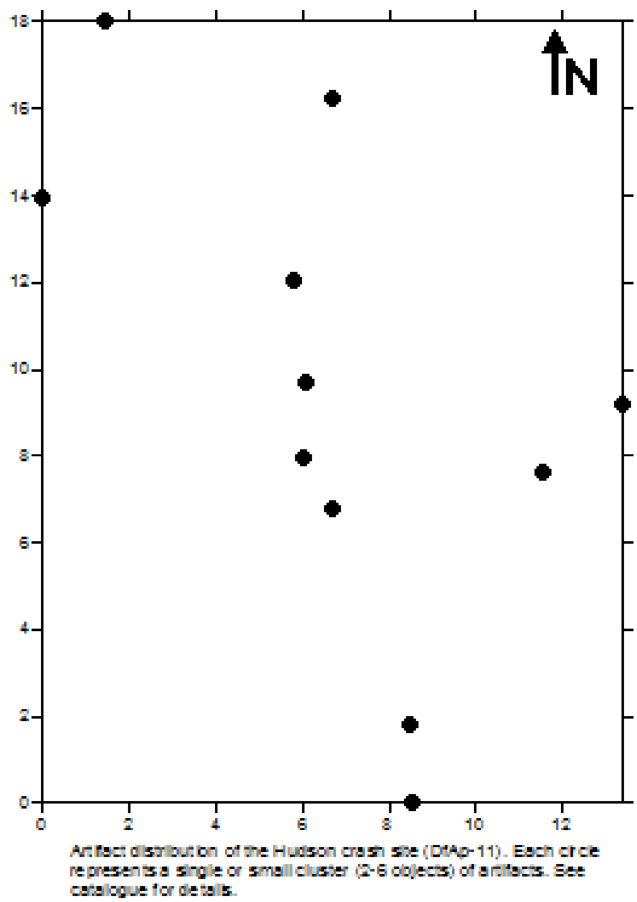
were measured from multiple points to best orient them on the map (Map 4.6).

4.7.4 Ferry Command Hudson Mk. VI s/n FK 690 (DfAp-11)

Figure 4.7: The hydraulic and tank cover collected by Mr. Connors when highway construction threated DfAp-11. Photos by author.

Like DfAp-08, the USAAF B-17 44-6344, the site of the Hudson has been heavily scavenged and very little remains. The location of the Hudson is very close to the TCH, and originally the highway was supposed to pass over the crash site. Because of this, the public were encouraged to visit the site and take pieces of the aircraft as souvenirs or scrap (Figure 4.7; Bryan Connors, pers. comm. 2008). Mr. Connors allowed researchers to view and photograph a hydraulic gear and a cover that he recovered during this time, but like all pieces recovered, the original context is lost. Ultimately, the highway did not pass directly over the site, but, the road to the Commonwealth War Graves Commission (CWGC) does potentially pass over some of the wreckage. Another reason for the lack of material culture could be that wreckage was bulldozed to one side when clearing for the road, but the cache was not found by researchers. Informants have said that there is at least a landing gear on the east side of the road to the War Graves, but researchers could not find it in the thick alders growing on that side (Darrel Hillier, pers. comm. 2010). That is not to say that the landing gear or other aircraft fragments are not present, just that the alders are so thick that it was not found.

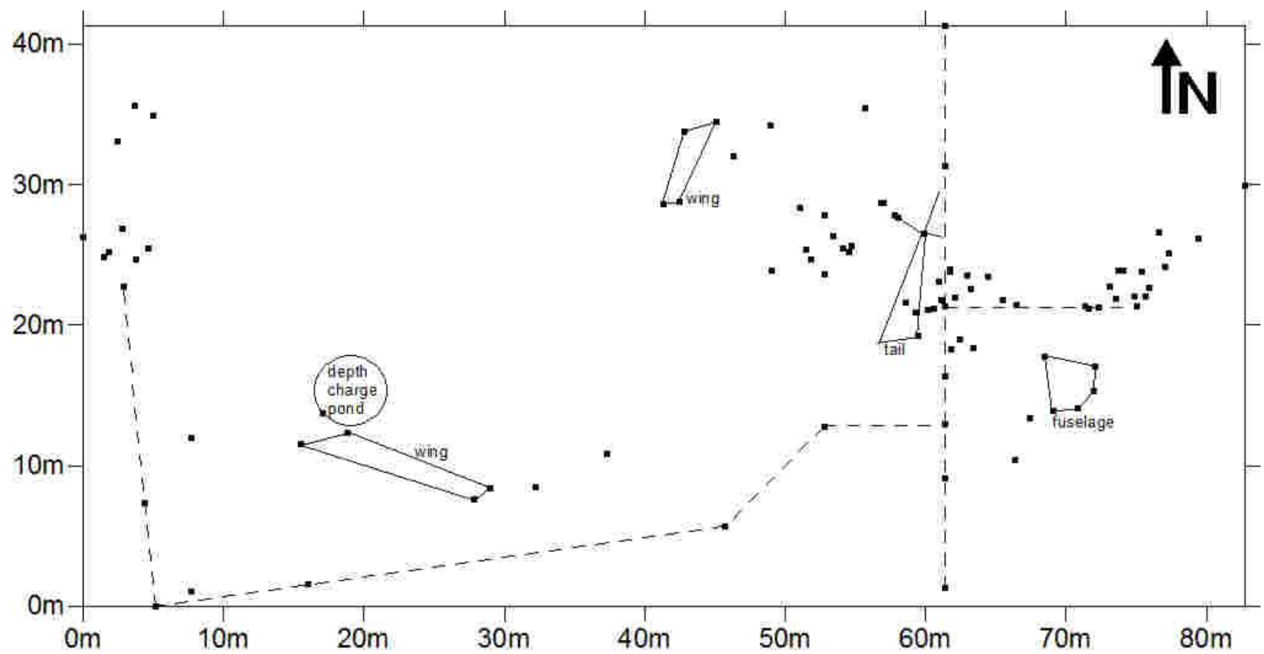
The site was inventoried using a compass and measuring tape. There was very little remaining on the site (Map 4.7), and while a surveyor's level and stadia rod could have been used, the site was forested enough that to get a clear view of all of the points from the level some of the trees would have had to be trimmed. For the limited material information available from the site, it was determined that adequate information could be obtained using the line and compass method. The site was revisited in 2011 and further expanded using the metal detector. Metal detector hits were, for the most part, uncovered and measured in to add to the site map. Some hits were found near the drainage ditch at the edge of the highway and limited searching was done for these pieces due to pollution and the expectation that most of what would be found would be debris from the highway.



Map 4.7: Hudson site distribution. From Surfer 8.

4.7.5 RCAF Canso 98107 (DfAp-07)

Of all of the sites included in this report, the RCAF Canso, located near the airport, is the most complete. The site was shown to researchers by Harold Pelley in 2009. At that time, pictures were taken and the site walked but nothing was measured or removed. In 2010, the site was again walked to establish the best location for a datum. The datum was placed in the area of highest artifact concentration and with relatively clear lines of sight to be able to expand the grid. Initially, a base gridline was attempted by measuring at 10m intervals up to 30m on each compass point. This became impractical as all but one gridline was interrupted by uprooted trees, aircraft and a river. Measurements were taken as near to the 10m points as possible, but given that the grid was later expanded any information achieved with the base gridline (e.g., elevation) can be established from the rest of the grid around the site (Map 4.8).



Distribution of the RCAF Canso crash site (DfAp-07).
Dashed lines represent datum grid, points represent aircrafts or clusters of artifacts (see catalogue).
Points connected by solid lines are the basic outlines of large aircraft fragments.

Map 4.8: RCAF Canso 98107 site distribution. From Surfer 8.

Once the gridline was established, artifacts were located and uncovered. Leaf litter, moss and dirt were removed from the surface of objects, and in some cases pieces had to be dug out of the ground. As pieces were uncovered, they were turned over and photographed. The first day of excavation was very hot and sunny and light for pictures was poor. With four people on site, work could be done systematically. One archaeologist was tasked with locating and uncovering objects around the site, another established the best gridlines and cleared a path around the site for the grid, another held the stadia rod to help with measurements, and one recorded measurements from the surveyor's level. The site was measured in sections, the first being east of the tail section where there was the highest incidence of aircraft wreckage. The inside of the tail was also explored, removing leaf litter. All pieces, mostly fabric scraps and bolts, were collected and measured as one because the enclosed tail did not allow for a more detailed measurement. In addition, it was sufficient to know that these pieces came from inside of the tail and further detail was unnecessary. The inside of the fuselage was also examined but nothing was found. The fuselage is submerged in an area of pooled water at the end of a small stream. The bottom of the fuselage could not be located and the piece was too heavy to move. The tail was also measured at multiple points. One corner of the tail was completely obscured by trees and its measurement estimated.

The second section of the site was behind the tail. The grid was moved along a north line then backtracked around the tail 45° south-west. The object behind the tail could then be measured. The grid was also extended to the west to measure a piece of fuselage hidden in the trees.

At one point while mapping the site the grid had to go off course slightly and expanded 37° east (323° north). This was done because a clear line of sight from the grid line to the wings, depth charge pond, and other objects could not be established. Large trees were present and could not be cut down. Therefore, instead of weaving around trees at 45° angles, as would be ideal for the grid but very time consuming, it was decided to move off grid to measure the remaining pieces. From this line the remainder of the site was mapped. The only other complication was with the depth charge pond. This is a small, round body of water on the site that was created when one of the Canso's depth charges exploded soon after the initial crash (Mulvihill 1943a). A depth could not be established for the pond so instead a point was measured to mark the pond, and from that point the diameter of the pond was measured to place it on the map.

A site visit in 2011 to look for a missing piece of aircraft (see Section 5.1.5.2) noted damage done to the site by Hurricane Igor in October 2010. Some trees had been uprooted, revealing unidentifiable pieces of aluminum that were recorded and added to the map based on surrounding aircraft debris (Figure 4.8).

Figure 4.8: Aircraft material (potentially part of the tail) uprooted after Hurricane Igor in 2010. Photo by author.

Although this site is relatively untouched, it is close to the airport property and was most likely extensively collected during the war for engines and instruments. Regardless, the site is at risk due to its accessibility.

4.7.6 USAAF A-20 (DfAp-13)

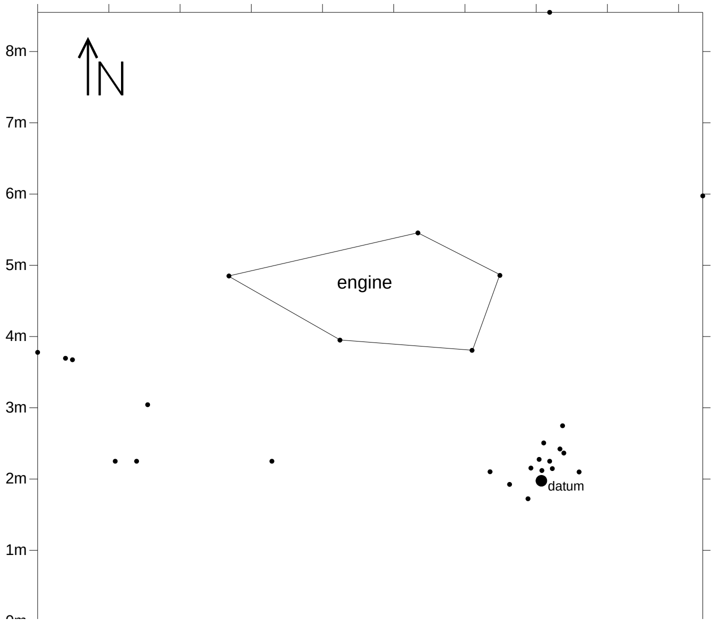
The crash is located in a forested area on the edge of a bog, with all of the remaining aircraft found within the tree line. The scar where one of the engines entered the trees is still visible from the bog and the engine remains (Figure 4.9). The area around the engine has a high concentration of aircraft debris, which was measured using a line and compass from the GPS established datum. The site was divided in this way because the area around the engine was so highly concentrated that it would be difficult to establish a depth measurement using the surveyor's level. The remainder of the site was so sparse and heavily wooded that the surveyor's level would have been impractical. The rest of the aircraft debris was limited. It appears that the area was salvaged somewhat during the war and most recognizable

Figure 4.9: Scar in the bog where one of the A-20 engines entered the trees. Photo by author.

pieces, such as instruments and the cockpit, have been removed or destroyed. Photographs taken of the crash show a great deal more debris present during the investigation, including a large portion of wing with the USAAF star logo (Figure 4.10).

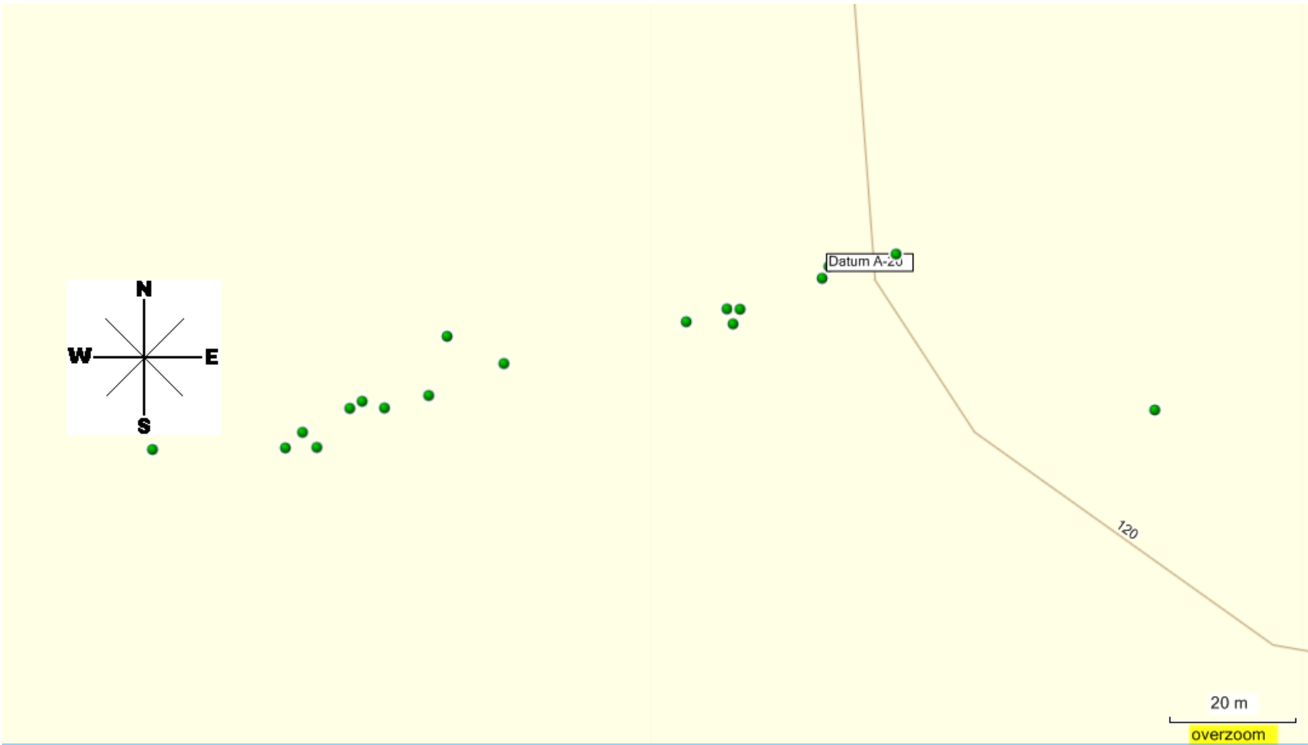
Figure 4.10: Image from the original crash investigation for USAAF A-20, showing debris that has been removed since the crash, most likely during the war era. McGlade and Wilkins 1943.

Much of this is not present, and besides the engine, most of what is present is relatively non-descript, aluminum fuselage fragments. What remains on site, besides the heavy concentration around the engine, include large pieces spaced throughout a heavily wooded area. The pieces could not give much information about the mechanics of the crash and most pieces could not be identified to a specific area of the



Map 4.9: Distribution of the area of high artifact concentration centered around the one engine on site and the datum. From Surfer 8.

aircraft. It was a clear day with good GPS satellite coverage and the larger pieces were measured using the GPS (Maps 4.9 and 4.10).



Map 4.10: A-20 site distribution. From MapSource.

4.7.7 RCAF Hurricane 5496 (DfAp-16)

The RCAF Hurricane was located near the airport in what was a small pond, unnamed in the crash report. The pond was later drained as the runway was lengthened with the coming of the jet age (Darrel Hillier, pers. comm 2010). The aircraft is not present, having been removed for scrap in 1943 (Walker 2012) and no metal could be found on site. The area was searched using a metal detector by two different researchers on two separate occasions. The search involved a sweep of the entire area, focusing on the perimeter of what was the lake, particularly around the north of

Figure 4.11: Photo of wreckage taken by the USAAF during the initial crash investigation. Note the shape of the treeline. McGlade and Wilkins 1943.

Figure 4.12: Possible location of DfAp-16. Taken from approximately where the aircraft in Figure 4.11 was located. Note the similar shape in treeline. The pond has been drained, and the trees have grown, but the landscape is similar. Photo by author.

the site where woody shrubs and alders were more prominent. Based on crash photographs obtained between the 2010 and 2011 field seasons, it was determined that researchers were looking in the correct area (Figure 4.11 and 4.12) The metal detector was used around an area of broken rock and some fuel residue in stagnant water, which is suspected to be where the aircraft crashed. Only one hit was obtained in the area, and researchers could not find exactly what set off the metal detector in the area. It is still believed that this was the location of the aircraft, and between the initial recovery in 1943 and the draining of the pond years later, all traces of the aircraft were successfully recovered (Walker 2012). It is realized that completely recovering every piece of metal is highly unlikely, but depending on the methods used to drain the pond, it is possible that the area was completely cleared of aircraft debris.

Even though no aircraft was found, the site was photographed, GPS coordinates taken at the segment of broken rock (the best estimate for the original location of the Hurricane), and the site was recorded as an archaeological site. In this way, if anything is ever found in the area, the archaeological designation and history of the site will already be available for future research.

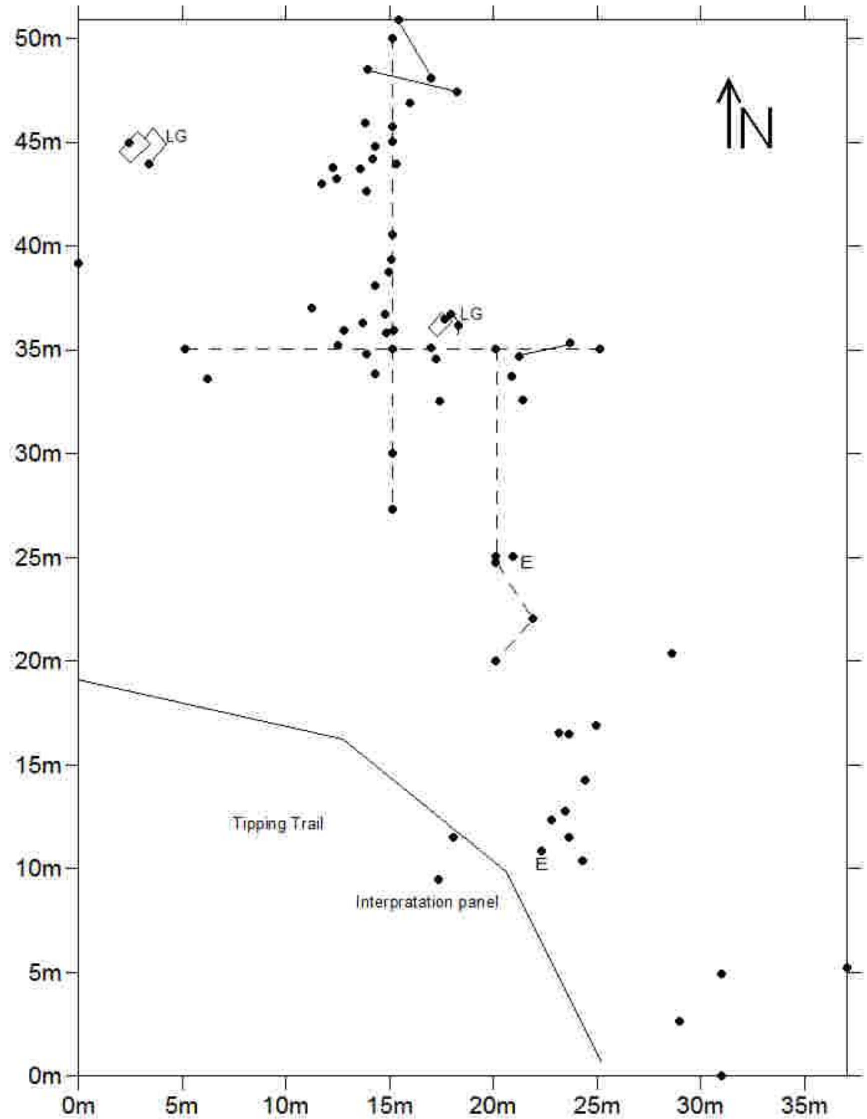
4.7.8 USAAF B-17 42-97493 (DfAp-09)

The Thomas Howe Demonstration Forest (THDF) is a forestry interpretation site on the Trans-Canada Highway (TCH) just outside of Gander. The B-17 is located on the Tipping Trail, one of the walking trails peppered with panels discussing the history and modern practices of the forestry industry in Newfoundland and Labrador (Figure 4.13). As this crash site is on Gander International Airport Authority land, and the forest is run by a board of volunteers, permission had to be obtained from THDF to investigate the site. Edward Blackmore, acting manager of the site, granted permission to investigate only if archaeologists did as little as possible to disturb the forest. Therefore, pieces on this site could not be uncovered or turned over, and tree branches could not

Figure 4.13: Thomas Howe Demonstration Forest trail map. Note "B-17G Crash Site" indicated on the Tipping Trail (solid black trail, crash location in red circle). See www.gandercanada.com for the full sized map.

be removed to maintain a clear line of sight for measurement purposes. In general, this was not a problem, but for some of the last artifacts measured near the trail, the trees were too thick to be able to get a clear line of sight. The angle for these artifacts was estimated and only the distance could be measured. It also means that in some pictures the artifacts are obscured by leaf litter and trees and there is the possibility that some pieces were covered by leaf litter and therefore missed.

Site investigation was undertaken using a surveyor's level and stadia rod, as outlined in the methods above. Due to the extremes in elevation (see catalogue), the gridline had to be moved to climb the hill to get from the main crash area to the engine and other objects near the Tipping Trail. No artifacts were recovered from this site, but a boot heel that was recovered by THDF staff was left in the care of archaeologists (Map 4.11).

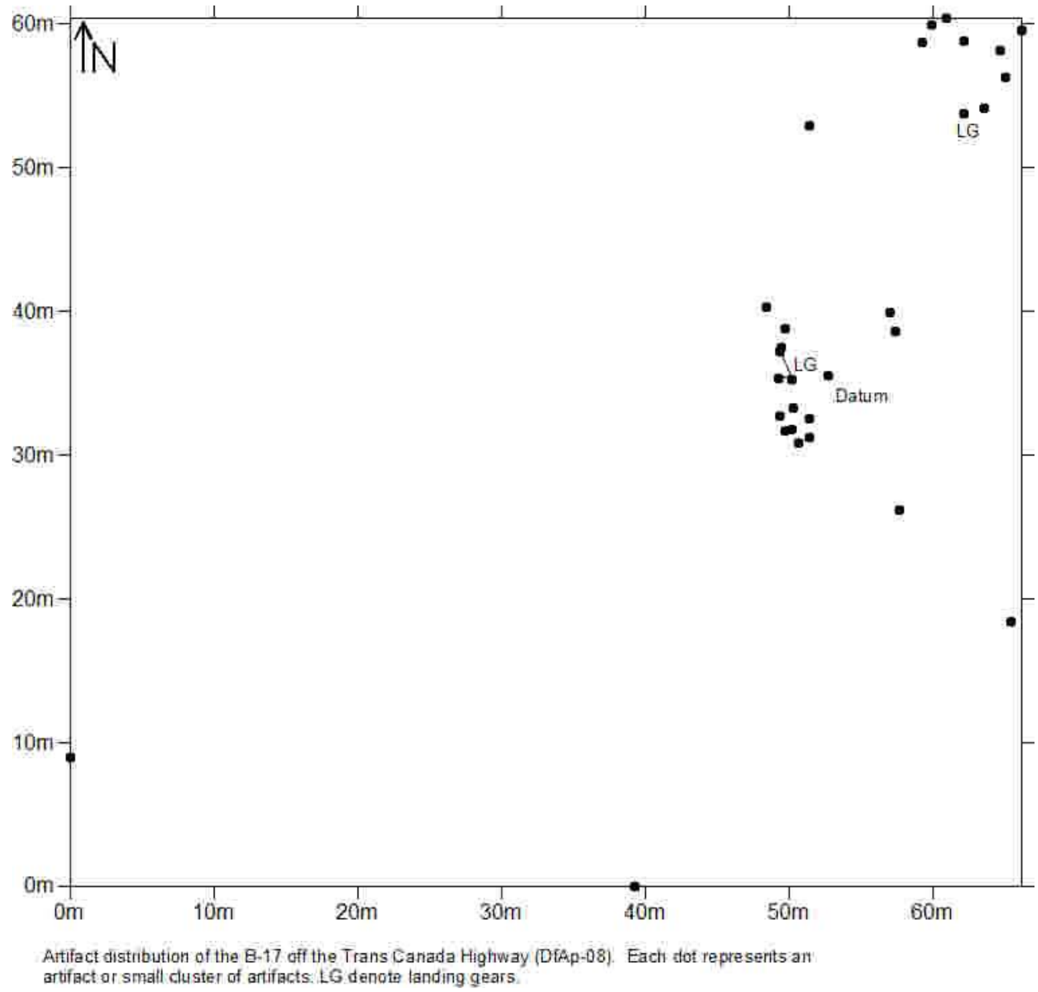


Artifact distribution of the b-17 crash in the Thomas Howe Demonstration Forest (DfAp-09). Dots represent artifacts or small clusters of artifacts, the dashed lines are the datum grid, LG are landing gears, E are engines. The solid line represents the border of the Tipping Trail.

Map 4.11: USAAF B-17 in the Thomas Howe Demonstration Forest site distribution. From Surfer 8.

4.7.9 USAAF B-17 44-6344 (DfAp-08)

Like the Hudson, this site has been the location of a forest fire (Frank Tibbo, pers. comm. 2010) and heavily scavenged since its creation. There is little aircraft evidence left, and the specific crash was only identified through site informants who had a partial accident report for the aircraft (Darrell Hillier, pers. comm. 2012).



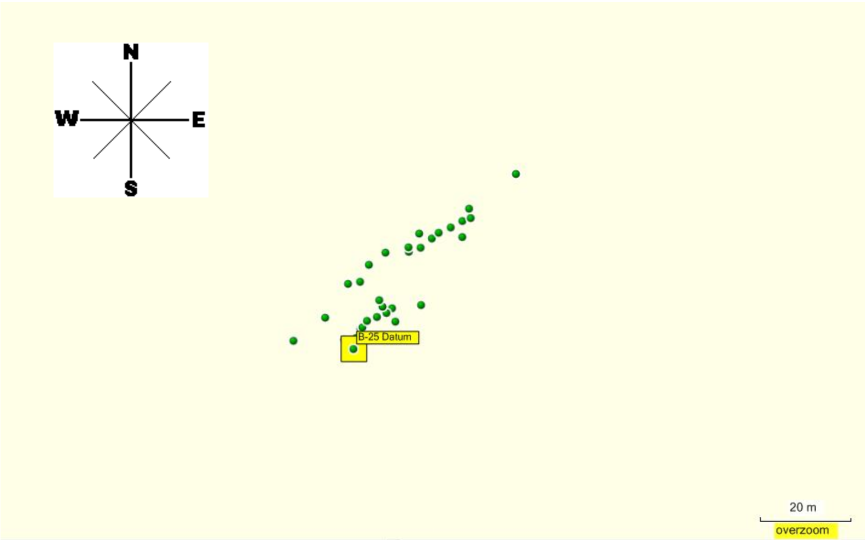
Map 4.12: USAAF B-17 off the Trans-Canada Highway site distribution. Note the TCH is to the East of the site.

Part of the site is very open, but the second half of the site is very concentrated in a dense patch of alders in the water caused by the airport runoff. Because there were so few artifacts in one area, and the density of the second area would not allow for a surveyor's level to be used, the entire area, except one piece, was measured using a tape and compass (Map 4.12). A datum was set up in the first area, which included the landing gear and the obvious burning, and a second datum was set up on the large piece of frame that was sticking up out of the water. This piece was very secure, and could not be moved by researchers, hopefully indicating that it will not move in the near future. The water in the area was deep enough and the foliage dense enough that no other suitable datum could be established. Given the size of a B-17, the area around the obvious wreckage was searched, but all that was found was a rubber gasket which was measured using a handheld GPS.

4.7.10 Ferry Command B-25 KJ584 (DfAp-14)

This site was more difficult to access, and researchers had some difficulty finding a clear route to the site in 2010. The site is located behind the airport, south-east of runway 2 (13/31 degrees or 12/30 during the war era, Tibbo 1997), on the edge of a large bog.

The layout of this site was very similar to the USAAF A-20, with large pieces scattered through dense trees. Without a chainsaw to clear the entire area, it was not practical to use the survey equipment. Some pieces were outside of the treeline, but most were inside a densely forested area. The trees were so dense that a measuring tape and compass could not work, but the GPS was used (Map 4.13).



Map 4.13: Ferry Command B-25 site distribution. From MapSource.

Each piece was cleared, turned over, photographed, and measured by GPS. In only one case two pieces were close enough to give the same measurement, but in that case they were also measured relative to each other to get a better idea of their location on site. Both pieces were unidentifiable aluminum fuselage, so the measurement was accurate enough for the purpose of this project. Had they been much closer together they would have been considered a single feature and measured together. There were also problems with photography as it was a very sunny day, the pieces outside of the tree line were very bright and detail was difficult to capture. Inside the treeline there were larger pieces in such a densely populated area that they could not be photographed clearly in one shot. Multiple pictures were taken of large pieces. The site was relatively well recovered, with no engine, propellers, instruments, or other sensitive equipment on site. What remained were mostly aluminum fuselage fragments and some pieces of frame.

4.6 Other Sites in Gander

While this survey does cover a number of sites in Gander, there are many more yet to be studied in the Gander area. As seen in Map 4.1, not all known sites have been visited and were beyond the scope of this project. Residents of Gander are aware of other crashes in the area, which hopefully will someday be recorded and protected as archaeological sites.

Chapter 5: Historical Context and Social Relevance of the Gander Wrecks

For each crash, where possible, individual incident reports were obtained. As the aircraft analysed in this project came from different countries and air forces, the success at obtaining reports varied. USAAF reports are readily available from online sources for a fee (i.e., accident-report.com) and RCAF reports are available from the Library and Archives Canada. Some of the RCAF files are not on microfilm or are poorly inventoried so not all reports are available through inter-library loan. Funds did not allow for a research trip to Ottawa to look through the files first-hand, so one report, the RCAF Hurricane, was not located. RAF reports were, for the most part, destroyed after the war. The best available sources are online forums (i.e., RAFforum.activeboard.com) and *Ocean Bridge* (Christie 1993). In one case, crew members were from the Royal Australian Air Force, and the report associated with the pilot, with some accident information, was available through the National Archives of Australia.

5.1 RCAF Douglas Digby 742 (DfAp-10)

5.1.1 History

RCAF Douglas Digby 742 crashed on an attempted return from anti-submarine patrol for Convoy WH 140 on 25 July 1941 (Heakes 1941). The aircraft left Gander at 1856 GMT for the purpose of convoy patrols. At 2320 GMT[7] the weather began to deteriorate. The Meteorological Officer predicted that the ceiling would remain at about 1500 feet with showers. The aircraft was

[7] Newfoundland Standard Time (NST) is -2:30 GMT. During the war, Daylight Savings Time was observed, and Newfoundland Daylight Time (NDT) is -3:30 GMT. Most times in the reports were given as GMT, but in certain cases time were given in local time, meaning the local time in Newfoundland. For consistency, times are given as GMT.

recalled at 2326 GMT, but Digby 742 did not respond immediately. The recall notice was repeated four times by Gander Station, and twice from RCAF Station, Sydney. At 0030 GMT the recall was acknowledged and at 0151 GMT the aircraft was in range of the Gander airbase. Although it was spotted by the Airport Control, Digby 742 could not see the airport. At this time the ceiling had deteriorated to 200 feet with rain and increased wind. The cloud increased and began to blow across the runways. RCAF Digby 756 was attempting to land at Gander when Digby 742 arrived. Digby 742 was instructed to circle until 756 had landed. Digby 756 landed safely at 0219 GMT. Digby 742 was then out of communication range for approximately twenty minutes. Captain Tomsett was instructed to proceed to Dartmouth where the weather conditions were more favourable. The Captain stated that he would attempt to land at Gander one final time and would proceed to Dartmouth if that landing was unsuccessful. At 0310 GMT a loud explosion was heard and there were no further communications with the aircraft. At 0330 GMT, the ceiling began to steadily rise becoming 1400 feet by 0530 GMT.

At first light, two aircraft were dispatched to search for Digby 742. The wreck was located almost immediately after take-off. A ground party had been organized during the night and was sent out to the scene of the accident. F/L MacLennan, Medical Officer at the RCAF Station Hospital, was in the ground party and assessed the injuries of the crew. The bodies were located throughout the site, and in some cases thrown as far as 240 feet from the main wreckage. All of the crew, except Sgt. MacDavid, died instantly. MacDavid succumbed to his injuries shortly after the accident. All crew were found to have extensive injuries, and in all cases except for AC 1 Crawford, showed fractures to the skull and long bones. Crawford sustained massive trauma to the abdominal and thoracic areas, causing death. When the crew were examined they were all in a state of *rigor mortis* (Heakes 1941). These airmen, listed above, were the first RCAF crew to be buried in Gander (Table 5.1; Heakes 1941; Walker 2012). Due to this incident, an area was selected for the Commonwealth War Graves for the interment of these men, and any future casualties at Gander (Pattison 1941).

Table 5.1: Crew list for RCAF Digby 742. Adapted from Heakes 1941.

Name	Rank	Serial Number	Unit	Duty	Injuries
Tomsett, M.E.	F/Lt.	C.1069	10 (BR)	Pilot	Fatally
Mather, W.H.	P/O	J.3479	10 (BR)	Pilot	Fatally
Pratt, A.G.	P/O		10 (BR)	Navigator	Fatally
Hunt, M.S.	Sgt.	R60720	10 (BR)	Air Gunner	Fatally
MacDavid, R.L.	Sgt.	R73032	10 (BR)	Air Gunner	Fatally
Crawford, T.J.E.	AC 1	R65641	10 (BR)	Wireless	Fatally

The accident report gives the evidence that the aircraft came in too low, and the starboard wing struck the bog, resulting in the crash. The engines were in good condition, and the aircraft had passed inspection. The altimeter settings had been passed on to the aircraft more than once, but Digby 742 never acknowledged receiving them. Salvage of the aircraft was requested, but given that the engines and bombs had sunk beneath the bog, EAC in Halifax determined that the salvage values of the engines would not warrant the expenditure necessary to drain the bog to retrieve them. Similarly, due to the boggy nature of the area, it was believed that the six-hundred-pound live bombs from the aircraft would soon rust through to become inert and up to that point the area should be treated with caution. Until the bombs were determined to be inert, it would be unsafe to attempt salvage operations, especially of the engines (Heakes 1941).

Although weather conditions had deteriorated, there were at this time no regulations for minimum ceiling. The conditions that were present at the time of the crash were poor and landing should only have been attempted by an experienced pilot. As a result of this crash, recommendations were made to the RCAF to put in place regulations for landing in poor conditions based on the time of day (day or night flying) and the experience of the pilot; an experienced pilot is considered to have completed at least 300 hours of flying on that specific type of aircraft. The determination that weather conditions are poor would be based on the ceiling level and the discretion of the Aerodrome Control Officer (Heakes 1941).

5.1.2 Analysis

The accident report states:

> From the furrow out in the ground it appears that the starboard wing tip struck the ground after which the aircraft cartwheeled resulting in the wing, nose and engines being torn from the fuselage and the fuselage breaking in the centre behind the bomb-bay (Heakes 1941).

The map of the site agrees with this assessment (see Map 4.4). The scar where the wing tip struck is still visible as a darker area on Google Earth (Figure 5.1), and does contain some aircraft debris

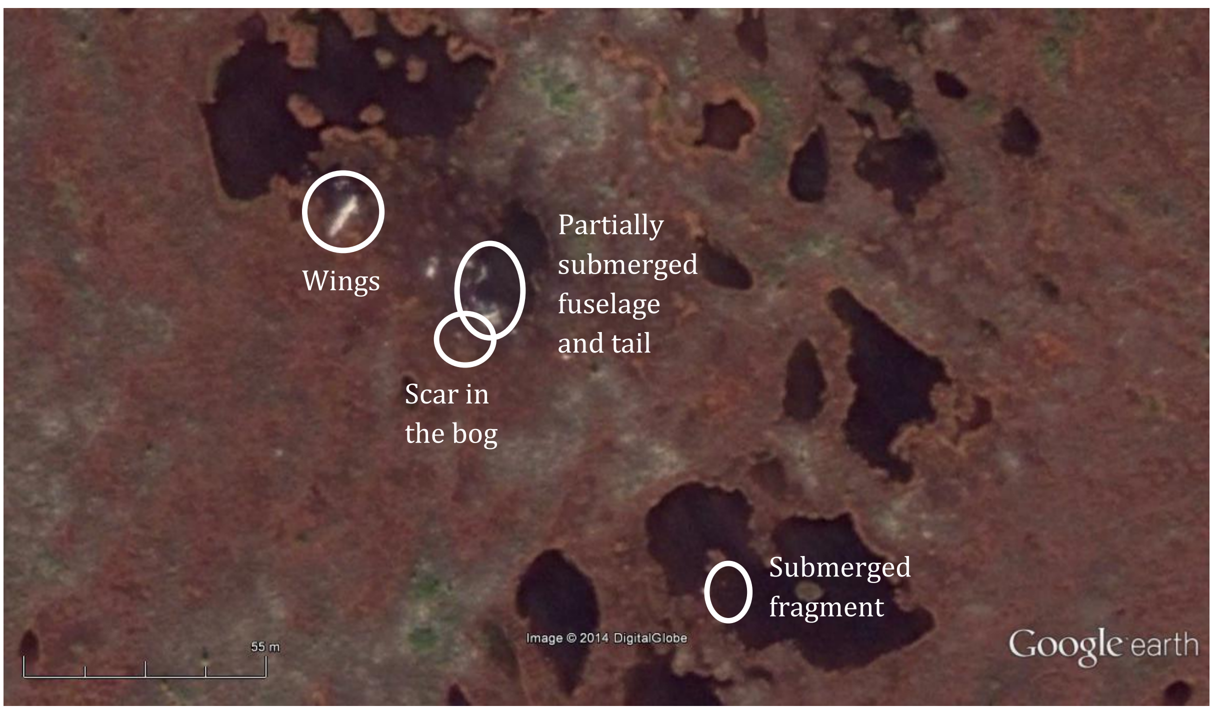


Figure 5.1: Aerial view of the Digby site with features marked. From Google Earth.

although it could not be measured due to the instability of the area. The wings are to the northwest of the impact point, and the tail is partially submerged to the east of the impact point. The cockpit was not visible and may have been destroyed by investigators or sank through the bog. One piece in an open area of water could not be measured in the field and was measured from Google Earth images. This piece, which looked like a piece of engine cowling, is 75m from the datum, or approximately 260 feet from the main area of wreckage, the tail and rear of the fuselage. This could be approximately where the bodies of P/O Pratt and AC 1 Crawford were located as the witness statement states:

> I was shown the body of P/O Pratt. The body was 240 feet from the main wreckage, body partly submerged in a small pond, face and head above water. […] I was shown the body of AC 1 Crawford, T.J. The body was 220 feet from the main mass of wreckage and was attached to seat [sic]. It was found in the small pond with head submerged in water (Heakes 1941).

Besides the location of the tail and the wings, the only other pond where wreckage was visible at that approximate distance is the one above. It is assumed that there is further wreckage in the pond, but none was found leading to it, indicating that when the aircraft cartwheeled debris either cleared the area between the main wreckage and this pond, or was heavy and sank through the bog. The witness statement by the Medical Officer also differentiates between the tail and rear of the fuselage and the main wreckage, assumed to mean the cockpit and front of the fuselage (in front of the bomb bay doors and where the wings attach). The fuselage in front of the wings was not found, and due to the high water level in the bog, much of the tail could not be accurately measured (Figure 5.2).

Figure 5.2: Some of the Digby features which could not be measured *in situ*. Photo by author.

Figure 5.3: Image of the RCAF Digby wreckage taken during the crash investigation. Note the similarity in feature position to Figure 5.2. From Heakes 1941.

Based on images taken after the initial accident, it looks as if the wreckage has been relatively untouched since the incident (Figure 5.3). The major change visible is a slow sinking of the aircraft into the bog. As stated in the report, the heavier items, such as the engines and bombs, sank under the bog immediately, and given the terrain, the same assumption can be made for any other heavy equipment.

The site is in a very open area, but not always an easy area to access. There is evidence of visitors to the site, as indicated by names and dates scratched in the yellow paint that marks the site as a known crash. The majority of these names date between 1961 and 1968 and between 1983 and 1999. The CDAA was opened in 1970, which most likely prevented access to the site (RCAF 2009). According to staff at the facility, the antenna near the site was inactive in the 1980s and was erected again in 2000, making the easiest access route to the crash site a restricted area (Cpl. M. Fudge, pers. comm. 2010).

Because the site is still in operation, there is limited information about the area except that it is restricted.

The site is still generally unknown, and even staff at the CDAA did not know of its existence or location (Spt. A. Sheppard, pers. comm. 2010). The area may still be hazardous, since there is no documentary evidence to suggest that the two six hundred pound bombs were ever removed from the site. The accident report does suggest that they would rust through, but, given the generally good preservation at aviation sites, especially of materials found in completely submerged locations, there is a possibility that the bombs may still be active. According to Constable Deacy of the Royal Newfoundland Constabulary (RNC; pers. comm. 2012), caution should still be taken on site until the time that the status of the bombs can be determined.

Unlike most of the other sites visited, this and the RAF Ventura (DfAo-01) are in areas of slow growth with no trees. This site most closely displays the mechanics of the crash from the air as no tree growth has obscured the scars left behind by the initial crash. The scar from where the wing struck is still visible as an unstable slash of black across the landscape. The aircraft is still floating in the pond, or break in the bog, where it impacted, and fragments line up around the site in accordance with the description in the accident report, in particular with the medical examiner's report of the locations of the crew. The site is so intact that the crash report can be used to better determine the layout of the site, particularly in the case of the pieces that are floating in open bog that could not be measured accurately from the stadia rod. With the measurements taken from GoogleEarth as well as the distances and directions given in the accident report it is easier to estimate the location of these pieces on the landscape. Of all of the crashes examined, this is the only site where the detailed accident report is available and the landscape is virtually unchanged since the incident.

5.2 RCAF Lodestar 557 (DfAp-15)

5.2.1 History

Lodestar 557 departed Moncton, NB, at 2345 GMT on 7 May 1942 on a cargo transport flight to Gander. At 0313 GMT the following day, the aircraft contacted the Aerodrome Control Officer at Gander Station to request landing clearance. The aircraft was given landing clearance by P/O Thomas Howard Murray, aerodrome control officer, and was told to check their wheels down. The messages were acknowledged by the aircraft. At this time the ceiling was practically unlimited. The aircraft was heard to pass over the airfield shortly thereafter, but the ceiling had unexpectedly fallen to 700 feet. This lowering of the ceiling possibly meant that ice may have formed on the aerials. It is unlikely that icing would have occurred on the wings or engines. This fly over was apparently done on instruments. The Lodestar contacted the Control Officer to indicate they had missed the field and were to try again. The aircraft acknowledged being given the ceiling height and barometric pressure by the station.

At this point, the landing of the aircraft on the control tower side was taken over by the station manager of Trans Canada Airlines (TCA), Mr. Harry Beardsell. The aircraft was carrying cargo and under the operational control of TCA and therefore should be under TCA radio coverage. Instructions were passed to the aircraft by TCA as to the proper landing procedures for Gander, and these were acknowledged. The aircraft broke through the now 600 ft. ceiling, and was advised to circle and approach runway 27. At this point, TCA spoke directly to the pilot. According to Beardsell, he advised the pilot to make one more attempt before proceeding to Sydney where the ceiling was at 1000 ft. and the visibility was 3 miles. P/O Murray, who was listening to the communications between the control tower and Lodestar 557, denied that the aircraft was advised of a secondary landing location. According to the radio log, it was actually Lodestar 557 who suggested that it would try for one more landing and if not successful would return to Sydney and TCA seconded this decision. The aircraft approached, but seemed to be lined up with the wrong runway and was advised to circle again and attempt runway 27. P/O Murray believed that the boundary lights were confusing Lodestar 557, causing it to line up with the wrong runway, so he switched off the lights and informed the aircraft through Beardsell. On the second attempt, the aircraft did not turn enough and was again told that it would probably not make it and to attempt again. The aircraft was told to make a right turn over the field near the airport, but it could be seen that the aircraft would not make the turn successfully. The pilot was advised to pull up two or three times by TCA, but at this point the aircraft was in a steep bank and went into a stall, losing altitude until it crashed. One witness saw the aircraft moments before the crash, and stated it was flying very low at 200 ft with engines functioning properly. The crash was indicated by a flash followed by a second, brighter flash, indicating it had crashed and was burning. Fire trucks and an ambulance were dispatched to the scene. It crashed at 0340 GMT approximately two miles east of the RCAF Station in Gander, all crew were killed and found in their proper seats in the aircraft (Table 5.2; Mulvihill 1943b).

5.2: Crew list for RCAF Lodestar 557. Adapted from Mulvihill 1943b.

Name	Rank	Unit	Duty	Injuries
Svendsen, H.	WO2	#164 Sqn.	Pilot	Fatal
Allen, C.H.	WO2	#164 Sqn.	2nd Pilot	Fatal
Sewell, A.G.	LAC	#164 Sqn.	W/Opr.	Fatal

According to the accident report:

AIRCRAFT: Scattered over a small area but distributed over approximately 190 yard line. The starboard wing tip made first contact with a tree and then the port with the resultant that the starboard wing came off first, followed by the port. The fuselage continued on and finally both wheels struck the ground, at this point the aircraft must have bounced into the woods where it caught fire and was almost completely burned out except for portion just forward of the rear door to and including the empennage.

<u>EMPENNAGE</u>: The empennage [tail assembly] was twisted completely around and was facing in the opposite to normal direction.

<u>WINGS</u>: Starboard damaged but not seriously while the port was fairly well intact, but both were torn from centre section outboard of root fittings.

<u>FLAPS</u>: It was observed on examining the crash that the section of flaps remaining on the centre section was in the up position. It is improbable the flaps would have been retracted as a result of the crash.

<u>INSTRUMENTS</u>: There were no instruments or controls present to indicate the attitude [sic] of the aircraft or the performance of the engines.

<u>ENGINES</u>: Port engine was seriously damaged while the starboard was completely burned out. The salvage from the two engines would be almost negligible.

<u>UNDERCARRIAGE</u>: The undercarriage was severely twisted but it appears certain that it was locked "down" at the moment of impact, since one of the [botusting] cylinders was found in the retractor or "undercarriage locked down" position and it is considered impossible for the cylinder to be forced into this position by a crash. The other cylinder was partially extended but this could have been caused by the crash. In addition one of the drag struts was observed to be buckled as indicating it had experienced a severe compression load which it could not experience if the undercarriage had been retracted.

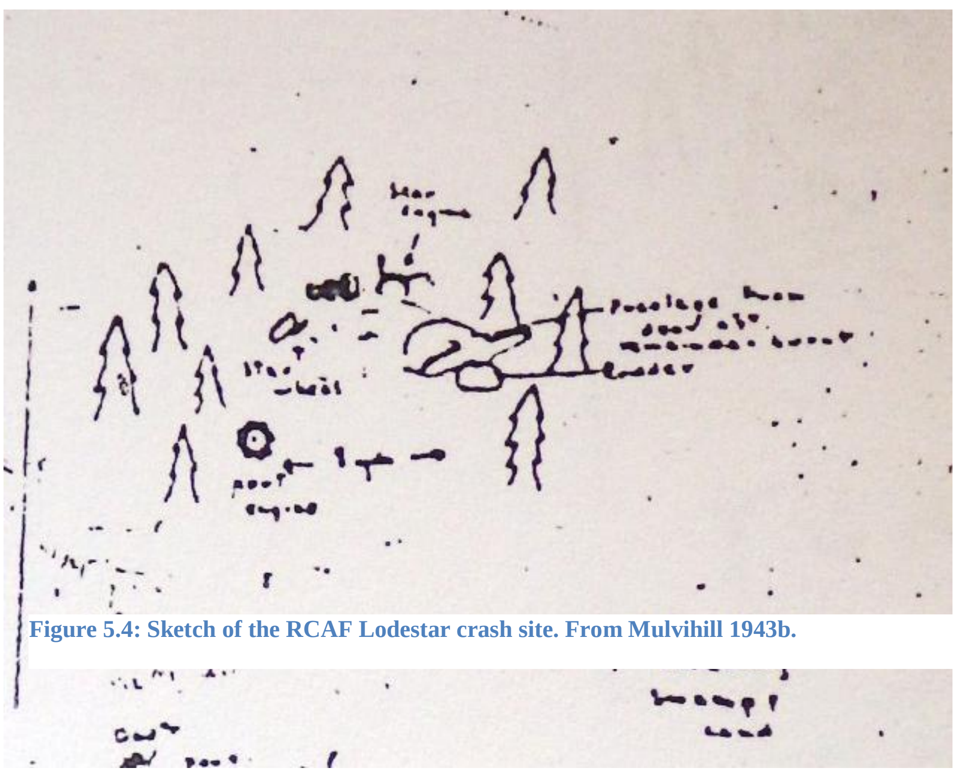


Figure 5.4: Sketch of the RCAF Lodestar crash site. From Mulvihill 1943b.

<u>GENERAL</u>: Other than the above, all other parts of the aircraft were so badly damaged or burnt that they were of no value in disclosing further

information (Mulvihill 1943b).

The aircraft had been certified as airworthy and in serviceable condition; the pilot, WO2 Svendsen, was fully qualified to fly a Lodestar in all conditions, and had twice flown the same route to Gander on transportation flights. The cause of the crash was determined to be "pilot error, while attempting to get into position to make approach under low ceiling" (Mulvihill 1943b). The aircraft slipped or stalled after changing from a left turn into a right turn in an attempt to realign with the runway. Because it was already in low altitude, the slip or stall caused it to strike the trees while it was trying to recover from the turn. The report also recommends safety changes to the airbase. As Lodestar 557 had to make a final attempt because it had aligned with the wrong runway, the report determined that the runway lighting system of the RCAF station in Gander is confusing and should be studied and improved (Mulvihill 1943b).

Figure 5.5: RCAF Lodestar crash site. Note the similarities to the sketch in Figure 5.4. Photo by author.

5.2.2 Analysis

Based on the crash report, this site is mainly intact. Even a comparison of the sketch in the crash report (Figure 5.4) and the site map (see Map 4.5) shows an almost identical layout of the crash site. It is known that this site has been visited, but very little seems to have been removed. Interestingly, most people who visited the site in the past, or who know of it, have the impression that the site has been largely recovered by salvagers in the recent past. Contrary to this, the site shows very little disturbance, to the extent that the tail rudder appears to be in the same location as indicated by the 1943 map. In agreement with the crash report, the cockpit, including all instruments, was destroyed. What is present on the site is an area of slag with pieces of instruments and aircraft scattered throughout. As indicated in the methods, the area was explored as thoroughly as possible given the presence of fuels and/or oils. The area is large, but, a comparison to the 1943 sketch indicates that the burnt area is essentially the same as it was just after the crash (Figure 5.5). Due to the fact that the crash report describes the scene in such great detail, the archaeological analysis does not add much to the information about the crash. One exception to this is that pieces of the aircraft were found over 30m west of the main wreckage, indicating that pieces of the aircraft broke off as it clipped the trees prior to the final impact.

Although this is a relatively well-known crash site around Gander, this site is one of the best preserved visited during this project. The crash report is very detailed, and when lined up with the archaeological work, it appears that very little post-war damage has occurred to the site, and hopefully, given the remote location of the site, it will remain intact.

5.3 Ferry Command Ventura AJ471 (AfAo-01)

5.3.1 History

Figure 5.6: Rescue and salvage team. From the VMFA collection.

Ventura AJ471 crashed in a bog between Benton and Gander, near Soulies Pond, on 18 November 1942. As with other RAF crashes, there is little information available about the crash. The rescue and salvage team assigned to the site consisted of Chris Brennan, Hugh McEachern, Cliff Pederson, and Eldon Callahan (Figure 5.6). Transcript notes from an interview conducted by Ventura Memorial Flight Association (VMFA) with Hugh McEachern indicate that the crew recovered parts from the aircraft by transporting them over nearby rivers to the railway. The propellers were brought out on their backs, having to wear their hats sideways to accomplish this feat. McEachern also recalled a Mickey Mouse Cocktail cartoon on the aircraft, a possibility because Venturas were built in a factory next to the Disney Burbank studios and cartoonists would often paint motivational cartoons on the aircraft, but no evidence of such a cartoon remains on site (Tony Jarvis, pers. comm., 2011).

5.3.2 Analysis

Figure 5.7: Aerial photo of the RAF Ventura taken in 1974 by Bill Parrott. Note how little damage has been done to the aircraft. On file VMFA.

Figure 5.8: Photo of the Ventura taken in 2010. Photo by Michael Deal.

This crash is in exceptionally good condition. It is believed that the wing spar is also intact, making it a good candidate for restoration to flying condition. Although the site is in good condition, it has also been heavily disturbed, but on a smaller scale than some other aircraft in the area. The aircraft is located on a snowmobile trail, as evidenced by the extensive graffiti inside the aircraft, mostly dating to the winter months. Based on site visitor accounts and images, pieces have been removed and moved around the site, such as the cockpit and a large section of fuselage which has been removed using an axe and moved to the edge of the bog. This damage is relatively recent (within the past 30 years) as indicated by aerial images taken by Bill Parrott in 1974 (Figures 5.7 and 5.8). This image indicates that the aircraft was relatively intact (the starboard wing was detached), and since then the tail was removed (still on site) and large sections of the fuselage were removed. Some of it is still relatively close to the site, but too large to move back. A 2003 image on the War Bird Registry website taken by the Ventura Memorial Flight Association (www.warbirdregistry.org/pv1venturaregistry/pv1ventura-aj471.html; VMFA) indicates that in 2003 the aircraft had already been cut up, but it does not look as if anything further has been removed from the site. The cockpit and tail assembly seem to move about the site, but generally stay close to the aircraft (pers. comm. Hillier 2010). In the 2010 visit, the cockpit was moved to the side of the aircraft and the tail to the opposite side. Also, smaller pieces look to have been removed and moved from the main area of the crash. The site is also littered with pop tins and cigarette packages, further indicating site use. Some of the lack of disturbance can be attributed to the fact that the site is generally visited in the winter when much of the smaller material will be buried under snow.

5.4 Ferry Command Hudson Mk. VI s/n FK 690 (DfAp-11)

5.4.1 History

As this is an RAF Ferry Command flight the full crash report is not available. However, two of the crew on board belonged to the Royal Australian Air Force (RAAF; see Table 5.3), so some crash information is available in the file associated with F/O Burrows (RAAF 1942). This Hudson crashed 6 December 1942 at 0351 GMT, one minute after takeoff from Gander (Christie 1995). The aircraft was beginning a Ferry Command delivery flight to the United Kingdom, but stalled after takeoff (RAAF 1942). The aircraft crashed and burned, immediately killing all four crew on board (Christie 1995; RAAF 1942). A funeral service was held at 1700 GMT and the victims of the crash were all buried in the Commonwealth War Graves in Gander on 7 December 1942 (RAAF 1942).

5.4.2 Analysis

This site is an example of the level of damage a crash site can potentially undergo. Almost all material has been removed, and it is impossible to determine what was removed prior to the construction of the highway and what was removed when the road gave greater access

Table 5.3: Crew list for RAF Hudson S/N FK690. Adapted from Christie 1995 and RAAF 1942.

Name	Rank	Serial Number	Service	Duty
Burrows, Ronald George Stanley	P/O	401898	RAAF	Pilot
Simmons, Douglas Percy Charles	Sgt.	1334966	RAF	Pilot
Thomson, Graeme Hamilton	P/O	656086	RAF	Navigator
Fazel, Jack Eric	Sgt.	405399	RAAF	Radio Operator

to the site. This site and DfAp-08 (see Section 5.3.8.2) are extreme examples of how threatened historic aviation sites are in Newfoundland and Labrador. At the same time, this site is an example of the information available through the aviation community. The site was identified and the RAAF records located due to the information and help available at RAF Commands Forums (2011).

5.5 RCAF Canso 98107 (DfAp-07)

5.5.1 History

RCAF Canso 9807 was requested for urgent operational duties, mainly convoy coverage. The aircraft departed in radio silence on 5 May 1943 at 0631 GMT from runway 15 and crashed a minute later, killing six of the seven crew on board (Table 5.4). Cpl. Urbain Edmond Antoine

Dube, 2nd engineer, who was located in the bunk compartment, was seriously injured, but survived (Mulvihill 1943a).

Table 5.4: Crew list for RCAF Canso 9807. Adapted from Mulvihill 1943a.

Name	Rank	Serial Number	Unit	Duty	Injuries
Casey, B.A.	F/Lt.	C.1061	5 B.R.	1st Pilot	Fatally
Barsalou, J.P.	F/Lt.	C.1237	5 B.R.	2nd Pilot	Fatally
Claeland, J.R.	F/O	J.11797	5 B.R.	Navigator	Fatally
Miller, J.H.	P/O	J.20859	5 B.R.	W.O.A.G.	Fatally
Morricee, A.F.	W.O.2	R.93362	10 B.R.	W.O.A.G.	Fatally
Stallwood, J.B.	Sgt.	R.122657	5 B.R.	1st engineer	Fatally
Dube, W.E.A.	Cpl.	R.63059	5 B.R.	2nd engineer	Seriously

Prior to takeoff, on the evening of 4 May 1943, the aircraft was inspected as part of the daily inspections of Canso 9807. LAC Donald Harry Scott, R144305, signed off on the inspection work sheets. The aircraft was carrying a full load of gas (1,300 gallons) and of oil (eighty gallons), and would have weighed approximately 33,150 lbs. The maximum load for a Canso aircraft was 34,500 lbs., keeping the aircraft within the allowable weight. When Canso 9807 took off, the weather conditions consisted of fog coming in from the south with a ceiling of about 600ft but dropping rapidly. At a temperature of 31.5°F (~0°C) there was the potential that ice could have formed in the carburetor, but not on the wings. But, had ice formed in the carburetor, the pilot would have noticed as he would not have been able to achieve takeoff speed with a full load. The aircraft took off without issue, but witness reports vary. Some witnesses saw normal exhaust coming from the engines, but other witnesses reported the starboard exhaust flames going out, indicating the failure of that engine. Other witnesses saw both engines functioning, but said a whining noise indicated that the engines were using more power than normal prior to the crash. No witnesses reported any sputtering or backfiring of the engines or other major indicators of engine trouble. The report concluded, based mainly on the witness testimony of Cpl. Dube and Captain George William John Gander, Commanding Officer of the 1st Aerodrome Defense

Company C.A. (A) and the final witness to see the aircraft before the crash that both engines were functioning prior to the crash, but were using more power than normal. According to the witness statement of Cpl. Dube, as part of takeoff preparation, the pilot "ran up his engines in front of the hangar and then again at the end of the runway. Both times they sounded normal" (Mulvihill 1943a). After a normal takeoff, it was witnessed that the air was rough and once airborne, the flight was extremely rough. The aircraft began to climb, and then dropped suddenly. The aircraft leveled out again for a couple of seconds, and then started to fall again. At this point, in his words, Cpl. Dube heard the crash and was thrown 40 feet from the aircraft. The final thing he could remember was a loud explosion which he believed was a depth charge. He regained consciousness later when in the hospital (Mulvihill 1943a).

The first priority for crash responders was to locate any survivors. Unfortunately, the crash was severe and due to the full fuel load, burned too hot to allow anyone to approach the main area of the crash; the aircraft and surrounding trees were burning. Cpl. Dube was located and transported to the hospital. No crew members could be found outside of the main crash area. The crash was high energy and the aircraft was extensively damaged, so that no information could be collected from the instruments or controls to indicate the cause of the crash. The wings were damaged, and due to the damage to the starboard wing and the relatively narrow swath created by the aircraft entering the forested area (only four feet wide), it was determined that the aircraft must have entered while on an almost vertical bank. The port wheel was found to be fully retracted in the wheel well, which would indicate that there was power to the starboard engine just prior to the crash. The rest of the damage is reported as follows:

<u>Hull</u>

Broken in two main parts at the bulkhead between the blister and bunk compartments. The pilot's compartment practically disintegrated while the navigator's compartment was torn and twisted back over the engineer's compartment.

Wings & tail section

The starboard wing was shattered and littered along the first seventy yards of the swatch. The port wing was relatively intact and lay one hundred and five yards down on the extreme right of the swath. The tail was broken off and lay under the aft part of the hull. (Mulvihill 1943a).

The report concludes that Canso 9807 crashed because it "stalled due to climbing at a critical angle in rough air" (Mulvihill 1943a). The weight of the aircraft may have been a factor, as it was the second incident with a Canso under similar conditions, so it was recommended that the maximum weight of the aircraft be reduced to prevent further accidents.

Figure 5.9: RCAF Canso wing tip photographed in 2009 but missing from the site in 2010. Photo by author.

5.5.2 Analysis

This is a very concentrated crash site (see Map 4.7). Based on the archaeological evidence and the documentary record, this was a sudden crash and burned quickly. There is very little evidence of fire on the aircraft remains, but site investigators reported that at first the crash was too hot to approach to locate crew members. This does illustrate that fire and explosion are not always obvious in the archaeological record, the evidence of fire in this case being that the area is populated with birch trees rather than the more common spruce trees. The site shows that the wing separated from the remainder of the aircraft first, followed by the tail, and the front of the fuselage was at the furthest point of the site from the runway. The cockpit was not located, but the report indicates that it was destroyed and the fuselage section could not be fully analysed due to it being submerged. As indicated by the site and the report, the wing broke in a number of places, and scattered around the site. A wing tip was on the site in 2009, and photographed by archaeologists, but in 2010 this piece was missing from the site (Figure 5.9). In 2011 the site was visited again to try to find this piece, without success. The tail is still in relatively good condition, and one of the blisters from the aircraft is still intact and in the possession of a Glenwood resident. The engines, tires and propellers are visible in pictures of the site taken at the time of the crash, but these were not found, indicating that they were removed by recovery crews during the war era or by site visitors in subsequent years. The amount of aluminum remaining on site would indicate that the former is more likely. Propellers and tires can be removed from sites relatively easily, but the lack of engines would indicate it was a purposeful removal at the time of the crash. Given the interest in the status of the starboard engine, it would make sense for site investigators to remove the engines.

The accident report in the case of this crash is very detailed, and archaeology cannot add further information, but instead can only confirm what is in the report. This site is of great archaeological importance because it is relatively untouched. The site is under threat, as indicated by the missing wing tip, but at the moment is a relatively complete WWII aviation site in Gander with relatively intact pieces that are of museum quality (i.e. the blisters and the tail of the aircraft).

5.6 USAAF A-20 (DfAp-13) and RCAF Hurricane 5496 (DfAp-16)

5.6.1 History

A few days prior to 27 October 1943, USAAF Major Allen and RCAF Flight Commander F/O Taylor discussed making an "air fighting practice flight" where they would spend an afternoon "chasing each other around for a while" (McGlade and Wilkins 1943). The plan was that they would start their flights at a sufficient distance from each other that neither would have an advantage, then they would turn into each other as if to attack. It was agreed that in the case of head on attacks, they would break away to port. On 27 October 1943, F/O Taylor in an RCAF Hurricane and a crew of four including Major Allen (Table 5.5) in an A-20C (Boston) took off just before 1700 GMT and flew south west of the aerodrome.

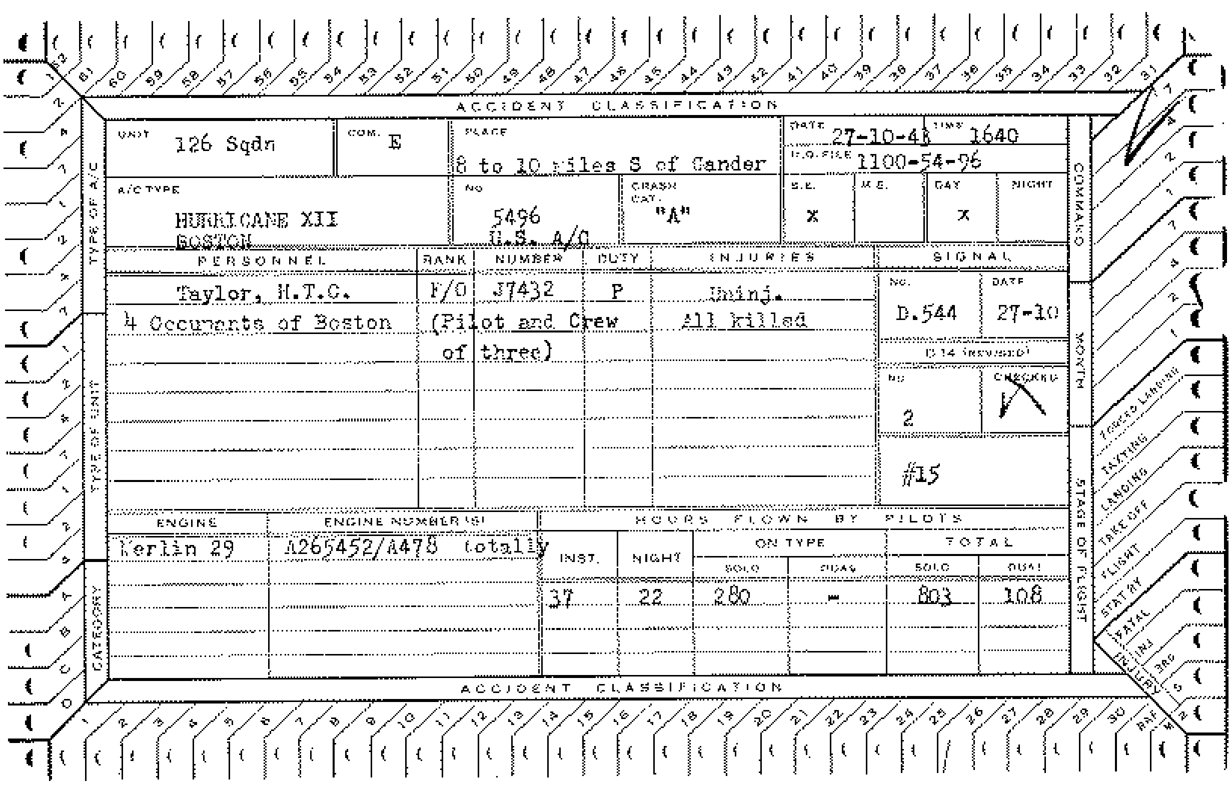
They climbed above 3000 feet, manoeuvred into position and flew into each other as if in a head on attack. According to sole survivor, F/O Taylor, the pilot of the RCAF Hurricane:

Table 5.5: Crew list for USAAF A-20. Adapted from McGlade and Wilkins 1943.

Name	Rank	Serial No.	Duty	Injuries
Allen, Sobey F.	Major	O-351490	Pilot	Fatal
Schaffner, Jack K.	2nd Lt.	O-748257	Bombardier	Fatal
Moore, Pless E., Jr.	Sgt.	18110333	Radio Operator	Fatal
Haynes, George M.	Pvt.	38165533	Gunner	Fatal

> When we turned in at approximately 3,000 yds. apart it placed us at a position head on to one another – I, slightly below the Boston; the Boston as diving and I as climbing through about 200 ft. As the distance between us decreased to about 300 yds. the Boston pulled up gradually and turned slightly to port while I turned slightly to port also; it was here I thought we had ample clearance. Then at about 100 yds. the Boston made a rapid and very decisive movement downwards, as if, in my opinion, he was either fixing his sights on me or had lost me for an instant. The upward movement, although begun, was never completed because it was at this instant that our wings collided. We were both turning slightly to port when this movement or manoeuvre occurred (McGlade and Wilkins 1943).

As the aircraft brushed right wings, the wing immediately broke off of the Hurricane and the aircraft went into a tight spin. The pilot abandoned the aircraft and parachuted to safety. He suffered only slight bruises. The aircraft crashed at the edge of a small, unnamed pond near the airport (McGlade and Wilkins 1943). On 2 November 1943, the aircraft was transferred to No. 19 Sub-Repair Depot at Gander for scrapping (Walker 2012). The A-20 continued on course for a few seconds then went into "a slow gliding right turn, then 'winged over' into a steep dive and crashed in the vicinity of Dead Man's Pond" (McGlade and Wilkins 1943). The right wing of the A-20C came off a few hundred feet above the ground. The remainder of the aircraft exploded and burned upon impact. None of the crew of the A-20 had the opportunity to bail out and there were no survivors (McGlade and Wilkins 1943).


ACCIDENT CLASSIFICATION

UNIT 126 Sqdn | COM. E | PLACE 8 to 10 miles S of Gander | DATE 27-10-43 | TIME 1640 | H.Q. FILE 1100-54-96

A/C TYPE HURRICANE XII BOSTON | NO 5496 U.S. A/C | CRASH CAT. "A" | S.E. X | M.E. | DAY X | NIGHT

PERSONNEL	RANK	NUMBER	DUTY	INJURIES
Taylor, H.T.C.	F/O	J7432	P	Uninj.
4 Occupants of Boston	(Pilot and Crew of three)			All killed

SIGNAL NO. D.544 DATE 27-10

D 14 (REVISED) NO 2 CHECKING

#15

ENGINE	ENGINE NUMBER (S)
Merlin 29	A265452/A478 totally

HOURS FLOWN BY PILOTS

INST.	NIGHT	ON TYPE SOLO	ON TYPE DUAL	TOTAL SOLO	TOTAL DUAL
37	22	280	-	803	108

ACCIDENT CLASSIFICATION

Figure 5.10: RCAF crash card for the collision of Hurricane 5496 and a USAAF A-20. From Walker 2012.

The circumstances of the crash were listed as a "head on attack between Hurricane (RCAF) and A-20 (USAAF)" and the cause listed as a "mid-air collision due to error of judgement on the part of both pilots and insufficient planning" (McGlade and Wilkins 1943). Both pilots were highly experienced, and no flying regulations had been violated in the activity, but the pilots did not have any previously agreed upon visual clues in case of interrupted radio contact. Had such visuals been agreed upon previous to the flight, the pilots would have had a better idea of what the other was going to do (McGlade and Wilkins 1943).

5.6.2 Analysis

According to McGlade and Wilkins (1943), "this as [sic] the first reported incident at the Unit of personnel of the U.S.A.A.F. and R.C.A.F. co-operating on such a flight". Although it was a first time incident, it does show a camaraderie and respect between at least the two pilots involved in the incident. The pilots discussed the practice flight prior to the activity, and later the day for the flight was arranged between them over a telephone conversation (McGlade and Wilkins 1943). This indicated that it was possibly first discussed socially, but even if it were only arranged professionally, it indicates contact and mutual respect between USAAF and RCAF air crew. Unfortunately, the RCAF records, beyond the crash card (Figure 5.10), are not available to add further information on this crash or the potential social relationship between F/O Taylor and Major Allen. The fact that the information available, including photographs of the RCAF crash, through USAAF records indicates that even though both sides would have led their own investigations with a focus on their own aircraft, at least on the side of the USAAF, the other crash was also fully investigated and the records saved. In the case of the USAAF records, the Hurricane was given a full crash report which was then attached to the record of the A-20, including the pilot's name, rank, duty and serial number, and the amount of damage to the aircraft. On the other hand, the crash card for the Hurricane fully lists F/O Taylor, but as for the USAAF crew, the crash card only states "4 occupants of Boston/(Pilot and crew of three)/All killed" (Figure 5.10). Even if the USAAF were only investigating the Hurricane because it collided with the A-20, it is because of this sharing of information between the two groups that there are images and a record available of the crash of the RCAF Hurricane.

The lack of material remaining at the site of the USAAF A-20C has been attributed to war-time recovery and salvage. One of the engines could not be found, and the one that was found was heavily damaged (Figure 5.11). Similarly, no instruments or large identifiable pieces were found on site. Normally, when sites have very little remaining, it is due to more contemporary salvagers looking for scrap metal to sell, but this site does not indicate that this is the case. The remains of a campfire were found relatively close to the site, but the area to the west of the crash, closer to the airport perimeter is where researchers first looked for the aircraft. This area was full of evidence of human activity, such as soda bottles, buckets, and other debris. It is possible that the area is used for hunting. Given that material remains on site, it is unlikely that contemporary scrap hunters have recovered the aircraft. The pieces that remain on site would be of value for their aluminum content, and many of them are small

Figure 5.11: Destroyed remaining A-20 engine found on site. Photo by author.

enough that they would be easily transported from the site. In this case, there does not even seem to be much movement of materials around the site, or damage caused by anything other than the initial incident.

5.7 USAAF B-17 42-97493 (DfAp-09)

5.7.1 History

On 29 December 1943 at 2303 GMT, USAAF 42-97493, took off from runway 27 into the wind in "a normal manner" (Bollis 1944). The aircraft was departing Gander for Valley, Wales. According to the crash report, the aircraft climbed steeply – so steeply that one witness, F/O Fisher, remarked that the climb was similar to that of a single engine bomber rather than a B-17 – to about 500 to 600 feet then banked to the left to turn to the south. At approximately 15 degrees into the turn, the nose of the aircraft dropped suddenly. Cpl. George W. Stiffler witnessed the crash from the Gander Control Tower, and stated that the engines did not appear to be having trouble, with the exception that three engines were exhausting blue flame and the #1 engine was exhausting yellow flame. The aircraft was still in a turn when it crashed. Witnesses and investigators agree that the left wing touched first, the aircraft caught fire immediately, skidded several hundred feet, and then exploded with flames shooting 500 to 600 feet into the air. All crew and passengers were killed (Table 5.6; Bollis 1944).

At the time of the crash, RCAF B-24J 593 was making its initial approach to Gander and witnessed the incident. The Liberator circled the crash and gave the control tower the position of the crash before landing. The accident investigation team arrived at the scene at 1230 GMT,

Table 5.6: USAAF 42-97493 B-17 crew and passenger list. Adapted from Bollis 1944.

Name	Rank	Serial No.	Duty	Injuries
Ryan, Bruce E.	1st Lt.	O-795488	Pilot	Fatal
Wooten, Stephen A.	2nd Lt.	O-519302	Pilot	Fatal
Gentile, John J.	2nd Lt.	O-798698	Navigator	Fatal
Thayer, Charles (MMI)	Sgt.	37212166	Engineer	Fatal
Norton, Frederick A.	Cpl.	12092803	Radio Operator	Fatal
McCain, Ballard D.	2nd Lt.	O-803839	Pilot	Fatal
Lineham, Paul J.	2nd Lt.	O-811689	Navigator	Fatal
Killela, Thomas R.	S/Sgt.	32455257	Engineer	Fatal
Nightower, Howard W.	Sgt.	14140152	Radio Operator	Fatal
Boucher, Daniel L.	Sgt.	39555248	Gunner	Fatal

on 30 December 1943. The path of the aircraft was observed, as well as several parts of the aircraft. The investigation concluded that, as observed by witnesses, the aircraft did strike the ground while on a 15 degree bank to the left. The left wing was torn completely off and was about 50 feet to the left of the fuselage. The right stabilizer was found about 100 feet from where the aircraft first impacted the trees, and the fuselage was broken into several pieces. The nose and the pilot's compartment was demolished and burned. The tail broke off, and all four engines and propellers were demolished or severely damaged. The damage to the engines, propellers, and cockpit was severe enough that neither engine could indicate power output, or lack thereof, nor could the instrument readings at the time of the crash be determined. Therefore, the investigator, Major Richard Loomis, could not determine the cause of the crash (Bollis 1944).

The aircraft was checked prior to takeoff, with all checks being deemed "O.K." Issues of an oil leak and problems with the carburetor heat gauges were reported, but were signed off on. Minor maintenance was done to the radio equipment, with a new fish put on antenna band A. Mechanical problems were not blamed for the accident. Overall, the cause of the accident was never determined (Bollis 1944).

5.7.2 Analysis

This site has been heavily scavenged over time. Where it is on the Tipping Trail in THDF it is easily accessible to the general public. A sign gives a brief history of the site, and a small part of the crash is visible from the trail (Figure 5.19). Off trail, there are small footpaths that go through the main area of the crash. Although the crash report and images indicate that the crash should have been spread over a large distance, there is very little evidence of the crash beyond a small area surrounded by the Tipping Trail (see Map 4.12). Searching was done outside of this area, but

Figure 5.12: Interpretation sign on the Tipping Trail in the Thomas Howe Demonstration Forest and one of the engines from the B-17 visible. Photo by author.

evidence of aircraft was not found. At the same time, not all of the engines were found on the site, indicating they were either missed or removed.

The site distribution has not added to the crash information given by the documentary record. If anything, the crash report gives much more information than the archaeological investigation of the site. However, the investigation had the secondary goal of inventorying what is on site, and this inventory, along with the history of the site, was given to the Demonstration Forest with the potential to be used to monitor further activity on site and to give the staff at THDF more information to use in their presentation of the crash area. Currently, the crash is of cultural and educational significance to staff because it is used when giving tours to school groups. Edward Blackmore, current director of the site, uses the crash as a teaching tool to show how catastrophic incidents, such as an aircraft crash, can impact a forest, and noting rates of growth and how the forest has recovered over the past 70 years since the crash.

Figure 5.13: Oxygen tank recovered by Thomas Howe Demonstration Forest staff and housed at their interpretation centre. Photo by author.

The staff at the THDF have also noted that aircraft pieces are still transported around the site by visitors. The staff have recovered pieces that have moved great distances from the site. An oxygen tank was recovered leaning next to one of the power line poles , indicating that it had to have been moved to this location as it had not been observed in that area until 2010 (Figure 5.13). As this is an oxygen tank, it has the potential to have landed a fair distance from the rest of the debris (for example the distribution of oxygen tanks located around the B-24 crash near Gander, DgAo-01; Deal *et al.* 2012), but would have been found and moved by a member of the public or a Newfoundland Power employee. THDF would like to better protect the site, but staff cannot constantly monitor the area. Some pieces have been collected by staff, such as the oxygen tank and a boot heel. Edward Blackmore would like to set up a small exhibit showcasing the history of the site, the artifacts, and promoting the Demonstration Forest either at the Gander Airport or at NAAM in an attempt to encourage more visitors to THDF.

5.8 USAAF B-17 44-6344 (DfAp-08)

5.8.1 History

USAAF B-17G 44-6344 crashed 4 August 1944 at 0218GMT. The aircraft made a normal takeoff from runway 23 (235 degrees) en route to the Azores, rose in a steep climb to 200 to 400 feet in a light rain, when the aircraft's left wing began to drop as if the aircraft were going to make a diving turn. Witnesses described the dip in the wing as resembling a stall. The aircraft descended at a 30 to 40 degree angle, and disappeared from view behind the trees. It crashed left wing first and exploded immediately in a 200 to 300 foot high flare (Blackeslee *et al.* 1944). An eye witness, USAAF navigator Andrew H. Hines, Jr. remembers the crash as follows:

> Air traffic on the North Atlantic crossing was severely impaired. At the time our aircraft was scheduled to cross, planes were beginning to "pile up", awaiting weather, and it became necessary to move them out. On approximately August 4th we were scheduled to fly the next leg of our trip – Gandar [sic] to Azores.
>
> Our crew was briefed for the flight and we were assigned the position of number 3 for takeoff. As we taxied toward the end of the runway we could see in the east lightning and bad weather from an approaching storm. At the end of the runway we stopped while number 1 took off. He cleared the end of the runway successfully and disappeared into the murk of the approaching bad weather.
>
> Number 2 pulled out on the runway and accelerated for take off. As number 3 we pulled out behind the vacated area and began engine acceleration for our own take off. Number 2 cleared the runway and climbed slightly then heeled over and crashed into the ground. The sky lit up. As number 2 struck and caught fire, our pilot accelerated our engines and we began to roll toward our own take off. We cleared the end of the runway and lifted into the air slightly and flew by the burning wreck of number 2. It was a boiling sea of flames. No one escaped alive. We passed, gained altitude and were immediately in a zone of St. Elmo's Fire. A ring of sparks marked the tips of our four rotating propellers.

> Arcs of static electricity began to dance though the aircraft. […] After a few minutes we left the disturbed weather. I had a clear sight of St. John's which I used as a point of departure for our flight to the Azores (pers. comm. 2 Aug 2013; see Table 5.7 for crew).

Table 5.7: Crew list for USAAF B-17 44-6344. Adapted from Blackeslee *et al.* 1944.

Name	Serial No.	Rank	Serial No.	Unit	Duty	Injuries
Oppenheimer, Saul J.	819304	2nd Lt.	819304	15th AF	Pilot	Fatal
Wampler, Chester C.	767028	2nd Lt.	767028	15th AF	Co-pilot	Fatal
Hild, Malcolm H.	T3200	F/O	T3200	15th AF	Navigator	Fatal
Harrog, David L.	719071	2nd Lt.	719071	15th AF	Bombadier	Fatal
Faulconer, Warren G.	13143604	Sgt.	13143604	15th AF	AEO	Fatal
Lawson, Gordon T. Jr.	17072183	Cpl.	17072183	15th AF	ROB	Fatal
Ruggeri, William	36559279	Cpl.	36559279	15th AF	AB	Fatal
Shelley, Keith M.	13092412	Cpl.	13092412	15th AF	AROG	Fatal
Leathers, Maurice E.	37678642	Cpl.	37678642	15th AF	AG	Fatal
Taylor, Forrest G.	19054972	Cpl.	19054972	15th AF	AAG	Fatal

One pilot, Stanley L. Anderson, attempted to contact the control tower to inform them of the crash, but other aircraft interfered with getting through. After trying four times, Anderson went directly to Control Operations and informed them of the crash. The subsequent investigation could not find the cause of the accident, but believed that it was due to an engine stall. The aircraft had had some maintenance done on its flight indicator, but the investigation found that this was not a factor in the crash (Blackeslee *et al.* 1944).

5.8.2 Analysis

There is very little remaining of this aircraft (see 4.11). Like most USAAF reports, there is no mention in the crash report that any of the aircraft was salvaged. However the site has been heavily scavenged and disturbed. There is evidence of burning around part of the site, and the trees themselves are sparse. The area was also the site of a forest fire many years ago which would have further damaged the site (Frank Tibbo, pers. comm. 2011). Researchers found landing gears, hydraulics, wheel assemblies, and other large or rusted pieces. All of the iron, copper and rubber were gone, except for a large rubber fuel gasket found a distance from the main site. What remained was steel (not recyclable in Newfoundland) and rusted iron, or pieces too large to be easily moved. The wet area of the site did have a few more pieces, and may have more small pieces in the water, but none were found by researchers. Given that the wet area of the site is in part of the runoff from the airport, and is relatively close to the highway, there is a great possibility that some of the aircraft was covered when the highway was constructed (Darrell Hillier, pers. comm.2010).

As it stands, there is very little left of the aircraft, and so the site is more of an example of how information can be lost when sites are scavenged. The evidence for site recovery consists of a small lunch area located near the wheel assembly, including empty pop bottles and rusted cans. What remains are all pieces that are in too poor condition to be recovered, and are of no salvageable worth. This site has been effectively destroyed in the search for scrap metal. This site demonstrates what can happen to remaining aviation sites around Newfoundland and Labrador without proper monitoring and protection.

5.9 Ferry Command B-25 KJ584 (DfAp-14)

5.9.1 History

RAF B-25 Mitchell KJ584 crashed during a night takeoff from Gander on 29 August 1944 at 0342 GMT (Christie 1995; RAF Forum 2012). The three crew on board were killed in the crash (Table 5.8).

Table 5.8: Crew and passenger list for RAF B-25 KJ584. Adapted from Christie 1995.

Name	Rank	Service	Seat
Kabin, Vladimir John		Canadian civilian	Pilot
Flood, David	Sgt.	RAF	Navigator
Sheldrick, Thomas Tweed	Sgt.	RAF	Radio Operator

5.9.2 Analysis

Figure 5.14: RAF B-25 engines removed from the crash site. Photo by author.

There is no crash record for this aircraft, and the site does not add much to the available information. The aircraft is located on the edge of a boggy, clear cut area near a forested area. It looks as if, when the area was logged, it was logged up to the bog, but also avoided the area of the crash. There is another area of trees close to the crash, close to where the debris extended, and this area was checked for further aircraft remains, but none were found. The distribution of aircraft fragments throughout the close trees would indicate that the main damage to the aircraft was caused by a mid-air explosion. The area does not seem to have burned, as there is no evidence of burning, nor is it a cleared area as was seen at the Hudson and B-17 TCH sites, or full of birch as seen at the Canso site. The site is actually very tight in the trees, making it difficult to obtain measurements or clear pictures of larger pieces. The site also does not show an entry point, such as is seen with the Digby (DfAp-10) or A-20 (DfAp-13) sites. There are pieces moved and missing, indicating that the site does get visited, but no graffiti or other indicators were found on site. The engines are located near the road to Deadman's Pond, and were placed there a few years ago by 9 Wing Gander to be removed to the aviation museum (Figure 5.14; Frank Tibbo pers. comm. 2011).

The aircraft must have exploded over the trees and this makes it difficult to uncover much more about the mechanics of the crash. It is a small site, with a concentration of large artifacts. The incident seemed to be one of high energy since even though the pieces are large they are heavily damaged and difficult to identify. There was no evidence of a cockpit, controls or radio equipment, so they were most likely destroyed or removed at the time of the initial recovery.

5.10 General Conclusions

As illustrated above, the archaeological investigation of WWII aircraft crashes can give a great deal of information about the actual crashes, sometimes beyond what is listed in archival records. The research into

Figure 5.15: Graffiti on the RCAF Digby (DfAp-10) which corresponds opposite the dates when the area had restricted access. Photo by author.

crashes will often incorporate information from a variety of sources, beyond the official incident documents associated with the aircraft. As seen from the B-25 (see Section 5.9), it is advisable, especially if official incident reports are unavailable, to search for the individuals who were on the aircraft as there may be other documents associated with the accident, especially if they are from a different country than the aircraft. Similarly, aviation history is a haven for enthusiasts and historians. There are many areas of specialization within the field, and many of those involved in such research are happy to share their information, such as those on the RAF forums who helped identify Ferry Command aircraft around Gander, and VMFA who had notes regarding the recovery of the Ventura. Similarly, much information was gained through public presentations as many in attendance would share their information (e.g., identifying the engines found on the road to Deadman's Pond as belonging to the B-25 (DfAp-14) and that a forest fire had further damaged the B-17 off the TCH (DfAp-08)). Therefore, the research of WWII wrecks must go beyond the official documentation. It is the official report coupled with personal and secondary information, along with the physical remains, that will give an idea of the crash and subsequent recovery.

As seen at many of the sites, history and site formation continues to the present day. Graffiti and other damage to the site can indicate various uses

Figure 5.16: Graffiti on the RAF Ventura (DfAo-01) which mostly dates to the winter months, indicating the crash site is on an unofficial snowmobile trail. Photo by author.

of a site, such as use as a trail marker or source of scrap and salvage material. As indicated, graffiti can also indicate when sites were or are most visited, and if necessary, steps can potentially be taken to help protect such sites from further damage based on the assessment of the archaeologist (Figure 5.15 and 5.16). Some sites are all but lost, but one of the goals of this project is to form an inventory of what remains around Gander in an attempt to protect them for the future.

Chapter 6: Newfoundlanders Working and Living in Gander

The first residents of Gander, the construction crew who worked to clear the land for the airport, lived in tents and railcars. When Bennett and his crew arrived to attempt to fly the seven RAF Hudsons overseas, they lived in train cars specifically brought to Gander to house them while they waited for the weather to clear so they could attempt their flight. As the base grew, so did the need for further accommodations. As the war effort progressed and more countries took up residence at the Newfoundland Airport, the base had to grow to accommodate them. Segregation of the countries began and “sides” were developed: the Army (American) Side, the Canadian Side, and the RAF side. As more servicemen and women arrived, the sides had to expand not just to provide accommodation, but to provide buildings for sports and entertainment, such as bowling alleys, theatres, libraries and gathering places such as postal exchanges and mess halls. The number of people needed to run the Gander Airbase meant a town (or arguably two due to the segregation between countries) was constructed just off the runways, a town where people from various countries lived together while doing their part in North American defence, anti-submarine warfare, and forwarding support to the Allied war effort in Europe.

6.1 Growth in Gander

In 1938, it was realised that land planes were going to be more practical than float planes, so the radio operators and meteorological personnel were relocated from the seaplane base at Botwood to Gander (Christie 1995; Riggs and Russell 1994). Because staff and their families were now living in Gander, permanent family accommodations were constructed (Baker 1973; Riggs and Russell 1994). Even with the influx of Canadian military for EAC, ATFERO and Ferry

Command personnel, and later the United States military, civilians continued to work on the base with the majority of civilians living in barracks on the Canadian side (Baker 1973; Hadley 1985; Riggs and Russell 1994). The weather station was run by Canada since its inception at Botwood, so it made sense for them to be housed alongside the Canadian military (Christie 1995). The mostly civilian meteorologists and radio operators had accommodations and offices in the Administration Building, and that function was maintained with the arrival of the Canadians (Christie 1995; Goff 2005). The first RCAF pilots to arrive were housed in the Administration building alongside the civilian radio operators and meteorologists until the barracks were completed (Goff 2005). When the USAAF arrived, their weathermen were offered space in the Administration building by Canadian Patrick D. McTaggart-Cowan, the man in charge of the Gander weather office, and worked alongside civilian and Canadian military until the time their own offices were ready (Christie 1995; Craven and Cate 1966; Goff 2005). McTaggart-Cowan, like many of the civilian staff, had been living and working in Newfoundland prior to the war (Sholto 1960). Newfoundland Rangers were also a presence in Gander, the "supernumerary" or special duty Rangers were stationed at Gander under the Ranger-in-Charge of the Gander Detachment. Rangers would police the area as well as aid in recovery operations at crash sites; Ranger 35, Jonathan Clarence Mercer of Point Leamington, was one of the two Rangers tasked with recovering the body of Sir Frederick Banting after the fatal crash of his Hudson transport in 1941 (McGrath *et al.* 2005).

Given how Gander was an operational airport prior to the arrival of the RCAF and Botwood was an operational meteorological station, it made perfect sense to have many of the staff continue to work at the airfield, even though they were civilians. For the most part, as the number of military in Gander increased, the number of restrictions on the civilian workers increased. Civilian employees had to wear uniforms and carry passes to be able to move around the airbase.

Newfoundland civilians were often easily identifiable, the most striking being the red berets worn by the Newfoundland recruited civilian security guards who worked on the base (Thompson 1944). In some cases, often depending on their country of origin, civilians who were working in Gander prior to the war were commissioned by the outsider forces but continued to work in Gander as military. This happened to T.M. McGrath, who was a radio operator in Gander prior to the war, but recruited to the RAF (Warren 1988). Due to their talent and work ethic, many remained on as civilian employees. N.F. Healey attributes this to knowing the priorities when working at an airbase:

> Some were tall and some were short, some had beards and others did not; some liked to talk and others said very little; but they all had one thing in common, and that was to produce forecasts as accurate as humanly possible for flyers who pioneered the Atlantic in the early days of war (Warren 1988, 55).

There were added benefits of the military presence for civilians. One major one, at the time when Newfoundland did not have centralized healthcare and very few hospitals, was that medical and dental services were available at the RCAF hospital and a dental clinic for civilian employees of the base (Baker 1973; Goff 2005).

The fact that Ferry Command was not military led to a different, more relaxed attitude at the airbase. This at ease feeling is reflected in personnel anecdotes told by pilots and ground staff. For instance, on the initial flight of the seven Hudsons, Bennett’s second pilot, Clauswitz, wore cowboy boots, instead of more suitable winter boots, for added luck (Bennett 1958). Even later in the war Gander maintained some of this less than military attitude. Sergeant Lester “Bud” Willsey of the United States Army Air Force arrived in Gander in November 1943, when the United States operations were at their peak. He recalls working as part of the Gander Operations in Flight Control:

> The USAAF fellows on the flight line were mostly former civilian airline workers. Some of the passenger planes in the Air Transport Command were owned by the airlines. Everyone worked together in harmony. The work involved at Gander caused every military person to give his all. They were a cheerful bunch who did not involve themselves in all the required Military discipline. I remember when the famous General Patten stopped over one time to refuel and complained to our Base Commander that no one saluted him as required when he toured the Base (Cardoulis 1993, 103).

Interestingly, with this recalled informality, an issue of *The Proppaganda*[8], an American publication permitted to be sent home by servicemen, states that "the Canadian Army is just like ours, but they seem to dote less on formality than we do" (Thompson 1944, 12).

6.2 Working For Canada and The United States

The issue of wages was difficult during the lifespan of Ferry Command. To aid in recruitment, Lord Beaverbrook instructed that the American pilots should get extremely high rates of pay, whereas pilots from the RCAF and RAF were receiving significantly less (Bennett 1958; Douglas 1987). Interestingly, rates of pay were also a point of contention for Newfoundlanders working on base construction. Canadian and American construction workers were paid more than Newfoundland workers. Much of this was due to the Commission Government negotiating with the United States to keep wages down (Neary 1988). The Commission Government did not want Newfoundlanders to receive high wages as this would upset the local economy and discourage Newfoundlanders from continuing at jobs such as mining and fishing (High 2009). The government argued that what Newfoundland needed was more employment, not higher rates of

[8] *Proppaganda* was initially described as "Published by the Special Service Office, U.S. Army Air Base, Somewhere in Newfoundland" as the location of Gander was classified information (Thompson 1944). Later, when Gander was no longer a classified location, the name of the publication was changed to *Propagander*.

pay (Neary 1994). Added to this was the encouragement from the mercantile class to keep wages in Newfoundland low. The United States policy on wages was to match local rates, and as they were treating Newfoundland as one wage area, all civilians employed on the base colonies were paid the same across the colony (Neary 1994). There were situations where the Newfoundland labourers felt their treatment was inferior to that of the higher paid outsiders. In one case, this feeling culminated in a thousand workers walking off the job at Fort Pepperell to successfully get the Commission Government to increase the base wage (High 2009; MacLeod 1986). The Americans wanted to pay significantly higher than Newfoundlanders were accustomed to. Pius Alexander of Little Harbour, Deer Lake, recalled that on his first two weeks of work as a labourer with the US Corps of Engineers in Stephenville he received $2.50 an hour, but when the Commission Government regulations came through, his wage dropped to 25 cents an hour; still a sizeable paycheque for a Newfoundlander, but much less than they originally wanted to pay (Cardoulis 1993).

A major point of contention is the attitude that many of the American military officials had towards the Newfoundlanders working on the bases, Gander included. The general attitude was "both critical and complementary" (Neary 1988, 208). The major problem was that the United States officials expected a certain calibre of work regardless of other obligations. According to the United States, the war effort meant that anything related to defence was priority in Newfoundland and that those looking to work on the bases should forgo their lives and other work. The United States and Canada were annoyed with the high turnover rates and the slow work pace Newfoundlanders were accustomed to. To encourage better turnout, multiple patriotic appeals went out to the Newfoundland public, much of which initially went unheeded (MacLeod 1986; Neary 1994). During the first winter of construction, many Newfoundlanders returned home to, in the American point of view, laze and live off the wages they earned (MacKenzie 1992). In many ways this was not laziness, but instead a traditional cultural practice. Newfoundlanders were accustomed to seasonal work. According to High (2009) and MacKenzie (1992), Newfoundlanders were incorporating the work available at the bases into their seasonal work rotation. The Newfoundland economy, before the bases, was based on seasonal work such as logging, fishing, sealing and farming, which took up different seasons, and allowed different work to be done at different times of the year. The outsiders interpreted this phenomenon as being restlessness and needing frequent changes in employment (High 2009). Goff (2005) believes that Newfoundlanders just wanted to be home at Christmas, but Ling (2001) suggests that, like the men serving overseas, the families of those working on base construction needed to return home around the start of the winter to help prepare the home for the long, cold season. For whatever reason, Newfoundlanders were leaving the bases causing high turnover rates and problems for construction schedules. Later in the war, local labourers were seen as better workers, and Newfoundlanders continued to be hired for base construction. By 1945, over 1,900 Newfoundland workers had been contracted to work in industries in the United States due to the war-time labour shortage (Neary 1994; 1998).

The United States military officials were also critical of the spending habits of the people and the lack of rationing imposed by the Commission Government (Bridle 1974; Neary 1988). Outside officials did not understand that Newfoundland had just gone through a severe economic depression, one that had led to Newfoundland losing representative government and resulting in extreme poverty for the people. Base construction and enlistment in the war virtually eliminated unemployment in the colony, and Newfoundlanders enjoyed the newfound prosperity (MacKenzie 1992; Neary 1988). Contrary to the American view that Newfoundlanders were squandering their money on luxury items, many Newfoundlanders were paying off their debts to merchants and bank savings increased from $29,463,000 in 1941 to $39,368,000 in 1942 and 1942 War Savings Certificates sales almost doubled from the previous year (MacKenzie 1992). Newfoundlanders were also impacted by the influx of American culture and goods, and for the first time, many of them had cash incomes and the means to improve their quality of life (MacKenzie 1992; MacLeod 1986).

When it came to what United States military officials thought of Newfoundlanders it can be viewed in the swearing in speech made by Major Joshua Cockey, Base Personnel Officer at Gander when he stated:

> No matter in what country you may be stationed, you will find everyone eager to learn more about Americans – their habits, customs, and ideals. In many ways, you will unconsciously share with others the ideals of freedom and democracy that we Americans so dearly cherish and for which we are losing lives daily to preserve (Thompson 1944, 12).

Newfoundlanders were viewed in the same way as every other base colony occupied by the United States during the war. The local population were a secondary class of people, often referred to as "natives," and the military officials often treated them in the same way they treated native peoples of other locations with base colonies (Bermuda, British Guiana, Trinidad, St. Lucia, Antigua and Jamaica), with much of the same racial attitudes found in the United States (High 2003; 2009). Locals were often segregated from the servicemen. In Newfoundland, it was not as severe as other base colonies, but on the Gander base, Newfoundlanders did have to wear identifying tags and were only permitted to take part in events at specific times, such as going to the movies (Cardoulis 1990).

6.2.1 "Little America"

The groups of outsiders did a great deal to shape the experience of their servicemen overseas. Bases were built according to typical Canadian and American architectural practices, familiar foods were imported, and radio stations created. These things were used to create a sense of home for forces serving overseas, but at the same time had a great effect on the civilian population (Webb 2004). The introduction of architectural ideas influenced locals to build their homes and buildings differently, and the abundance of mainland North American radio programs altered what local stations would play, and what people, particularly the youth, would listen to.

The method of construction used for foreign military bases reflected the national identity of those serving there. This phenomenon, known as “Little America” for United States bases, was common with any country setting up international bases (Lake 2002; Schofield 1999). Soon after the outsiders began to arrive and construct buildings, Newfoundland architecture began to take on similar characteristics (High 2009; MacLeod 1986; Neary 1988). In 1945, the governor of Newfoundland, Humphrey Walwyn, commented that:

> Already the effect upon Newfoundland building and architecture, heretofore stereotyped and ugly, is discernible in new civilian building and housing schemes. Up to date methods in healing [sic] and plumbing, applied on the Bases, are being adopted widely; for example central heating by oil burners is spreading rapidly (High 2009, 10).

Just the introduction of the styles of heating and housing were enough to change how the civilian society lived. Interestingly, in contrast to this statement, at Gander, newspaper reports describe the buildings as ugly and drab, certainly not something to replicate to improve the architecture of Newfoundland (Historic '83 1983; see Section 6.2).

Prior to the war, Newfoundland had two government funded radio stations, VOFM and VONG, and a private one, VOCM (Neary 1988). These stations mostly played programs from the British Broadcasting Company (BBC) and local programming, but very little from mainland North America (Webb 2004). To keep servicemen from getting homesick while overseas, the American station VOUS (Voice of the United States) was established at Fort Pepperell (Cardoulis 1990;

Webb 2004). Another, VORG, was operated by the RCAF in Gander, and played a variety of American, Canadian, Newfoundland and British programs (Babbitt 1944). These radio programs were there to maintain cultural patterns of experience for the outsiders, but also influenced socialization (Webb 2004). Military radio stations introduced Newfoundland society as a whole to new products (Ling 2002). Newspapers and magazines advertised many of these products as well. The American music played was greatly consumed by the civilian population, and may even be the reason why the girls in Corner Brook had excellent jitterbug skills and smooth dancing talent (Lewis 1944; Webb 2004).

6.3 Entertainment and Romance

The service personnel at Gander had a great deal of interaction with Newfoundland girls. The Post Exchange, a type of retail store on base, on the American side was staffed with fifteen Newfoundland girls who worked as waitresses, cooks, and cashiers who set the tone for how many of the servicemen would spend their off-duty hours. According to Reinitz (1944, 6) "just as the atmosphere of the canteen is built around the girls who provide the service, the life of the girls is built around the canteen" showing how the women were there to work but also a distraction for the men, creating an opportunity for socializing and even dating. Off base, socializing with the Newfoundland civilian population came in different ways, often depending on the country of origin. Beginning early in the construction of the airfield it was decided that workers needed to get away from the isolation for socials and a train was arranged to transport them to Grand Falls. This continued into the war with Canadian and American forces holding private and public dances in Grand Falls (*Grand Falls Advertiser* 8 Nov. 1941). Later articles about dances in the *Grand Falls*

Advertiser often mention the high numbers of uniforms in attendance, suggesting outsider attendance to the events. Besides a few specific events it is rarely distinguished which country those uniforms represented, possibly for security reasons. One case of interest shows Newfoundland, Canadian and American servicemen and Newfoundland civilians attending "The Home Guard Dance" which filled up the Town Hall until late into the night, indicating that although there were private functions, there were also incidents of outsiders coming together in public venues to socialize (*Grand Falls Advertiser* 18 April 1942). These events often seem to have had some form of military pretence, such as the Home Guard Dance or Military Sports Meet (*Grand Falls Advertiser* 29 Aug. 1943). Events were not always covered in detail by the local newspapers, possibly due to the censors. *The Gander*, an RCAF magazine, contained a sports section, and while it was reported when a Gander team would travel, usually to Corner Brook, for sporting events, it was rare to state exactly who they were playing against, stating censorship regulations (*The Gander* 1934, 6). As well as dances and sporting events, RCAF servicemen on short leave would travel to Grand Falls for the fishing in that area (most likely salmon; *The Gander* 1943a).

As the United States Service Organization Inc. (USO) was completed in 1944, fewer American servicemen would go to the socials in Grand Falls. Jean Woodman, a teacher in Grand Falls in the second half of the war recalls that it was only the Canadians who frequented Grand Falls. Perhaps she just recalls them best because while other outsider forces were well behaved, the Canadian Algonquin Regiment at Gander had a reputation for rowdiness (MacLeod 1999). This rowdy behaviour was a common characteristic across Newfoundland, not just with the Canadians in Gander. Generally, the United States servicemen were the best behaved of the groups of outsiders, a fact noted by the Newfoundland and American governments (Neary 1994). Helen

Porter of St. John’s also recalls the Canadian sailors as the ones who liked to drink and fight a lot, whereas the United States forces were more clean-cut and more interested in sex, not alcohol. Newfoundland women had the added choice of British sailors of the Royal Navy (RN), who were the preferred choice (MacLeod and Penney 2002).

Although not in Gander, the USO located in Corner Brook was frequented by United States servicemen on three- or four- day passes from Gander (Cardoulis 1993; Lewis 1944). This, like the Postal Exchange on base, employed a number of local girls and was a place for servicemen to relax. Unlike the Postal Exchange, the USO was more open to the public, where civilians and other servicemen could be invited to shows, giving outsiders time to socialize with locals (Cardoulis 1993; MacLeod 1999). Like the Postal Exchange, one of the big selling points was the women who worked there and the girls of Corner Brook who “know what the score is, have heard all the lines, and developed a few angles of their own. They are friendly, considerate, and anxious to show the boys a good time” (Lewis 1944). Interestingly, the American magazine *Proppaganda* seems to try to sell the idea that the girls of Corner Brook are the same as the girls of the United States, encouraging socializing which could lead to more relationships that were permanent when the official policy was to discourage marriage between United States servicemen and Newfoundlanders.

On the Canadian Side, the Women's Division (WDs) served their country by working in support services and had a secondary role of socializing with the men of Gander (Tibbo 1997). Dances were held with great frequency, each sponsored by different divisions and picnics were held to welcome new WDs to the Gander Family (*The Gander* 1943a; 1943b; 1944a; 1944b; 1944c; 1944d). WDs also had their own clubhouse in 1944; a nice place to bring their dates containing soft lighting, radios, a large fireplace and soft leather chairs in the date room (*The*

Gander 1944b, 8). WDs at Gander were expected to socialize with servicemen "on both sides of the runway [*Canadian and American*] and all along the railway tracks [*mostly Newfoundlanders*]" (Italics mine; *The Gander* 1943a, 9).

Marriage between Newfoundland women and outsider men became relatively common, and again, rumours often made it into the Grand Falls gossip column (Cardoulis 1990; Neary 1988). Early in the Canadian occupation of Gander, gossip columnist W.B. (1941) comments on the possible marriage to occur between a girl from Bishop’s Falls and a Canadian serviceman. The subsequent marriage announcement did not follow in the next few weeks, but even if these two were not married, many outsider servicemen did marry Newfoundland girls. *The Gander* contains a regular section called Wedding Bells in each magazine dedicated to marriages involving RCAF members stationed at the base. Marriages could be between servicemen and servicewomen, staff, WDs, or Newfoundland girls, showing much more mixing and fewer restrictions placed on Canadian servicemen as compared to their American counterparts (*The Gander* all dates).

The attitudes towards these marriages differed depending on the home country of the servicemen. Canada did not keep track of the number of marriages that took place in Newfoundland. A survey of marriages announced in the St. John’s newspaper, *The Evening Telegram*, by MacLeod and Penney (2002) estimates that 450 marriages between Canadian servicemen and Newfoundlanders took place between May 1944 and August 1945. On the other hand, the United States Consul General, George D. Hopper, kept detailed records of the marriage of United States servicemen to Newfoundland girls, and even went so far as to calculate how many of those marriages were due to a necessity like pre-marital pregnancy (MacLeod and Penney 2002). As with the Newfoundland labourers, many military officials had low opinions of the Newfoundland women. In their view, the American servicemen were well-behaved and pure, but were being corrupted by the “outport/waitress class.” Even though relationships and marriages were often along similar class lines, it was still seen as Newfoundland women trying to take advantage of American servicemen so that they could move to the prosperous United States (Cardoulis 1993; Neary 1994). Even if a Newfoundland girl married a United States serviceman, she still had to go through normal immigration procedures and, if successful, would lose her Newfoundland passport (Neary 1994). Eva Oswald, née Marsh, from St. John's, discovered herself without a country after her marriage to her American husband, Alfred. When Alfred tried to send her to New York to live with his parents they were told by the American Consulate that "your wife is unable to qualify for an American Passport since she did not acquire an American Citizenship [sic] by marrying an American. She is unable to obtain a Newfoundland Passport [sic] because she lost her citizenship by marrying an alien" (Cardoulis 1993, 79). The Oswalds had to petition US Immigration, The Red Cross and the US Consulate until they issued an Affidavit in-lieu of a passport so she could travel to the US. Interestingly, in Cardoulis (1993) many of the stories of Newfoundland women marrying American servicemen talk of staying in Newfoundland or moving away only to return years later. Many others did move to the United States, and some formed groups with other Newfoundland service wives.

Marriage between Newfoundlanders and American servicemen became difficult in October 1943 when General Order Number 100 was released stating:

> no military personnel on duty in the Panama Canal Zone or in any foreign country or possession, may marry without approval of the Commanding Officer of the United States Army Forces stationed in the Panama Canal Zone or in such foreign country of possession” (Cardoulis 1993, 68).

And:

> no military personnel of this command [Newfoundland Base Command, U.S. Army Newfoundland] may marry without the prior approval of the Commanding General,

> Newfoundland Base Command. Approval of the Commanding General <u>will not</u> be given to any personnel of this command for marriage to a person who is not an American citizen (emphasis theirs; Cardoulis 1993, 69).

This order did deter some servicemen as there was a general decline in marriages, but many still applied for approval, and in other cases, knowing they would not be approved, married in secret (Cardoulis 1993; MacLeod and Penney 2002). The punishment for marrying without permission was a court-marshall, a sentence of not more than four months in jail, an automatic reduction in rank, and forfeiture of two-thirds month's pay. After the time was served, the individual could be reinstated. Meanwhile, wives could receive dependant's allowance while her husband was in jail (Cardoulis 1993; Neary 1988). Some servicemen found this sentence to be worth the risk of marriage.

MacLeod and Penney (2002) point out that approximately the same number of marriages between United States servicemen and Canadian servicemen took place from 1944 to 1945 across the colony. The movement of young women to mainland North America during and after the war did not cause a drop in population as it was generally balanced by the return of Newfoundland servicemen who served overseas and their British war brides (Ling 2001; MacLeod 1994).

Statistics are not available for the Gander area, but there is a strong possibility that fewer marriages took place in the area due to the access restrictions and isolation of the airbase. Added to this is the fact that it was not built near a town, like the majority of other bases, and dependants of servicemen were not allowed to join their husbands on the base, except for short visits from the wives and families of RAF Ferry Command personnel (Christie 1995). Until the United States officially entered the war, their dependants were permitted to move to Newfoundland from the United States (Neary 1988). Similarly, Canadian dependants stayed throughout the war, causing housing problems for St. John's and eventually leading to restrictions on the number of Canadian dependants permitted in the colony (Bridle 1974). But Gander was restricted and so dependants of either mainland group could not move to the base (Cardoulis 1990). If dependants were not permitted on base then there was less incentive for marriage. Married women in many fields in Newfoundland were discouraged from working and married women were forbidden from working as civil servants (Ling 2001). Women married to outsider forces working in Gander would have to quit their jobs and live off of their husband's salary, most likely while returning to their parents' home until after the war. One crafty American, Alfred Oswald, did manage to convince an RCAF Major to hire his Newfoundland wife, Eva, as a maid, making him the "only American who had a wife with him in Gander" (Cardoulis 1993, 79).

Although military dependants were not permitted to live on base, there were civilian families (Baker 1973). Some base employees did have their families in Gander, even early in the airfield's history. In 1940, there were ten school age children, who were taught out of a railcar. Later in the war, possibly 1944, the people of the Gander Airbase requested a new school from the government of Newfoundland. The Commission Government felt that while it was responsible for schools around the country, the circumstances around Gander were different. According to a report signed by Governor Walwyn (ca. 1944),

> It can be stated that without fear of contradiction that, had there been no Airport, there would have been no settlement and certainly no school, at Gander, which would have remained a small way-side Railroad. The necessity for a school in this locality is the direct outcome of the establishment of the Airport.

At the time of the letter, there were 57 school children in Gander, 46 of whom were children of individuals directly employed by the airport, 8 were children of railroad employees, who were only present in such high numbers due to the airport, 2 were children of the storekeeper, also only present due to the airport, and one was a child of the resident agent of the oil company, again, only there due to the airport. The government believed that had there not been an airport, the few children who might have been present in the area, if a railway clerk were living in Gander, could be easily transported to a nearby town for school. As such, the Commission Government felt the cost of the school should fall under airport maintenance, meaning the Air Ministry would cover five sixths of the cost to the facility (Walwyn c. 1944).

Children were given space and accepted as part of the community, were built a playground and wading pool to both keep them occupied and keep them safely out of the hangars (*Propagander* 1944). Children were often treated to special occasions put on by the outside forces. For instance, Eileen Elms, who was a child in the 1940s in Gander, recalls the fourth of July celebrations put on by the USAAF, the RAF celebrating Guy Fawkes night and the RCAF making Christmas special for the children by bringing gifts and other children from Gambo for a Christmas party where they met Santa at the RCAF Globe Theatre (Cardoulis 1993; Warren 1988; *The Gander* Jan-Feb 1944). Children could also frequent the theatres on the Canadian and American side (the Globe and the Star respectively), which is further discussed in section 6.2.

Many interactions between civilian Newfoundlanders and servicemen were romantically inclined, but there were also many activities available on base that resulted in more casual interaction. As access to Gander was restricted, there were few stores and most food was acquired on base at the mess hall (Cardoulis 1990). Civilians were permitted to eat amongst the servicemen and base workers. For instance, Joseph R. Smallwood, who would later bring Newfoundland into Canadian confederation and become the first premier of Newfoundland, ran a piggery behind Hangars 21 and 22 that provided fresh pork for the base. Even though he was a civilian and did not work on the airbase itself, he was still permitted to eat at the mess (Goff 2005).

There were a number of venues on base where civilians could interact with service personnel. However, the Canadian and American sides had separate entertainment: their own theatres, officer's clubs, NCO messes, and gymnasiums, which encouraged socialization amongst members of their own service more so than other ones (Cardoulis 1990).

One of the duties of Transport Command was the transportation of dignitaries and celebrities. As well, sometimes celebrities would stop in Gander as part of their USO tours (Cardoulis 1990; Goff 2005). Civilian and military alike would come out to see dignitaries, depending on their personal preferences. The largest turnout was for British Prime Minister Winston Churchill, where everyone on shift came out to hear him speak (Goff 2005).

Many activities were available to servicemen and women. Reading issues of *The Gander*, there are sections dedicated to all of the different activities available. Sports on base include:

> Basketball, borden ball, floor hockey, bowling (all four organized and unorganized), badminton, tennis, gymnastics, rope climbing, wall weights, boxing, wrestling, calisthenics, swimming, diving, skiing, skating (we hope), hiking (stay out of the woods unless you have the instincts of a homing pigeon) (*The Gander* 1944a, 25).

Skating was only available on Dead Man's Pond; a rink was attempted, but the work and weather made it unfeasible (*The Gander* 1944a, 6). Rod Goff, who was a child in Gander throughout the war, remembers a maintained rink during the war period, first an outdoor rink built by the army, indicating they must have been successful in other years (Goff 1999, 16). Sports teams would travel around the island to play in tournaments, but as personnel were constantly transferred, it was often difficult to maintain teams (*The Gander* 1943b, 6). On the American side, sports available included baseball, basketball and bowling. American and Canadian teams would sometimes play against each other, although this was better reported in *Propaganda* than *The Gander* (*Propaganda* 1944, 28).

Other activities available to the RCAF base included:

> Movies, radio listening, dancing, reading (books, magazines, and newspapers) writing (letters for the Gander, for the radio). Recorded program, discussion groups, band concerts, pop concerts, choir, glee club, arts and crafts, cards, pool, ping-pong, relaxation over a coke or a beer (*The Gander* 1944a, 25).

The library on base was well stocked and contained "biography, fiction, history, travel, sociology, economics, English, religion, reference and technical, plus a miscellaneous assortment on many other subjects" (*The Gander* 1943a, 25). The Gander School of Arts and Crafts opened in early 1944 and was where servicemen could work on crafts, wood cutting, lino-cutting or take a drawing class (*The Gander* 1944a, 20). VORG, the Voice of Radio Gander, began operation in 1944, playing Canadian and local broadcasts (*The* Gander 1944a, 19). Popular games played on base included snooker, checkers, cribbage and bridge (*The Gander* 1944c, 25). Two chaplains, one USAAF, one RCAF, would host a discussion group for whoever wanted to join (Goff 2005). These discussions took place in the one-room chapel on the American side that had been built for Roman Catholic and Protestant services (Baker 1973). Topics for discussion could be initiated by anyone in attendance, and no form of membership was required (*The Gander* 1944a, 32). Civilians were invited, and Joseph Smallwood was reported to have participated frequently in these discussions (Goff 2005).

Religion did have some impact on interactions at Gander. The chapel could be used by anyone, with services going on at either side of the chapel. Given the religious history of Newfoundland, coupled with the influx of a new population of Catholics, intense prejudices developed. Much of this was resentment and mild conflict between the Irish Catholic Newfoundland population and the French Catholic of the French-Canadian troops. As well, the Protestant population of Newfoundland had a general dislike for all Catholics (Bridle 1974).

6.4 The Significance of Gander

The experience of outsider groups in Gander was different from other bases in Newfoundland. Because Gander was restricted, the base did not experience the same characteristic problems as others. Bases built near towns, such as Harmon Field, had problems with the development of a shantytown outside of the American territory. Much of this was because many people had just lost their homes to make room for the base, and rather than re-establish themselves as fishermen and farmers, they decided to build tar paper houses near the base and get jobs there (High 2002). Similarly, with the easy access to the base and nearby town, women could enter the community without restriction (High 2002; Neary 1998). Although there were no legal prostitution houses in Newfoundland at the time, there were prostitutes and other women interested in making connections with the military base (High 2002).

The ATFERO crews in Gander had a transient nature in that pilots and crew would stop there briefly before continuing overseas, but these stops were generally short term, and longer stays were unplanned and due to poor weather. Gander did have a problem with long periods of down-time as sometimes few aircraft would pass through the base, followed by a high volume, but again, this was often weather-related (Craven and Cate 1966). At such times, flight crews were offered activities to counteract the weariness of down-time, such as lectures, ground training, clearing runways and catching up on maintenance. Other staff would see no difference in the amount of work they had to do. The work for signalmen and those in administration, laundry, stores and other such work was not weather dependant (*The Gander* 1944a, 2). Naval bases, such as St. John's, also had a transient nature, but the ships in the harbour were often there for leave.

This, coupled with the high number of pubs and taverns in St. John’s, caused a higher incidence of rowdiness and vandalism than seen in Gander. On the other hand, EAC was permanently stationed in Gander. Poor weather would ground aircraft and could reduce U-boat activity, with the potential to cause long periods of down time for crews. Boredom and inactivity were often a problem for the permanent staff and crew of the Gander airbase (Douglas 1986).

Maintaining order was not as difficult in Gander, but there were incidents in Grand Falls, which may have been caused by servicemen on leave from the airbase, but overall, few are recorded in the Grand Falls Advertiser. Gander itself had enough military, along with Newfoundland security and police to maintain order.

Gander was not alone in the influx of groups of outsiders operating in a military capacity throughout the Second World War. Other towns and communities around Newfoundland had similar experiences. Moreover, the United States had a number of other base colonies (see Section 3.1.1), which were granted by the Anglo-American Leased Bases Agreement. The characteristic patterns of the experiences of outsiders concerning the war effort and the interactions with local civilian society are very similar, creating a unique history shared across diverse cultures (MacKenzie 2004).

Stories of Gander offer little regarding the less formal social interactions, but hints can be found. Much of the American part of the base was restricted, as well as distant enough from the remainder of the housing that it was necessary to take a bus to get from the Canadian side to the American side. This created physical distance between the different groups (the Newfoundland civilians lived in barracks on the Canadian side or in homes near the railway stop, again, near the Canadian side, figure 6.1). This was not unlike St. John's where the United States forces were stationed at Fort Pepperell that was, at the time, outside the St. John's city limits. There was enough entertainment available to the Americans that it was not as necessary for them to leave the base and interact with the population. Similarly, the United States forces imported all of their necessities

Figure 6.1: Gander Airbase during the war era. The Army side, or US side, was in the centre, between the runways, the Canadian side was at the base of the photo near the railway (which also housed most of the Newfoundlanders) and a small area considered to be the RAF side is to the left of the runways. Photo from Tibbo 1997.

whereas the Canadian forces obtained duty-free merchandise through local wholesalers (MacKenzie 1992). This may not have led to much interaction between civilians and the

Canadians, but it did connect them to local businesses and further supported the Newfoundland economy.

Whether the location of the bases caused this distance from the people or the physical isolation was the cause, the United States Forces did not fit in as well in the general population. Efforts were made to discourage contact with civilians in an effort to maintain a feeling of home and to discourage conflicts that can arise from prolonged socialization (Webb 2004). This is seen in the magazine *Propagander* (1944), which was published for the servicemen and to be sent home. The magazine had to point out how the local women who work and socialise on base and at the USO in Corner Brook are "just like the girls back home" leaving outsiders to believe that there is a general disconnect that would cause servicemen to see the girls as different (*Propagander* 1944, 26). Overall, it was the Canadians who fit in better in Newfoundland society, which could be attributed to similarities in culture, or to similarities in how they came into the war (MacLeod 1986). Both Newfoundland and Canada were at war due to their political loyalty to Britain, but the United States was in Newfoundland initially for self-protection. The concerns for the other countries and the war only went as far as the necessity to defend them as part of the defence of the United States.

Research seems to indicate that Gander was a mix of segregation and camaraderie. It is a difficult area to research in that some documents indicate strict segregation where some individuals who had no reason to go to the American side may never have seen it, but in other cases, individuals remember free movement between the two sides of the base. Perhaps this could be based on the individual roles that people played in Gander, with servicemen feeling the segregation more strongly than the civilian population. Or, it is entirely possible that the lines between war time and post-war Gander are blurred in the recollections of people, especially children. Regulations seemed to be more relaxed after the war, but it is difficult to know if this was a trend that started before the end of the conflict or if Gander opened up and became more accessible suddenly after the war ended and the Americans pulled out of Gander.

CHAPTER 7: WHY THE GLOBE THEATRE

When this project was first conceived the main focus was to be the infrastructure of the Gander Airbase, including the adjacent former town site of Gander (henceforth Old Town or Old Town of Gander). As the project progressed, it was apparent that the crash sites were going to provide significantly more information than originally anticipated and access to the Old Town for archaeological work would be limited. Gander is an active airport, so it was quickly established that most of the airport would be inaccessible for investigation. Research also indicated that a great deal of the original infrastructure has been altered or destroyed. For example, the original control tower is now the location of the terminal building. Lastly, Transport Canada (TC) could not give permission to dig critical areas of Old Town due to contamination issues. A great deal of work has been done to clean up all contaminants left behind by the war, but there is constant monitoring of the environmental condition of these sites. Digging in these areas would disturb the monitoring probes and could pose health risks to researchers. One area visited was the dump associated with the Old Town, but this area was completely off limits for excavation and it was strongly suggested that the area not be accessed at all because TC did not want the area disturbed. Similarly, the dump site for the remains of the 1944 fire in Hangar no. 6 was of interest (Flynn 1944; Tibbo 1997). That fire destroyed four Liberators, spare aircraft engines, and radio equipment. After the fire, the remains of the aircraft and contents of the buildings were bulldozed away from the runway to a dump at the end of Runway 31 (Cardoulis 1993; Hanrahan 1999). This area could potentially yield tools and other items of everyday use. Like the dump, it could give insight into the ongoing workings of the base, something that is not strongly reflected in the historical record. Like the dump, contamination was too great a threat to permit excavation.

The area selected for excavation was the original site of the Globe Theatre, on the Canadian side of the base. The decision to excavate this site was based on a number of factors. First, the American side of the base was completely off limits because it was built on what is now part of the active airport (see Map 6.1), and after the United States left in 1948 the entire area was burnt down and bulldozed (Edison 1983; Sandars 2000). While there could still be remains of the American side of the base under the surface, the location on the active airport made it impossible to excavate. The Canadian side is much more accessible and the old roads are often used for recreational purposes. The Canadian side was active during the war period, and although the area was divided by country, there was a lot of interaction between the groups as it was common for people to cross the runways between aircraft takeoffs to reach the other side of the base, especially after the war (Tibbo 1997).

The Globe Theatre was believed to be an ideal area to find evidence of the interactions of people from the various countries, most interestingly, between Newfoundlanders, Canadians, and Americans. It was also one of the few locations where civilian personnel could enter, including whole families. In contrast, to the ever present tragedy of crash sites, the Theatre would have been a place of camaraderie and relaxation, thus revealing another aspect of life in Gander.

7.1 History of the Site

An exact date for the construction of the Globe Theatre could not be found, nor why the name was chosen. It could be in reference to Shakespeare's theatre, but it would also fit the theme of building designations around Gander, most of which have celestial names (i.e., the Star Theatre

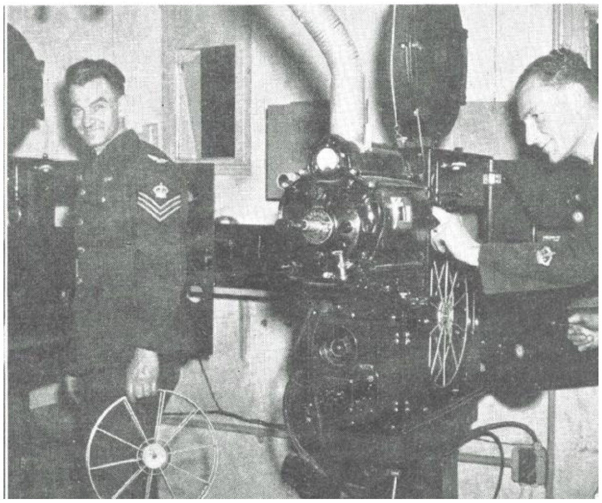


Figure 7.1: The projector room and equipment at The Globe. From *The Gander* 1944b.

on the American side and later the Jupiter and Saturn hotels). The Globe hosted movies and shows to entertain those living and serving in Gander, with the main clientele consisting of Canadian servicemen. There was also a 300 seat theatre on the American side, and the Americans had a USO club in Corner Brook which they could attend during leaves (Lewis 1944; Tibbo 2008). Both theatres started with bench seats, but switched to bucket seats within a short time after opening. The Globe tended to run a wide variety of movies, while the Star mostly played westerns (Harahan 1999, 46-7).

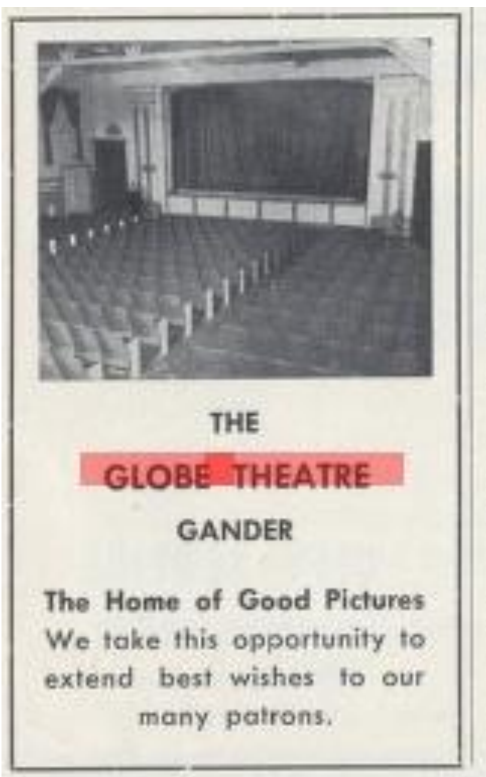


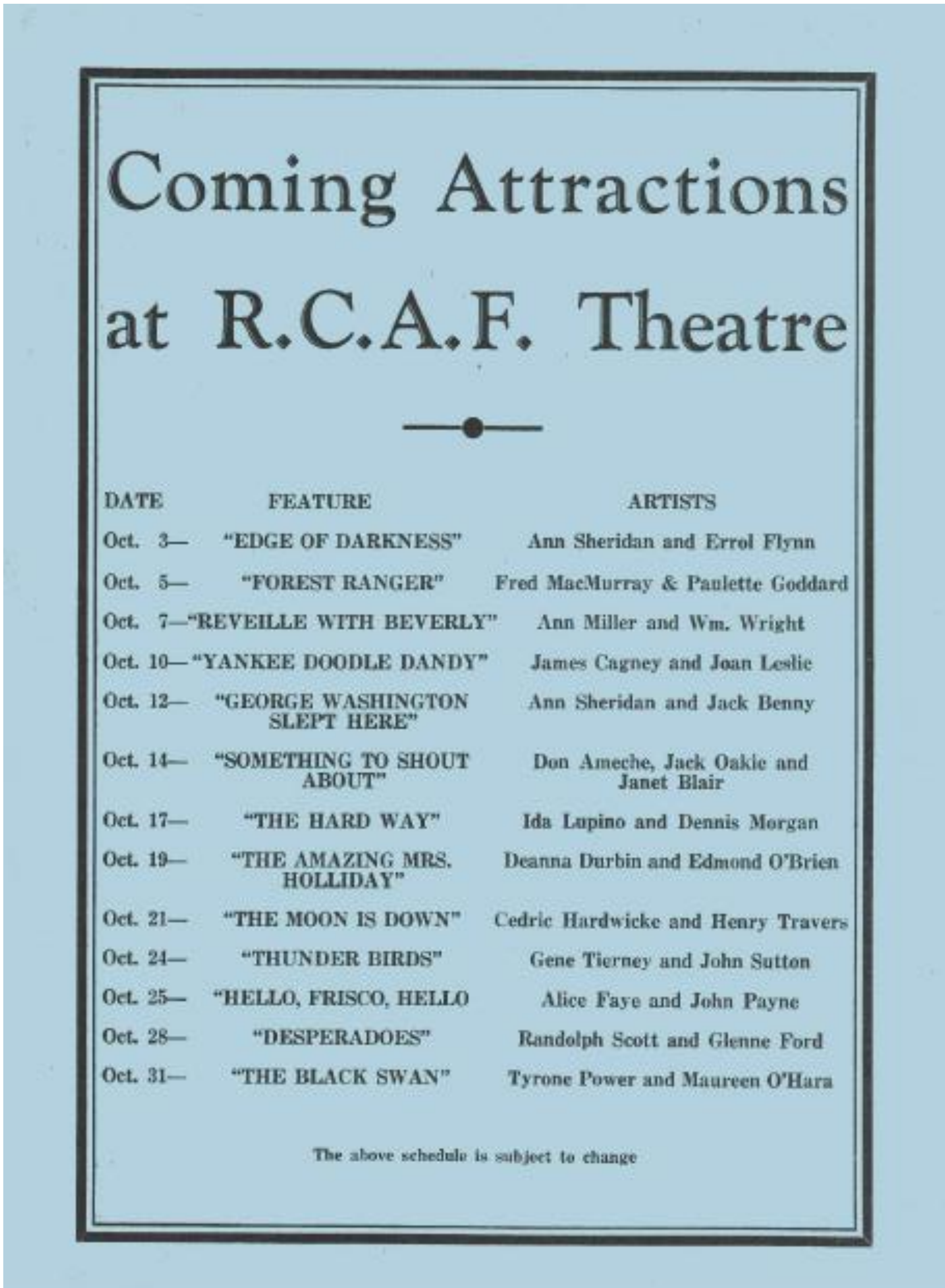
Figure 7.2: Interior view of the Globe Theatre. From *Atlantic Guardian* 1950.

No pictures of the outside of the Globe could be found, and images of the inside generally consist of close-up images of the performances, a single image of the projector (Figure 7.1) and the seats and stage (Figure 7.2). Documentation would suggest that the theatre had a similar architectural style to the other buildings around the Canadian side of the base (Edison 1983, 21).

Like most of the prices in Gander, the Canadian facilities were more expensive than the American ones. Due to the Base-Lands Agreement, which stated that there was no duty on American products, American products could be sold much more cheaply. For instance, in 1941, cigarettes cost Americans 8 to 10 cents, while Canadians and Newfoundlanders paid 25 cents a package. Arguments that the prices should be the same were countered with the fact that the prices were the same as at canteens in Canada, and due to the differences in customs and duty between the two countries, the prices would be different (Anonymous 1941). Similarly, the prices for the theatres were different, with the Star on the American side costing 10 cents and the Globe costing 15 cents.

It is unclear how much children were charged to access the theatres, as some recollections say they were free (Eileen Elms in Cardoulis 1993, 99), and others say they were charged 10 or 20 cents (Hanrahan 1999, 46; Elms 1999, 10; Lush 1999, 19). There may be inconsistencies regarding the theatre prices during and after the war because there were two theatres on the airbase; based on stories from those who grew up on base, children likely had access to the entire base regardless of their country of origin (Elms 1999; Hanrahan 1999). Furthermore, the people who were children at the time of the war may not differentiate the actual prices charged during and after the war. Most people who were children at Gander during the war fondly remember the theatres. They recall on Saturdays trying to see the movies at both theatres. If they could time it right they could see the 7pm show at the Star and the 9pm show at the Globe (Hanrahan 1999, 46-7; Elms 1999, 10). According to Eileen Elms (Cardoulis 1993, 99), there were four movies a day and a large bowl of ice cream cost only five cents. She does not specify which theatre she frequented.

Movies were not the only form of entertainment at the Globe; dances, comedy, and variety shows were also featured. *The Gander*, a wartime publication "in the interest of the personnel of R.C.A.F. Station, Gander, Newfoundland" included an entertainment section that told of the different shows coming to the Globe. Such features included a minstrel show produced by the glee



Coming Attractions at R.C.A.F. Theatre

DATE	FEATURE	ARTISTS
Oct. 3—	"EDGE OF DARKNESS"	Ann Sheridan and Errol Flynn
Oct. 5—	"FOREST RANGER"	Fred MacMurray & Paulette Goddard
Oct. 7—	"REVEILLE WITH BEVERLY"	Ann Miller and Wm. Wright
Oct. 10—	"YANKEE DOODLE DANDY"	James Cagney and Joan Leslie
Oct. 12—	"GEORGE WASHINGTON SLEPT HERE"	Ann Sheridan and Jack Benny
Oct. 14—	"SOMETHING TO SHOUT ABOUT"	Don Ameche, Jack Oakie and Janet Blair
Oct. 17—	"THE HARD WAY"	Ida Lupino and Dennis Morgan
Oct. 19—	"THE AMAZING MRS. HOLLIDAY"	Deanna Durbin and Edmond O'Brien
Oct. 21—	"THE MOON IS DOWN"	Cedric Hardwicke and Henry Travers
Oct. 24—	"THUNDER BIRDS"	Gene Tierney and John Sutton
Oct. 25—	"HELLO, FRISCO, HELLO	Alice Faye and John Payne
Oct. 28—	"DESPERADOES"	Randolph Scott and Glenne Ford
Oct. 31—	"THE BLACK SWAN"	Tyrone Power and Maureen O'Hara

The above schedule is subject to change

Figure 7.3: Coming attractions as advertised in the August-September issue of *The Gander* (1943a).

club on 4 August 1943, Gander Follies of '43 produced by Cpl. Russ Ewanchuck featuring "a great array of Gander talent", the travelling RCAF "All Clear" show playing nine performances in February 1944, Music and Comedy by the band, glee club and drama club on 26 May 1944 and variety shows where members of the RCAF and RAF could show off their own talents. The August-September, 1943 issue of *The Gander* (1943a) also featured a list of "Coming Attractions at R.C.A.F. Theatre." This was the only early issue located, and the next available (*The Gander* 1943b) had changed format. The coming attractions listed the schedule for movies to be shown at the Globe in the next month, with a new movie featured every couple of days (Figure 7.3). These movies were all relatively new; eight of the thirteen movies scheduled to be shown in October 1943 were released that year (verified on www.imdb.com), while the other five movies were released in 1942.

Like the construction of the theatre, the demolition date of the building is difficult to determine. In 1949, when Newfoundland joined Canada, it was evident that Gander would need more space than allocated by the base. As such, in 1950, construction started on the town land that was adjacent to the airport, which was later also called Gander, to house the 3000 people currently living at the former base (Edison 1983, 7). By 1957, many new buildings had been built at the new town site, and many buildings on the airport itself were being destroyed to make way for the new terminal and runways (Edison 1983, 7). At the same time, many of the more specialized buildings, such as the post office, library (located next to the Globe Theatre, see Map 7.1) and hospital were still in their original locations in the Old Town (Edison 1983, 14). It was not until 7 August 1961 that the first sod was turned over by Premier J.R. Smallwood at the location of the new James Paton Memorial Hospital. Construction of the hospital was completed in May 1964 and the first patients were transferred from the Sir Frederick Banting Memorial Hospital in the Old Town to the new hospital on 25 May 1964. The article goes on to state "On that day, one era ended, and another began" which may indicate that the hospital was the last building to be abandoned in the Old Town (Edison 1983, 63.)

7.2 Excavating the Globe Theatre

Once the site was selected, there was a two week period in which the area could be excavated as other crash sites were visited first while Transport Canada determined the safety of that and other locations Some of this time was taken to locate the RCAF Lodestar wreck. Waiting to confirm access to the site, coupled with two days of rain, delayed the start of work. In total, 11 days were devoted to the excavation.

7.2.1 Methods

Figure 7.4: Signs erected by the community to demarcate the different buildings around the Canadian Side of the Gander Airbase. Photo by author.

Figure 7.5: Portion of an undated map used to verify the Globe Theatre. The building in question is listed as building 53 (circled), which according to the corresponding legend (not pictured) is the Globe Theatre.

The excavation plan for this site was heavily influenced by the number of people available to work. The base crew for this project was two people, but with the generous help of volunteers, eight people helped on the site with two very productive days where six people worked on site.

First, the site was located and confirmed using visitor information signs (Figure 7.4) and an undated map of the base[9] (Figure 7.5). The Globe site was overgrown and showed little evidence of recent disturbance. It is common knowledge around Gander that the Old Town is used for cycling, walking, and running during the day, and for drinking by the local underage population at night. Also, an area very close to the Globe Theatre site that was once the railway platform has been used for many years by the younger residents of Gander to perform their own plays, and drink

[9] This map is believed to date just after the war era based on a number of factors. The Army and American sides are both on the map, but there are no confidentiality stamps, indicating that it is post war. As well, Hangar 22 is marked as having been destroyed by a fire, which happened in 1944, indicating the map at least post-dates the fire.

alcoholic beverages. This was also a concern as there was a strong chance that people would be using the area at night and could disturb the excavation. Thankfully, no disturbance was noticed.

Figure 7.6: Excavations of the walls in progress. Note the collapsed slab of concrete, a product of demolition, in the foreground. Photo by author.

The overgrowth was mostly alders with only a couple of birch trees, meaning it could be cleared with relative ease. The birch trees were, for the most part, left alone, but one fallen tree had to be removed from the site. Once the area was cleared of alders and tall grass, the foundations of the structure were visible in certain parts of the site. At the recommendation of Michael Deal, excavations started by uncovering the foundation to trace the outline of the building (Figure 7.6 and 7.7). Archaeologists and volunteers were given a section of foundation to carefully clear, and

Figure 7.7: Excavation of the walls in progress. Note how the demolition of the walls was uneven, giving varied depths throughout the foundation. Photo by Kathleen Ellwood.

would bag finds such as non-diagnostic glass and metal in bags labelled for that excavator, location and date. Items of interest, such as bottle glass, coins, and film were measured *in situ*, using the surveyor's level for objects found around the foundation, and three points of measurement for objects found in the excavation units (Table 7.1).

7.2.2 Analysis

The archaeological context of the Globe is slightly disturbed. The entire northwest side of the building is heavily disturbed. The broken walls tend to lie within the boundary of the building, suggesting that the building was torn down from that direction. Coupled with this is the fact that there were large quantities of slag found within the first few centimetres all over the site, but in the deepest and highest concentrations in the south-west corner of the structure. Public knowledge around Gander states that to the north of the Globe was a metal work shop (Peter Hoyle, pers. comm. 2011). According to an undated, but post-war map, that area consisted of industrial buildings, such as plumbing and paint shops, a lumber store and a flushing point. The presence of slag indicates that, especially around the northwest and northeast sides, there was a lot of mixing between the buildings during destruction. This would also indicate that not all of the nails and window glass found around that corner are necessarily from the Globe Theatre. Most likely, it is the pieces of window glass that have been painted black (Figure 7.8) that come from the Globe, as black paint was used to cover the

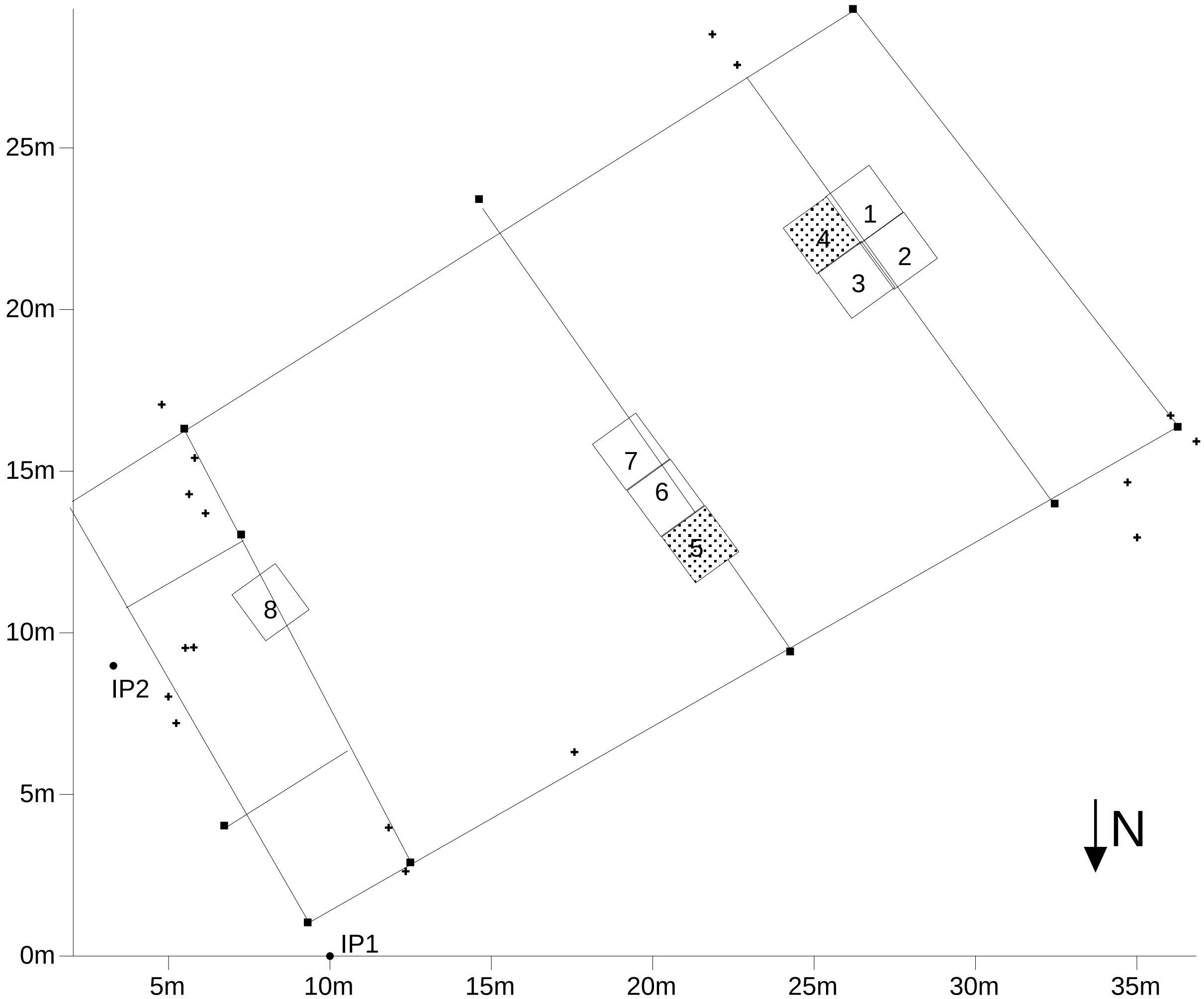
Figure 7.8: Example of window glass painted black found at the Globe site. Photo by Courtney Merner.

Table 7.1: Identifiable and interesting artifacts recovered from the Globe Theatre.

Category	Artifact number	Description	Site location
Coin	DfAp-12:1	Newfoundland 50 cent piece from 1909	unit 2
	DfAp-12:2	United States 1 cent piece	unit 2
	DfAp-12:3	Canadian (?) 25 cent piece	unit 2
	DfAp-12:4	Newfoundland 5 cent piece from 1929	unit 2
	DfAp-12:5	Newfoundland 5 cent piece from 1943	unit 2
Bullet casing	DfAp-12:8	Bullet casing	unit 2
	DfAp-12:10	Bullet casing	unit 2
	DfAp-12:13	Bullet casing	
	DfAp-12:160	Bullet casing	unit 2
Movie paraphenalia	DfAp-12:99	Film	unit 2
	DfAp-12:158	Film	unit 6
	DfAp-12:246	Film	unit 3
	DfAp-12:249	Film	South east wall
	DfAp-12:332	Film	East wall
	DfAp-12:352	Film	unit 2
	DfAp-12:353	Film	unit 2
	DfAp-12:354	Film	East wall
	DfAp-12:266	Bolt	unit 3
	DfAp-12:267	Bolt	unit 3
	DfAp-12:271	Bolt	unit 3
	DfAp-12:276	Spool	unit 3
	DfAp-12:277	Spool end	unit 3
	DfAp-12:349	Spool end	unit 3
	DfAp-12:350	Spool end	unit 3
Identifiable glass	DfAp-12:351	Fly wheel	unit 3
	DfAp-12:6	Gaden pop bottle piece	East wall
	DfAp-12:11	Gaden pop bottle piece	East wall
	DfAp-12:12	Pepsi bottle fragment	unit 6
	DfAp-12:14a-c	Coke bottle fragments	unit 7
	DfAp-12:15	Coke bottle fragment	unit 8
	DfAp-12:16	Coke (?) bottle fragment	unit 8
	DfAp-12:49	Gaden (?) bottle fragment	unit 3
	DfAp-12:62	Green bottle base, "MADE IN CAN"	West wall
	DfAp-12:119	Coke (?) bottle fragment	unit 7
	DfAp-12:169	Coke (?) or Pepsi (?) bottle fragment	South east corner
	DfAp-12:175	Pepsi bottle fragment	North wall
	DfAp-12:200	Coke (?) bottle fragment	West wall
	DfAp-12:201	Coke (?) bottle neck fragment	West wall
	DfAp-12:206	Coke (?) bottle fragment	West wall

Category	Artifact number	Description	Site location
Identifiable glass	DfAp-12:207a-c	Dominion bottle fragment	West wall
	DfAp-12:210	Coke (?) bottle fragment	West wall
	DfAp-12:212	Coke (?) bottle fragment	West wall
	DfAp-12:214	Coke (?) bottle fragment	West wall
	DfAp-12:215	Coke (?) bottle neck fragment	West wall
	DfAp-12:216	Coke (?) bottle fragment	West wall
	DfAp-12:221	Coke (?) bottle fragment	East wall
	DfAp-12:247	London Dry Gin bottle, complete	Peg 13
	DfAp-12:262	Green Coke bottle fragment	East wall
	DfAp-12:340	Pepsi (?) bottle neck fragment	Unit 3
Mirror fragments	DfAp-12:126	Mirror glass	Unit 7
	DfAp-12:136	Mirror glass	Unit 7
	DfAp-12:173	Mirror glass	East wall
Other	DfAp-12:7	Ceramic plate printed with a crown and the letters "DUR"	Unit 2
	DfAp-12:19	Ceramic insulator	West wall
	DfAp-12:33	Red mug? Handle	Unit 6
	DfAp-12:40	Threaded glass, top of a jar?	Unit 6
	DfAp-12:66	Tin can, top, with a yellow striped label with red detail. Writing "S.V.P. LA CANNETTE VIDE A LA"	East wall
	DfAp-12:67	Tin can, top, with a red label and greet lettering. Writing "NTA"	South wall
	DfAp-12:80	Blue porcelain mug handle	South wall
	DfAp-12:95	Grey/brown tile with a waffle pattern on the bottom	Unit 2
	DfAp-12:101	Tar roofing tile	Unit 2
	DfAp-12:159	Piece of toilet porcelain. Writing "CRAPP"	Unit 6
	DfAp-12:161	Chewing gum. Used, with a shoe print.	Unit 2
	DfAp-12:163	Light bulb base	Unit 7
	DfAp-12:174	Beige plastic button	Unit 2
	DfAp-12:185	Red brick fragment	North wall

windows to keep the light out for better viewing of films. In other cases, such as the near surface finds at the inner rear foundation of mirror glass and porcelain that most likely is part of a toilet, the objects are likely original to the Globe. Again, recollections from those who attended the theatre are that the toilets and change rooms were located at the rear of the building, under the stage (Peter Hoyle, pers. comm. 2011). It is typical for a theatre that change rooms and rest rooms be located near or under the stage for easy access for the actors. The presence of toilets and change rooms indicates that the inner foundation most likely helped to support the stage (Map 7.1).

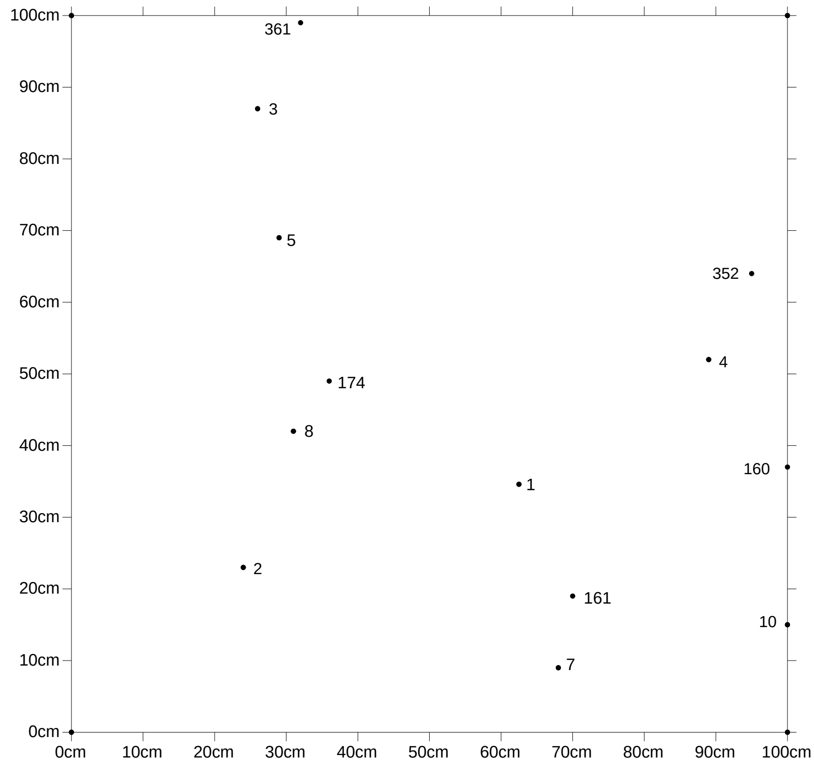


Map 7.1: Globe Theatre site plan. + represents artifacts recovered from the foundation and the shaded units were not excavated. Note the walls do not line up exactly, mostly likely due to shifting during demolition. Created in Surfer 8.

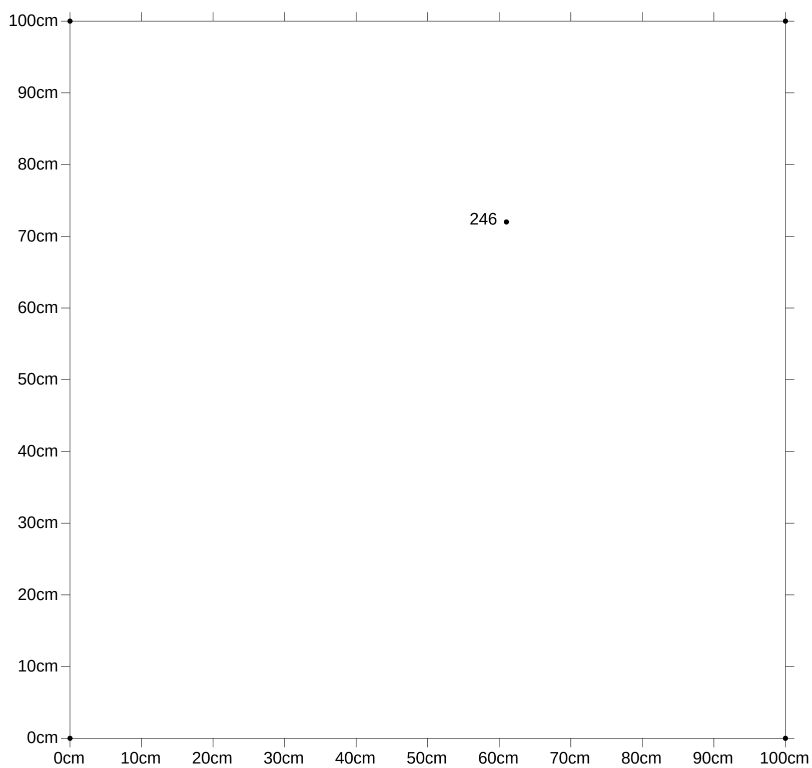
At a depth of 0.81m on the southwest corner of the foundation, an almost complete bottle of Gordon's Dry Gin was found (Figure 7.9). The bottle could date to the war era as screw tops were introduced in 1908 and this brand was available in Canada and the US from 1902 (http://www.gordons-gin.co.uk/about/gordon%27s-timeline). This bottle could indicate heavy disturbance at the site, showing that more modern materials were mixed deeply into the matrix during the destruction of the site, or, if it is from the war, it is the only indication found on the site of alcohol being consumed. Given the location of the bottle it was probably consumed secretly outside or in a dark corner of the building. As it was on the same wall as the entrance, it was possibly consumed outside, out of the view of the ticket vestibule. Alcohol was most likely forbidden, as was the case with United States Services Organization (USO) buildings outside of Gander (Cardoulis 1993).

Figure 7.9: Complete Gordon's Dry Gin bottle found at the Globe Theatre. Photo by Courtney Merner.

Figure 7.10: Units 1 (bottom right), 2 (bottom left) and 3 (top left). Photo by author.



Map 7.2: Artifact distribution of unit 2. Numbers correspond with the artifact catalogue.

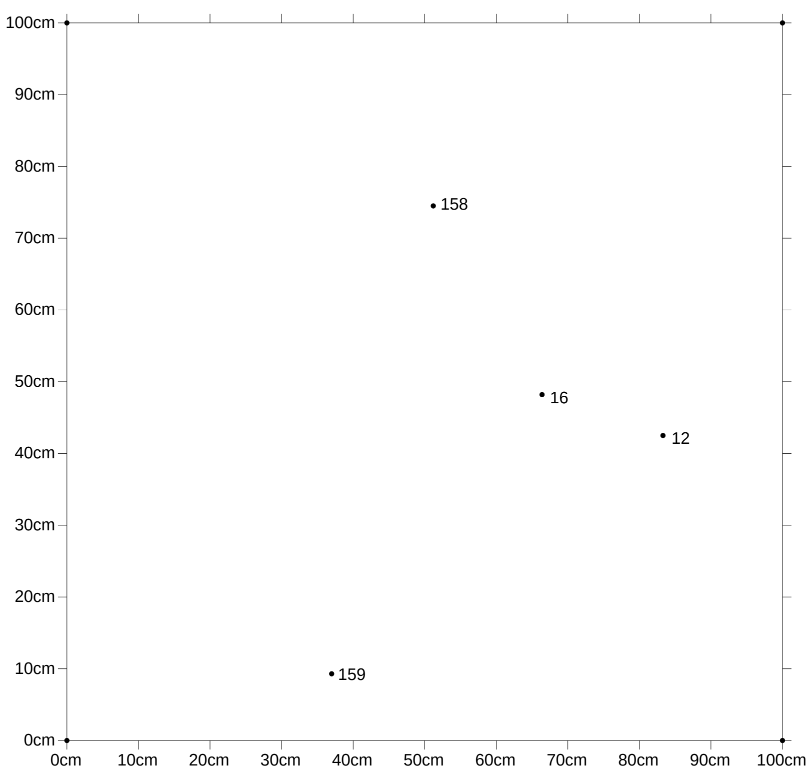


Map 7.3: Artifact distribution of unit 3. Numbers correspond with the artifact catalogue.

Units were also opened in the centre of the site (Figures 7.10-7.12, Maps 7.2-7.5). This would have been where the seats were set up, and the area was chosen for a couple of excavation units because it might reveal more about theatre goers. Unfortunately, the units revealed little (unit 1 had no diagnostic finds, and unit 8 had only a single diagnostic find), and in one case, excavation was hindered by a knocked over slab of concrete from an internal foundation. These units did reveal bottle glass, but little else of interest.

Peter Hoyle (pers. comm. 2011) indicated that there was a small entrance foyer at the front of the building. Units were opened along the foundation to

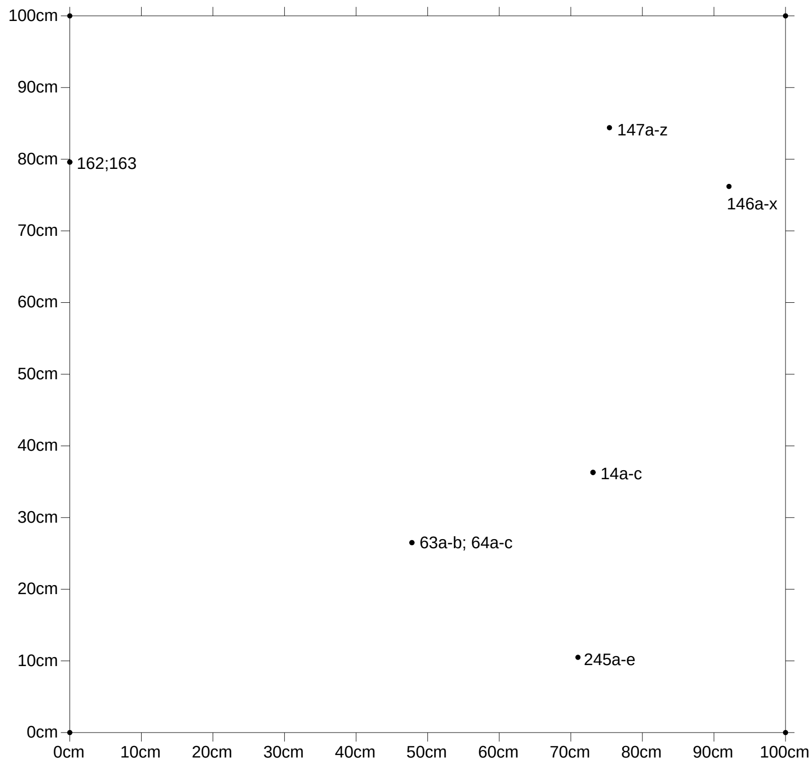
Figure 7.11: Units 6 (right) and 7 (left). Photo by author.



Map 7.4: Artifact distribution of unit 6. Numbers correspond with the artifact catalogue.

look for this entrance. They were dug down until a layer of fallen reinforced concrete was located. This concrete has metal mesh throughout, with tar paper in association. The concrete has a red stripe along it. Site visitors who attended the theatre could not remember this demarcation, but suggested it may have been the lines delineating the aisles. In one unit, this material was removed but finds under it were negligible and consisted only of metal and glass fragments.

There were significant finds in this front area. First, three Newfoundland coins were found, a 50 cent Newfoundland piece from 1909 (DfAp-12: 1; Figure 7.13), a five cent piece



Map 7.5: Artifact distribution of unit 7. Numbers correspond with the artifact catalogue.

from 1929 (DfAp-12: 4) and another from 1943 (DfAp-12: 5). An American penny with no clear date (DfAp-12: 2) and a poorly preserved Canadian coin, possibly a 25 cent piece with no clear date (DfAp-12: 3), were also found. These coins were probably lost by movie goers as they were paying for their tickets. The fact that there are coins from each country indicates that people from all three countries attended the theatre, or that there was enough contact between groups that money could be used regardless of the country of origin. The 50 cent piece would have been enough for a GI to treat his girl to a movie and buy her a 10 cent Coca Cola (Hanrahan 1999: 46, for the price of a Coke), assuming that Newfoundland currency was accepted at face value to Canadian.[10]

[10] Thus far, research has failed to indicate how currency was used, if all coins were taken at face value or if there was an exchange rate based on the country of origin. All recollections, including government communications, do not distinguish currencies, just referring to currency as dollars and cents. Especially in cases of comparing the cost of items, no distinction is made based on exchange rates. This leads this researcher to assume that currency was accepted at face value around the base until evidence is found to prove otherwise. This is supported by the memories of Dominick (Tony) DeAntonio (in Cardoulis 1993, 5) that "it was not unusual then to receive foreign coins in change for your money when shopping in the local candy stores on Water or Duckworth Streets." Coins may have been interchangeable, or, like now, coins of similar size mistaken for another currency (although this would not apply to the Newfoundland 50 cent piece). Newfoundland currency was distributed through Canadian banks, a by-product of the Depression and the numerous loans Newfoundland took out from Canadian banks to pay her debt in the post-WWI/Depression era. The only indication otherwise comes from Carl (Bob) Post (in Cardulis 1993, 32) who states that "Newfoundland money which, at that time, was valued at 10% less than the American greenback."

Figure 7.12: Unit 8. Photo by author.

Four .45 calibre bullet casings were found (DfAp-12: 8, 10, 13, 160; Figure 7.14). Like the coins, these were probably lost out of pockets while getting the money to pay for tickets. With the large concentration of personal items (money, bullets and buttons), around a similar depth (besides the 1909 NL coin which was found at 51.7cm, the rest of the items were found between 79 and 87cm depth), there may have been gaps in the floor for the pieces to fall through. These were most likely a product of souvenir hunting from children or soldiers. Souvenir hunting was a common practice in the war era, and the practice during the First World War has been studied in detail by archaeologists (Saunders 2007; Saunders and Cornish 2009). Unfired bullets can be collected as souvenirs, perhaps the type used by a preferred gun, or even picked up and absent-mindedly pocketed during training or gun cleaning/loading. Used shells may have been the product of a successful session at the firing range. These pieces may have been kept, or shown off to the Newfoundland

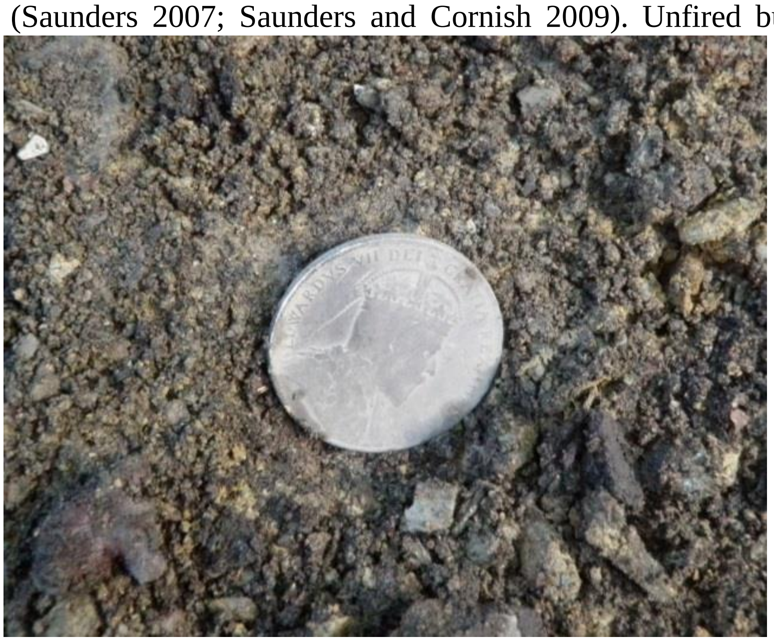


Figure 7.13: 1909 Newfoundland 50 cent coin *in situ*. Photo by author.

women shipped in for social events. Similarly, children could have been in possession of bullets or shells, having picked them up on base or given the attractive or shiny objects by soldiers. This adds another layer of history to the shells, as they were originally designed to be only fired from guns in battle or training, but soldiers or children must have kept them, at least for a short time, as toys or souvenirs (Saunders 2007).

One element encountered all over the site was evidence of soda bottles. Many of these have been identified to a brand. Most prominent on the site are Coca-Cola, Pepsi and Gaden bottles. Shortly after Pearl Harbor, Robert Woodruff, the then president of the Coca-Cola Company, ordered that, "We will see that every man in uniform gets a bottle of Coca-Cola for five cents, wherever he is and whatever it costs our company" (Pendergrast 1993, 199). Therefore, Coke would have cost only five cents on the American side of Gander. Given the difference in prices on the rest of the base, it is not possible to assume that Coke would have cost the same on the Canadian side, but, if American soldiers were attending the Globe (the American coins found suggest that they were) then they may have had to pay a little more due to the extra duties paid by Canadians. Dave Hanrahan (1999) remembers Coke costing ten cents in 1946, but Coke prices generally increased after the war because the five cent edict came at a cost to the company. Coke was well-advertised during the

Figure 7.14: Examples of the bullet casings found at the Globe Theatre. Photo by Courtney Merner.

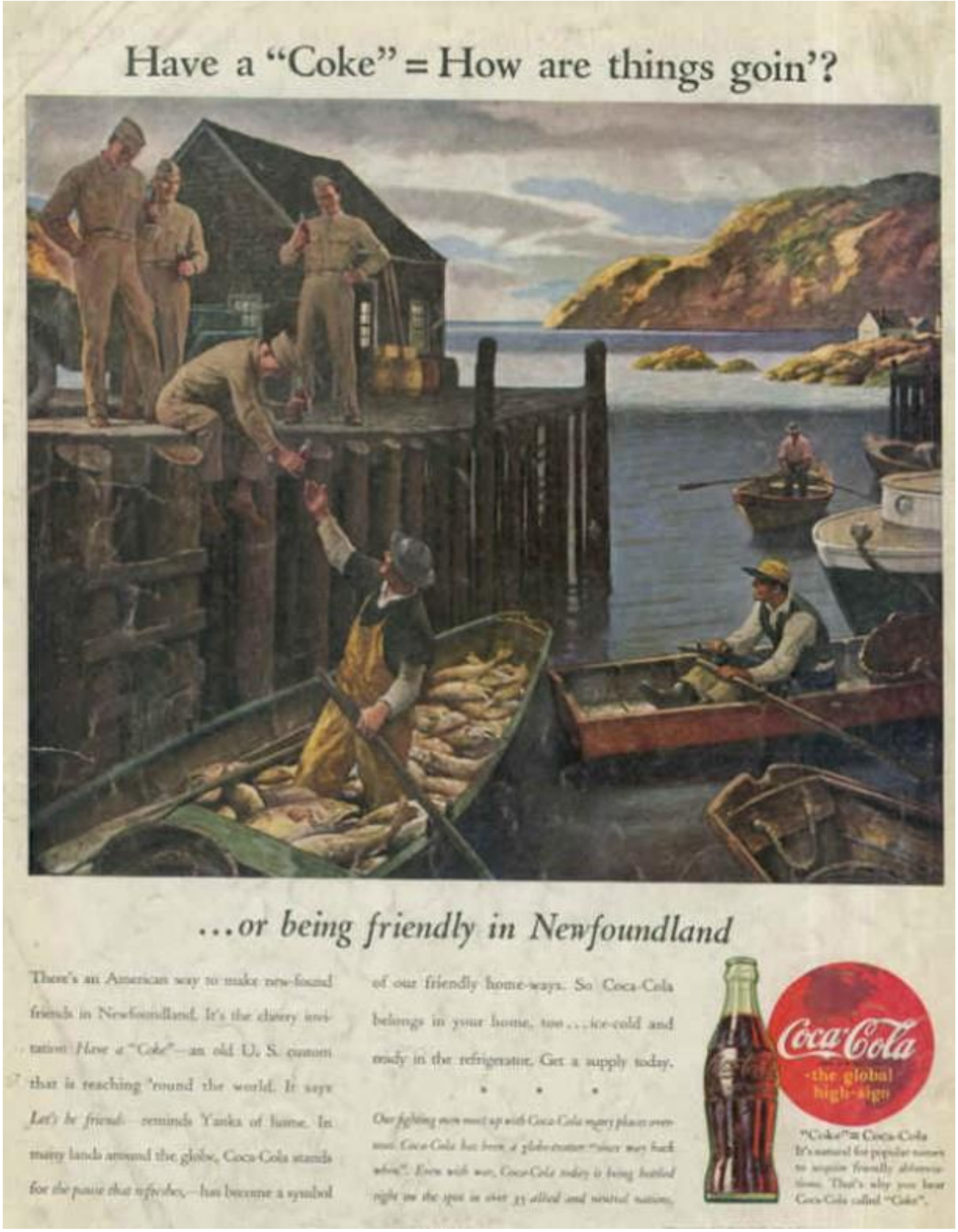


Figure 7.15: This 1944 advertisement depicts US servicemen in an "exotic" location. Adds such as this one were designed to show how the servicemen needed the comforts of home, i.e. Coca-Cola (Pendergrast 1993). From the collection of Shannon K. Green.

war, and was seen as essential for the optimal performance of military and staff (Figure 7.15). This idea was part of a document written by the Coca-Cola Company at the start of the war which stated that it was necessary for American soldiers to have constant reminders of home while they served overseas to maintain morale (Pendergrast 1993). This extended beyond the availability of Coke to the use of American architectural styles for base construction and American radio stations which played familiar American music and advertised American products (e.g., VOUR on the Gander base). This phenomenon has been dubbed "Little America" and was often very influential on foreign consumerism and style (High 2009; Lake 2002; Schofield 1999).

Coke also convinced the American government that Coke was such an essential need for the well-being of those in uniform that they were exempt from sugar rationing (Pendergrast 1993). The major problem that Coke faced with the spread of the drink everywhere that Americans were stationed was shipping. Shipping already-bottled Coke abroad took up space needed for guns and other supplies, so in 1942, the Coca-Cola Company began shipping concentrate and having the drink bottled overseas (Pendergrast 1993). Coke was actually already being bottled in Newfoundland before the start of the war. Gaden's Aerated Waters Company, Limited (shortened to Gaden's, Limited shortly after it was sold in 1942) began bottling Coke in 1938. Gaden's was also a bottler of Gaden's Keep Kool drinks (DfAp-12: 6, 11; Figure 7.16 and 7.17) which in 1889 included lemonade, soda water, ginger ale, champagne cider, and nectar drinks. At the start of the war, the Gaden's plant was located on 166-168 Duckworth Street in St. John's. In 1942 the plant was sold to a number of St. John's businessmen and shortly thereafter relocated to 665-683 Water Street, St. John's. Gaden's continued bottling Coca-Cola until the bottling facility closed in 1977

(Wicks 2002). Rations and shipping expenses aside, during the war Coke spread to much of the world, and not just to GIs, but to the local men, women and children, plus the cafes and restaurants that servicemen frequented (Hayes 2004). According to Dominick (Tony) DeAntonio (in Cardoulis 1993, 7), cola was not common in Newfoundland when he first arrived on the *U.S.T. Edmund B. Alexander* in 1941. On a date with his future wife in St. John's he asked a waitress "what kind of pop they had. She said they did not carry pop, only beer which was cherry, grape or orange" indicating that colas were perhaps not as popular in Newfoundland (at least in St. John's) in favour of other sodas, also called beers.

Figure 7.16: Fragments of Gaden's bottles found at the Globe Theatre. Photos by Courtney Merner.

Figure 7.17: Gaden's Keep Kool bottles, note the similar lettering to DfAp-12:11. From Wicks n.d.

Coke was even part of aircraft rations. The list of food aboard the ill-fated B-26 that crashed at Saglek, Labrador[11] included a case of Coke, but the drinks are not

[11] For more on the Saglek tragedy and diary excerpts see Cardoulis 1993 or "A Crash in the Wilderness circa 1942: A True Story of Determination to Survive" at http://www.lswilson.ca/page8.htm.

mentioned in the diary, perhaps indicating that they were drunk early on before Josephson began listing what they ate every day in detail (Cardoulis 1993). From that perspective, if the Americans were attending the Globe, then it was likely stocked with Coke.

The history of Pepsi is more difficult to piece together. Pepsi was registered as a trademark in Canada in 1906, and the first bottling plant to open outside of the US opened in Montreal, Quebec in 1934, the same year the Pepsi-Cola Company Limited of Canada was formed. It expanded across Canada as territorial rights were granted (www.pepsico.ca; www.pepsiusa.com). This does not indicate when exactly Pepsi was first available in Newfoundland, but a Pepsi-Cola franchise was obtained by Reginald C. Harvey of Browning-Harvey Limited in 1944, the first instance of Pepsi being bottled in Newfoundland (Wicks n.d.). There is a strong possibility that Pepsi was available in Newfoundland prior to that date if Browning-Harvey applied to bottle it in competition with the advertising and availability of Coca-Cola during the war era. Therefore, even though Coke would have been bottled in Newfoundland, Pepsi was potentially shipped in. There

Figure 7.18: Fragments of Pepsi-Cola bottles found at the Globe Theatre. Photos by Courtney Merner.

is no indication of the price of Pepsi during the war, but in the US after the war it cost five cents for a 20oz bottle to compete with Coke (www.pepsiusa.com). What is known is that Pepsi was found at the Globe, but only identified by the logo (DfAp-12:12; Figure 7.18). Coke is easier to identify due to the trademarked shape and green bottle glass associated with it.

The presence of Gaden bottles on site does show that Newfoundland products were brought in and consumed at the Gander Airbase. As previously mentioned, the train only stopped at Gander with special permission as Gander had restricted access. Therefore, Gaden had to be purposefully brought in, perhaps at the request of Newfoundlanders. The presence of Gaden bottles could be due to Newfoundlanders requesting the well-known locally bottled sodas, or GIs who discovered it for themselves while on leave in Grand Falls. The presence of the bottles shows that the base was not completely isolated from Newfoundland influence. But, because the theatre was operational after the war when Gander was no longer a restricted area, and taking into account the short occupation period and high degree of disturbance with the destruction of the building, the Gaden and Pepsi bottles may not have been brought to the site until after the war. The bottle fragments found cannot be distinguished as being from the war or post-war period.

Figure 7.19: Fragment of a Canadian made bottle commonly used in Newfoundland. Photo by Courtney Merner.

Evidence of Canadian manufactured glass was also found on site. A number of Dominion Glass Company, Limited, bottles were found on site, identified by an embossed letter D inside of a diamond (DfAp-12:318; Figure 7.19). This bottling company was located in Montreal and had the symbol registered in June 1928 (Wicks 2002). This does not necessarily indicate that there were Canadian sodas on site, but Wicks (2002) indicates that a great number of bottles were brought into Newfoundland from Canada and London for bottling. Therefore, the Dominion Glass Company probably supplied a number of bottlers in Newfoundland.

A number of unidentified bottle fragments were found on site. These could be from a variety of companies from Newfoundland, but without more diagnostic markings, cannot be identified. Some speculations can be offered. For instance, Gaden's ginger beer was marketed in emerald green bottles, but none of the green bottle glass had the distinctive Gaden's trademark of a sea-lion (later a seal) on an ice-pan (Wicks 2002). As well, a number of different companies used cross-hatched bottles, and without larger fragments, no specific beverage or company can be identified.

Drink cans were found on site, which post-date the war era. Coca-Cola began putting Coke in cans in 1955, but did not make cans of Coke available in many areas until 1959 (they had to solve the problems of cost and needed to develop a liner that would not alter the taste of the drink prior to mass distribution; Coca-Cola Company 1974). Soda cans were found at the Globe site, but could not be positively identified to a particular brand (Figure 7.20 and 7.21). In any case, soda in cans such as those found at the Globe and at DfAp-11 (see Section 5.4.2) did not come to market until after the war era, again indicating that the timeline for the Globe (as well as other sites in the study) are not restricted to just the war era and that there was some use after the war.

A reminder of the function of the building was found at the front of the site. Pieces of film were located around the excavation pits near the door and the outer wall, as well as machinery that

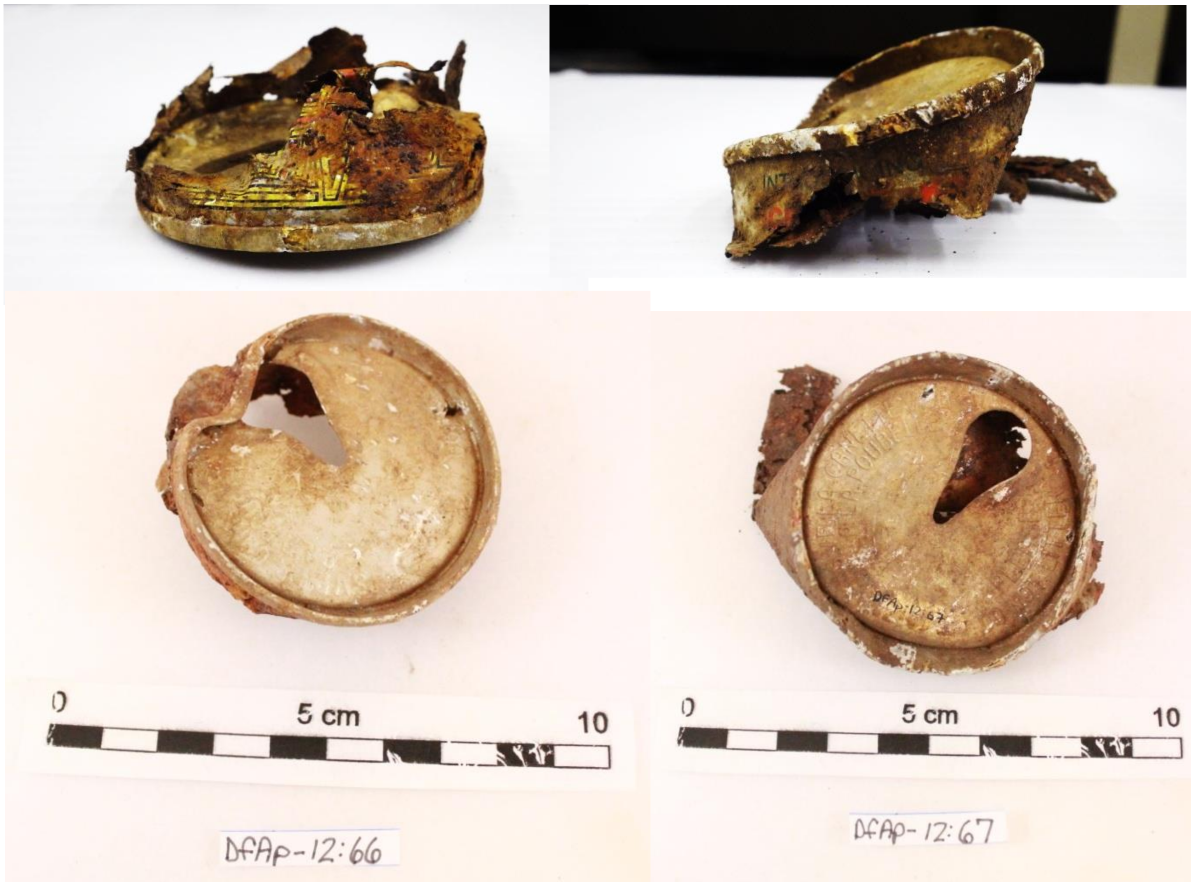


Figure 7.20: Soda cans found at the Globe Theatre. Note the colour on the side of each can. Photos by Courtney Merner.

could belong to a video projector. The projector would have been located over the door and if it had been left in the building in favour of a new projector in the new theatre, then it would be expected to be found near the door. Very little other evidence was found to indicate the use of the building, making the historic record important, as the interpretation of the material record is shaped by knowing the primary use of the building. Without that knowledge, the array of artifacts would have less meaning and not give much information as to who used the site, in particular identifying their country of origin. As it stands, the artifacts recovered from the Globe, although they were sparsely distributed throughout the site, and the history and folk memory of the site do indicate that the Globe Theatre was used by the main nationalities present during the war period in Gander; Newfoundlanders, Canadians, and Americans.

One major problem with excavation was determining at what depth to stop. Researchers dug until no new artifacts were uncovered, but could not dig to sterile soil. This was because sterile soil could not be identified. Gander was constructed on a bog, and so it is mostly constructed on fill. If the bogs around the airport are any evidence (see Digby Section 5.2.2), the bog was large and deep, meaning that it would take heavy equipment to dig to sterile soil. This is also why, in this researcher's opinion, the bottom of foundations could not be found, even at a depth of 1m (the depth at which the lowest artifacts were found). Support for buildings on a bog would have to be deep. One problem was the lack of flooring materials found in the building, for very little evidence of any wood was found (except for fragments of window frame, DfAp-12: 217a-d, 253, 333, 370). The wood from the stage, floor, and balcony may have been removed and reused, potentially in the construction of the new town of Gander.

7.3 Open Day

From the start of aviation archaeology work in Gander, the public has been interested. As stated at the start of this thesis, the people of Gander are proud of their aviation heritage. Throughout this project, public presentations and public relations work was done to discuss archaeology and history with residents and interested parties. When excavation at the Globe Theatre started, a couple of residents walking in the area would stop to talk, but many others would pass by without stopping. Those who stopped shared information and memories about the site, in particular, Peter Hoyles, who visited the site every day to share stories about early Gander and to see what we found.

As there was so much interest in this work, and the Globe Theatre was significantly more accessible than any other site except the B-17 in the Thomas Howe Demonstration Forest (even some of that site was off the trail). It was decided to invite visitors to the site to share stories, memories (both personal and secondary, see Section 2.4) and to see what was being uncovered at the site. Advertising the excavation and inviting residents out was an experiment in community outreach and a means to better collect information about the site through personal and secondary memory in an informal setting. While none of the public presentations were overly formal, discussing early Gander while standing in the Old Town opened more memories than sitting in the North Atlantic Aviation Museum or the Thomas Howe Demonstration Forest interpretation centre.

Excavations on the theatre started on 14 July 2011, and public days were scheduled for 23 and 24 July 2011. The public day was announced on the CBC Central Morning show during an interview on 6 July 2011, at the Thomas Howe Demonstration Forest during a presentation about the research and excavations done in the previous year on the B-17 later the same day, and a press release was sent to three local radio stations (CBC, VOCM and K-Rock) to announce in their community calendar segments. On the morning of 23 July, signs were posted around the Former Townsite, small ones directing trail users to the site, and two large signs along Circular Road, which runs parallel to the runway and the Old Town (Figure 7.21).

The public days did not generate the number of people hoped for, but the weather did not help. Saturday was a beautiful, sunny and hot day, which meant many people left town to go to their cabins, fishing, or some other activity. Sunday was rainy and cold, keeping most people indoors. A few people did come out especially to see the archaeological work, including one gentleman who was in attendance at the THDF presentation and brought his grandsons out to the site to see the archaeologists and share with us some of the history of Gander. Generally, the bulk of the visitors were walkers who saw the signs and felt encouraged to visit the site and share their stories about the history of Gander.[12]

Figure 7.21: Field assistant, Eric Guiry, showing one of the Open Day signs. Large signs were placed along roads and smaller signs along the walking trails on the former townsite of Gander. Photo by author.

It was encouraging to archaeologists to have people visit the site and show an interest in the excavations and the artifacts recovered. For future work in accessible areas, especially near walking trails, this archaeologist will be certain to always post signs. Before the signs went up, maybe 1 in 10 people passing by would stop and ask about what was being done. After the signs went up, at least half of the passers-by stopped to chat, ask questions, tell stories, and observe. Information from site visitors was often contradictory, especially the stories about the Sabena crash, but valuable nonetheless. Gander has a rich folklore and all of the stories and information were important and helped inform researchers not only about the Globe Theatre

[12] Most of the stories related to the Sabena crash of 1946. See *Charlie Baker George* by Frank Tibbo (1993) for more information on this crash.

and life in Gander during the war, but to get their feelings on the archaeological work going on in Gander.

Thanks to the visitors who came to the Globe during the open days, and to Peter Hoyles, researchers could ask questions about the site. As few images of the inside or outside of the building could be found, the information from site visitors was invaluable in confirming the locations of the stage, the powder room, and identifying that the entrance to the building consisted of a foyer that extended slightly ahead of the foundation of the site. The information provided by site visitors helped to inform researchers, to improve the interpretation of artifacts, and determine the best places to open excavation units on the site. Any future work will be done with these results in mind and whenever possible, the public will be invited to visit accessible sites to share information with researchers.

CHAPTER 8: DISCUSSION

The archaeological investigation of Gander is a test case to explore the viability of aviation archaeology in Newfoundland and Labrador. As seen in section 4.4, some work has been done in the province, with varying results. These excavations and surveys have been conducted on aircraft crash sites. While crash sites tend to have the greater public appeal, the concentration on Gander was due to the history of the airport. At the Newfoundland Airport, thousands of aircraft passed during World War II and crashes happened. Due to the sheer volume of aircraft, the majority of the known crash sites are around Gander (Deal and Hillier 2007). These locations have helped shape the landscape and oral history of Gander. It is rare to find a resident of the area who does not know the location of at least one aircraft crash site. Most people spoken to during this work had visited sites, and in many cases, they were concerned about the state of these sites.

The crash sites are as much a part of the visible landscape to residents as the Old Town of Gander or the airport itself. Younger residents, those who have lived in the current town and not the Old Town, recall spending their childhood playing at the dump site or among the foundations of the Old Town (pers. comm. Darrell Hillier 2010; Nicole Warren 2008). As adults, many residents visit sites, whether in the summer by crossing bogs and braving flies, or in the winter on snowmobiles (pers. comm. Duane Collins 2010; Darrell Hillier 2010; Dana Young 2014). As seen from Open Day (see Section 7.3), many residents walk the streets of the Old Town for leisure and exercise, and the signs posted around the site (see Figure 7.4) show the pride in the area. These signs were erected for a Ferry Command reunion in Gander in 2000 to indicate where each of the RCAF buildings were located and to give a little history about the area (pers. comm. Frank Tibbo

2010). Almost everyone who stopped to talk during Open Day had some knowledge of the area, at least an idea of what many of the buildings were used for.

Throughout this work, the community has made suggestions as to how the project should progress. Many offered opinions as to which crash sites should be examined (the RCAF Lodestar, see Section 5.2, was often seen as a priority to local residents), offered directions for site access, and their own stories of site visits. In other cases, site visitors have offered help with transport to visit sites such as the Sabena, which is best accessed with an all-terrain vehicle due to poorly maintained roads and the distance needed to cover to reach the site. Others had details on how to find other sites in Gander, or vague ideas of where they might be, and promised to keep this researcher informed if they found more specific directions. When it came to the Old Town, while many site visitors would tell stories of the Globe, most wanted to know more and see the excavation of more war related buildings, such as officer's headquarters or planning rooms. In such cases, the explanations from section 6.0 were given, that environmental issues meant that Transport Canada could not give permission to excavate in such areas. This demonstrates how the community wants to be involved in this research, to share memories, whether of the Second World War in Gander or of post-war site visits, and to learn more about early Gander.

Aviation archaeology, as explored in chapter 2, is the study of the material culture of aviation. This can involve the study of historic aircraft, crash sites, runways, control towers and other infrastructure related to aviation. Often, aviation archaeology tends to focus on airplane archaeology, or the survey, excavation and/or recovery of aircraft crash sites. These sites are often considered "at risk" due to the scrap value of the metals in aircraft, development and construction, changing tides exposing previously submerged or buried aircraft, or simply because the aircraft has been located and the means are there to excavate it. In terms of archaeological research, the majority of work has been done on underwater sites, typically looking for a specific aircraft or surveying the waters of an area of high aircraft incidents (see Section 2.1). Typically, aviation archaeology is done on a site-by-site basis with little work looking at related aviation infrastructure. One exception to this is the underwater survey of WWII aircraft crash sites related to the training bases in Victoria, Australia (Ford 2006). Part of why airbases have not been surveyed as a whole is because many historic runways are still in use, even if on a limited basis. It is also the nature of aircraft to move long distances, thus aircraft affiliated with a base could crash a significant distance from the start or intended end point. In the case of Gander, all of the sites within the scope of this project are related to Gander, but that does not mean all Gander related aircraft have been studied. For instance, the RCAF Hudson crash site in Musgrave Harbour where Sir Fredrick Banting died left from Gander but crashed about 65km away from the airbase. Similarly, while not a war era crash, the AOA DC-3 which crashed in Stephenville in 1946 was originally destined for Gander, but was rerouted to Stephenville due to heavy fog in Gander (Daly and Green 2013). Arguably, that would make this crash site related to Gander, because if the aircraft landed in Gander and a replacement crew been available as planned, the pilot error which was determined to be the cause of the crash might not have happened. By this logic, trying to study the aviation archaeology of a site can arguably link many other aviation sites, particularly when the core site in question was referred to as “the crossroads of the world” and most aircraft flying overseas had to stop there to refuel. Returning to the work done in Victoria, Australia, researchers focused only on the sites in the waters around Victoria, not on aircraft associated with the training bases in the area outside of the immediate area, similar to how the area directly around Gander has been viewed in this work (Ford 2006).

Other work in aviation archaeology has been focused on singular sites or individual crash sites, often more in relation to finding a living person affiliated with the site, whether someone who personally worked with the aircraft in question, or a family member passing on secondary memory. Projects such as The Memory Project: Stories of the Second World War by The Historical-Dominion Institute and The Wartime Memories Project in the UK are attempting to collect memories from WWI and WWII before they are lost, or more local projects like that of the Stephenville Regional Art and History Museum where they are collecting memories from veterans associated with Stephenville, regardless of the war, are just focused on memory (Gale 2014). This project has only touched on the memories associated with Gander, combining archaeology and the primary memories of those who worked and lived in Gander during the war, and some secondary memory. With the number of people both in Gander and those worldwide who may have had associations with the airbase, a more comprehensive attempt should be undertaken to better understand the sites examined and life on the airbase. The largest obstacle with such a project is locating those who have memories of the sites, particularly the Canadians, Americans and British who worked at Gander but left after the war. Most contact has relied on individuals finding the researcher and sharing what they know (often in exchange for historical information about specific incidents) based primarily on the fact that obtaining personal recollections were outside of the scope of this project, but what few stories were shared enriched the project, indicating that further research will lead to even better understanding of the historical and social impact these sites had on Gander and the North Americans who served in Gander.

Table 8.1: Breakdown of sites investigated in this project.

Site Name	Aircraft Number	Date of Crash	Borden	References cited
RCAF Digby	742	25 July 1941	DfAp-10	Heakes 1941; Walker 2012
RAF Ventura	AJ471	18 November 1942	DfAo-01	Anthony Jarvis, pers. comm.; RAF Forum 2011
RAF Hudson	S/N FK 690	6 December 1942	DfAp-11	Christie 1995; RAAF 1942
RCAF Canso	98107	5 May 1943	DfAp-07	Mulvihill 1943b
RCAF Lodestar	557	8 May 1943	DfAp-15	Mulvihill 1943a
USAAF A-20		27 October 1943	DfAp-13	McGlade & Wilkins 1943
RCAF Hurricane	5496	27 October 1943	DfAp-16	McGlade & Wilkins 1943; Walker 2012
USAAF B-17 TCH	42-97493	29 December 1944	DfAp-09	Bollis *et al.* 1944
USAAF B-17 THDF	44-6344	4 August 1944	DfAp-08	Blackeslee 1944
RAF B-25	KF584	29 August 1944	DfAp-14	Christie 1995; RAF Forum 2011
The Globe Theatre			DfAp-12	Historic '83

8.1 Discussion of Results

This project is divided into two sections, that of the aircraft sites investigated, and the Globe Theatre (Table 8.1). The crash sites have been examined separately, but there is information that can be drawn from looking at the aircraft sites as a whole. Table 8.2 breaks down some of those uses and how the sites are important archaeologically. Many of the histories show evidence of

Canadian and American forces working together. As seen in chapter 6, official documents such as *Propergander* and *The Gander*, indicated little mixing between the Canadians and Americans. The American publication did mention the Newfoundlanders working on the base (Lewis 1944; Reintitz 1944). Evidence at the Globe (see section 7.2.2) and memoirs (see Section 6.3) suggest that there was more interaction between the two North American countries than the official documents would indicate.

The crash sites have also indicated more information about the mechanics of the crash, further supplementing the original incident reports. Lacking from the reports are discussions of the recovery of the sites, but examining sites has allowed for better determination of war-era recovery/rescue operations versus scavenging of the site for scrap metal after the war. This also allows for a better assessment as to how much at risk these types of sites are to further scavenging operations or looting by enthusiasts. Finally, some sites show evidence of use since the war era outside of collecting and removing scrap metal. An assessment of post-war use can also facilitate better planning for how to protect these sites from further damage.

The findings at the crash sites were varied with each offering different contributions to the archaeological record and the understanding of the area. Some sites, such as DfAp-07, DfAp-08 and DfAp-11, demonstrated how great the risk of disturbance is to aviation sites. These sites are all close to the highway and have been scavenged of all reusable material. Even under the current protection of the Thomas Howe Demonstration Forest (THDF), DfAp-08 is still at risk as staff have noted aircraft elements moving around the site. Of these sites, the THDF has most appreciated the archaeological work conducted as staff now use the compiled history and the list of artifacts to better understand and manage the site (pers. comm. Edward Blackmore). The map provided also allows them to quickly review what is on site and the layout when the survey was

Table 8.2: Breakdown of crash sites indicating archaeological significance.

conducted so they can better identify site disturbance. DfAp-11, on the other hand, was not

Site name	Air Force	Function of Aircraft	Site Condition	Archaeological and Historical Significance				
				Canada and US working together	Crash Mechanics	Evidence of Recovery	Evidence of Scavenging	Evidence of Use
Digby 742 (DfAp-10)	RCAF	Eastern Air Command	Moderate, past site use evident		X			X
Ventura AJ471 (DfAo-01)	RAF	Ferry Command	Moderate, some current site use				X	X
Hudson S/N FK 690 (DfAp-11)	RAF	Ferry Command	Scavenged				X	X
Canso 98107 (DfAp-07)	RCAF	Eastern Air Command	Good, limited visitation	X	X			
Lodestar 557 (DfAp-15)	RCAF	Milk Run	Good, limited visitation		X			
A-20 (DfAp-13)	USAAF	Training	Good, limited visitation	X		X		
Hurricane 5496 (DfAp-16)	RCAF	Training	Removed	X		X		
B-17 42-97493 (DfAp-09)	USAAF	Transport Command	Scavenged				X	
B-17 44-6344 (DfAp-08)	USAAF	Transport Command	Somewhat scavenged				X	X
B-25 KF 584 (DfAp-12)	RAF	Ferry Command	Good, limited visitation			X		

scavenged in the same way as people were invited to remove material. This did allow for some preservation instead of the pieces being old as scrap metal, although the context is lost, as researchers were invited to photograph aircraft pieces collected at that time.

DfAp-13 and DfAp-14 allowed for a better understanding of war era recovery and post-war scavenging of sites. These sites are known but not frequently visited by aviation enthusiasts (pers. comm. Darrell Hillier 2010), but have not been cleared of scrap metal like those sites previously mentioned. Instruments are absent from the sites, as are propellers, seats and personal effects, but aluminum and copper remain. As seen in section 4.1, site recovery during the initial rescue/recovery and investigation involved the destruction of sensitive material, but only in rare occasions would large pieces of the aircraft be removed. The only case of this in the study was DfAp-16, which was removed in an attempt to salvage the aircraft after the crash, only to have it scrapped in Dartmouth.

DfAp-16 did, in its absence, force researchers to better analyse the landscape. In this case, the images included were fortunate because in photographing the crash site, site investigators also photographed the tree-line and the shape of the pond the A-20 landed in (see Section 4.7.7). This allowed for the positive identification of the area, even in the absence of any aircraft material.

Figure 8.1: Pepsi can. One of many found around the Ventura crash site along with beer cans and cigarette packets. Photo by author.

DfAp-10 and DgAo-01 are of interest due to their reuse. Both sites have suffered heavy visitation, but are in environments not conducive to the removal of material. Site visitors have found other ways to leave their marks on these sites through graffiti and litter (Figure 8.1). The graffiti tells about the site visitation as well. The dated graffiti on DfAo-01 shows that the aircraft is typically visited in the winter months and any efforts to promote good site stewardship would be best focused on the snowmobile community. DfAp-10, on the other hand, is currently well protected due to the restrictive nature of the CDAA. The graffiti on that aircraft dates to times when the security of the area was lessened, generally due to less activity at the military installation. If activity is scaled back in the future, it can be assumed that the aircraft will begin to receive regular visitation again, although given the nature of the bog in which it rests, the removal of large pieces of aircraft would be difficult, but the removal of smaller pieces very possible.

The Globe revealed much more about the movement of goods into Gander. As Gander was closed to the rest of Newfoundland, and the countries who were stationed there had trade agreements with the Newfoundland Commission Government through the British Government, it was expected to find Canadian and American products, such as Coke and Pepsi. Of particular interest were the discovery of Gaden sodas and Newfoundland coins, which showed that Newfoundland goods were also being brought into Gander. With further excavation in the area, other Newfoundland products, such as food and drink, could potentially be found. It can also be assumed that not only Newfoundlanders would have consumed these products, thus introducing at least the Canadians at the Globe (but potentially the Americans at the Star Theatre) to Newfoundland goods.

8.2 Newfoundlanders, North Americans and the British

Looking at the sites as part of the war effort of the Gander Airbase reveals relations between people of different counties working and serving on the base. Many of the crash reports contain the witness statements of personnel from other countries. When there was an aircraft incident, the RCAF and USAAF worked together to a certain degree to determine the cause of the crash. This is evidenced by the fact that witness statements crossed country boundaries. If a USAAF witnessed an RCAF crash (as is the case with the Canso [DfAp-07] that crashed just past the American side; see Section 5.5.23) then USAAF personnel would give witness statements and aid with the recovery where necessary. This is most clearly indicated in the incident between the RCAF Hurricane (DfAp-16) and USAAF A-20 (DfAp-13; see Section 5.6). The aircraft were practicing manoeuvers together, indicating cooperation between the countries to better train their personnel, when they crashed. The records for the Hurricane are not available and the microfilm reel on which is it supposed to be listed did not contain any record of the incident. Limited information was available from the crash card and the internet (see Figure 5.10). The greatest source of information regarding this crash was the USAAF report regarding the incident. It did involve both aircraft, but the USAAF was not obligated to record the status of the Hurricane in detail. The report for the A-20 contained not only images and descriptions of the A-20, but also of the Hurricane, and a full report as if it were a USAAF crash, including excerpts from F/O Henry Taylor, the pilot of the Hurricane and only survivor of the incident. The only detailed information available about the RCAF Hurricane comes from USAAF reports (McGlade and Wilkins 1943).

The archaeological evidence supports fluidity in movement around the base. On the site of the Globe Theatre, on the Canadian side, Canadian, Newfoundland and American artifacts were all uncovered. These included Coke bottles (an American product, also available in Canada and to a limited extent, in Newfoundland) and Gaden Keep Kool bottles, a Newfoundland company. Due to its distinct "Coke Bottle Green" colour, Coke bottle glass is easily identifiable on the site, and also due to this, is possibly over-represented in comparison to other bottles that cannot be as easily identified. Dark green bottle glass has not been identified to any specific beverage, but could be identified as a bottle made in Canada, but filled in Newfoundland. Clear bottle glass could belong to a number of different bottle types, some having patterns commonly used by Canadian companies, but also used by American bottlers. Pepsi bottles are generally identified by the contours of the clear bottle glass and any pieces containing part of the Pepsi logo. Gaden bottles can only be positively identified by the bottle logo and return for refund paragraph on the back of the bottle (see Figure 6.12). This is a Newfoundland soda company with bottling facilities in St. John's and Grand Falls (see Section 6.3.2) Similarly, the coins from all three countries found under the entrance suggests the building was used by Canadians, Americans and Newfoundlanders, perhaps encouraging the Globe to stock the variety of sodas discussed above.

Documentary evidence shows that American products would be available. As part of the Leased-Bases Agreement, the United States was exempt from import duties to the bases, therefore American products were available in abundance. A goal of the United States was to create bases that were as close to what the American servicemen were comfortable and familiar with as possible, creating all the comforts of America in other countries. Canada was not exempt from import taxes, but it would make sense to find a global product such as Coca Cola on the Canadian side, as well as the American side. The Gaden bottles, on the other hand, would have been brought in to Gander from either St. John's or Grand Falls. This does not mean that Canadians and Newfoundlanders could buy from the American duty free and pay lower prices. Rather, there were complaints made by the Canadians about how they had to pay higher prices and requested that the Newfoundland Commission government allow their products duty-free status. As this was not part of the agreement with the Canadians, the prices for Canadian goods remained higher than

American equivalents. The Commission Government did reduce the prices slightly, but still included tax and duty (Anon. 1941).

Therefore, archaeology, along with documents and folk memory, help to create a more personal account of war era Gander, one beyond the military and government communications and rules. There is ample opportunity for further research into this area. Any further historical and folkloric research will allow for a better understanding and better appreciation of the historical significance of Gander, and the day-to-day lives of those who served and worked there.

8.3 Aviation and the Archaeology of Non-Combatants

Aviation archaeology is a study of a relatively modern period. Aviation in the modern understanding can be thought to have begun in the late 1700s with lighter than air machines flying around continental Europe and North America. Well-known today is the first heavier than air flight made by the Wright Brothers in 1903 and the great trans-Atlantic crossings made by Alcock and Brown, Lindbergh and Earhart. In both World War I and II, innovations into flight technology to increase the safety and distance for flying made flight more accessible to the public. After WWII, commercial flight became common, first reserved for the wealthy, and with larger aircraft, more accessible to the average person. Flight has gone through rapid advancement in the past 100 years, changing human interaction and increasing globalization.

Aviation archaeology, in the context of this project, falls under the category of conflict archaeology, or the study of human conflict (see Section 2.1). In particular, this area of study looks at non-combatants in conflict archaeology. For the most part, the base and the aircraft were not involved in conflict, though there were some reports of potential sabotage to aircraft (Tibbo 1997).

The base was a landing and takeoff point for aircraft and the workers on the base were responsible for the maintenance and upkeep of the runways and the aircraft, or controlling their flight to and from the airbase. There were aircraft involved in eastern Air Command stationed in Gander for Anti-Submarine Warfare, and were involved in combat both when protecting the convoys and when actively U-boat hunting (see Section 3.2.2), but for the most part, the aircraft passing through Gander were part of the supply chain, ferrying aircraft, supplies and personnel from North America to Europe (see Section 3.2.1). In fact, the RAF came to Gander strictly for transport routes across the ocean (see Section 3.2.1) and the United States established at Gander as part of North American defence (see Section 3.1.1). It was only the Canadians who were predominately established at Gander to actively participate in conflict, such as convoy protection (see Section 3.2.2). Therefore, Gander offers a look into conflict archaeology by examining the material culture of non-combatants – life away from the front but still in a war zone – the work involved as a stopping point for the ferrying of supplies and the tragedies that occurred in the non-combatant areas.

While Gander was an area of non-combat, the war still heavily impacted the area. Gander is home to a Commonwealth War Graves, established after the crash of RCAF Digby 742 (see Section 5.1.1). The War Graves currently contain 100 burials from the Second World War, but contained more as American servicemen were buried at the site, but repatriated after the war (pers. comm. Hillier 2010). Currently, servicemen from the RCAF and RAF rest at the site (Figure 8.2).

Figure 8.2: The Gander Commonwealth War Graves. Note the empty spaces are where American servicemen were buried until they were repatriated after the war. Photo by author.

The establishment of the War Graves does not mark the first casualties at Gander, or associated with Gander, but with the crash of Digby 742, it was determined that further casualties would occur, and an appropriate resting place must be established at Gander (Heakes 1941).

Knowing that casualties were a possibility at Gander, even though it was a non-combat area, must have affected those living on the base. Many casualties were just passing through on Ferry or Transport Command trips, but others lived, worked and regularly flew in and out of Gander. Therefore, there would have been an impact on everyone at the base whenever an aircraft crashed and crew died. In *The Gander*, there is a memorial to a crew of four who perished over the Atlantic while hunting U-boats (1943a). The deaths of crews such as this one and that of Digby 742 and Canso 98107 would have impacted all of those who worked on base

and while publications such as *The Gander* and

Figure 8.3: Four grave markers of casualties from crashes examined in this project. Note the differences in air force emblems between the RCAF, RAF and RAAF and the personal notes at the bottom. All USAAF graves were repatriated, so an example of a USAAF headstone is not available at Gander. Photos by author.

Properganders share light and happy stories, the reality of war would be present even in bases as distant from the main fighting, such as Gander. Even looking at some of the epitaphs in the Commonwealth War Graves in Gander, it is obvious that the deaths were important to those left behind on base. Many contain notes about God, and others reflect more about the individual and their relationships with others (Figure 8.3). For each headstone, the air force under which they served is the main decoration and the epitaphs are the only personal touches.

8.4 Recommendations for Future Preservation of Sites

One aspect that is obvious from this research is that aviation sites are at risk. Table 8.2 indicates that in this project alone, four of the ten sites investigated showed evidence of scavenging or collecting. Individuals looking for scrap metal to sell are the greatest risk to these sites, as their work can potential leave a site almost bare, as seen with Ventura AJ471 (see Section 5.3), Hudson S/N FK 690 (see Section 5.4), B-17 42-97493 (see Section 5.7) and B-17 44-6344 (see Section 5.8). A similarity in all of these sites is their accessibility as all but Ventura AJ471 are just off the TCH. Ventura AJ471 is accessible via snowmobile trail in the winter months, so while it is far from a proper road, it is easily to reach with the proper vehicle. Although the looting of Hudson S/N FK 690 was encouraged as the TCH was supposed to pass over the crash site, the result was the same; very little information can be obtained through the archaeology of the site. The only benefit was that because the site was not scavenged specifically for the selling of material, some fragments still exist in private collections, but their context has been lost. Similarly, collectors are a risk to aviation sites. While aviation enthusiasts and researchers can work together to locate, research and preserve sites (see Section 2.1), enthusiasts are known for collecting objects of interest from wreck sites, such as machine guns, bomb release mechanisms, instruments, personal effects, and other easily identifiable pieces. As these elements of the aircraft are the most easily identifiable to a location on the aircraft they are of great use to researchers for examining crash mechanics and in the case of sites with MIA servicemen, predicting where their remains might be found on site (Howshower 1997; Moore *et al.* 2002; Webster 1998). Identifiable parts to aircraft are also the artifacts most likely to be housed in museums, to be properly conserved for the public to see.

The best resources for the preservation of sites are education and community ownership. Installing interpretation panels or distributing information about the site can change the perspective of those likely to visit. This has been successfully done with shipwrecks. Organizations interested in protecting shipwrecks have produced waterproof documents and guide books with general histories and locations of sites, details about the types of material which will be found at these sites, and guidelines on site-sensitive behaviour and other resources for future research (Green 2004). In this work, a focus has been on public archaeology (see Open Day, Section 7.3) and public presentation. Throughout the field seasons, public presentations were given at the Thomas Howe Demonstration Forest and radio interviews were done with the Canadian Broadcasting Company (CBC) radio in Gander, St. John's, and translated to French for Radio Canada. These presentations and interviews worked to inform the public of the archaeology work going on in the area, and allowed residents to interact with archaeologists, both by asking questions and by sharing information about sites. The public archaeology aspect allowed visitors to see archaeologists at work, get a first-hand look at artifacts as they were being uncovered, and again, to ask questions and share information. In both cases, the public engagement in Gander was successful and continues as research is being shared.

Education, through guides, public presentation, articles (both academic and online), etc. allows for people to become more aware of the material resources that remain from the Second World War. Knowing that crash sites still exist within communities allows for that community to take ownership of the site, and thus better protect them. An example of this is Burgoyne's Cove, near Clarenville, where a B-36 crashed in 1953. The site was difficult to access, but the surrounding communities have worked together to create a groomed trail that leads to the site. The hike is steep, but park benches are placed at some of the more difficult points. As well, picnic benches have been installed at the crash site. There is also information about the crash posted near a large piece of the fuselage and tail and a memorial at the summit of the site. The communities have thus created a picnic spot and tourist attraction which is helping to preserve the area. As there was effort taken to care for the site, it is now seen more as not just a hiking trail, picnic spot and tourist attraction, but also as a memorial to those who perished in the crash.

Contrary to this is the site of a C-54 which crashed at Garden Hill on the Port-au-Port peninsula in 1944. In 1994, concerns were raised that a new highway passing near the crash would threaten the site (Gale 1994). These concerns proved true as the site has been almost completely looted of scrap metal. Efforts were made to memorialize the site, as from the highway two signs are visible indicting where the site is located and giving some history, but the trail to the crash is not maintained, perhaps indicating to scavengers a lack of community ownership. With the creation of the Stephenville Regional Art and History Museum in the area, there is a renewed concern for World War II and Cold War material culture in the area, and the museum has become a place for those who have objects from crash sites to be able to donate them to the community without fear of legal repercussion (while still trying to teach visitors to cause minimal disturbance if they do visit crash sites).

Aviation crash sites will always be at risk as the metals found on site can be worth a great deal of money. Through education and community ownership, these sites can be preserved and memorialized with upkeep and signage as a way to encourage their preservation.

8.5 The Stephenville Project

The work accomplished in Gander can be used as a template for other aviation towns. For instance, Stephenville, Newfoundland, has started the preliminary work in commemorating 50 years since the United States Air Force left in 1966 (Hiller 2007).

As part of the Anglo-American Leased Bases Agreement (see Section 2.1.1), land was granted to the United States in St. John's, Placentia/Argentia and Stephenville, as well as smaller stations around the colony. These areas were unlike Gander in that they were already established communities before the arrival of the Americans. Stephenville, in particular, comprised mostly of farm land, and the mainly French-speaking community worked as fishermen and farmers. The establishment of the base relocated many residents of the area who then vied for the employment offered by the same base. During the American occupation of the area, from 1941 to 1966, Stephenville was transformed from a small community to a modern garrison town (Higgins 2006). The American influence is apparent in the street names, mostly American states, and the Little America phenomenon (see Section 2.2.3.2) can be seen in the construction of the homes on these streets. During the Cold War, many areas of Stephenville were rebuilt to provide homes for the

Figure 8.4: The last remaining WWII hangar in Stephenville, Newfoundland. Photo by Shannon K. Green.

soldiers stationed at Harmon Field; most of these buildings still stand as residential housing. The Cold War base is still relatively intact, although only one building still stands from World War II (Figure 8.4). As it was an airbase, like Gander, there were aircraft crashes in the area, although many fewer than at the Newfoundland Airport. Two of these sites, DbBo-02 and DcBt-01, have been preliminarily surveyed by the author though there is the potential for more work to be done on both sites.

Both Gander and Stephenville are proud of their aviation history, but it is only in the past couple of years that Stephenville has been focusing on their own history. The recent opening of the Regional Art and History Museum in Stephenville has given the people of Stephenville and surrounding areas a place to donate material culture of their own history, and, this past summer students have been encouraging veterans to visit the museum to share their stories of WWII, the Korean Conflict, Afghanistan and Peacekeeping missions (Gale 2014). While many of these stories may not focus on Harmon Field, the museum is trying to collect the history of residents, whether it took place in the Stephenville area or not, as it all contributes to the area's history, demonstrating the museum and community focus on trying to collect the recollections and material culture of the area. Very little history has been written about Stephenville. Unlike Gander, with a multitude of memoirs and histories available for purchase at the North American Aviation Museum, Stephenville has only just started to come together to focus on this history. A large push is due to the 50th anniversary of the United States leaving the area and how the community plans to commemorate the occasion. Research into the area has been limited with High (2009) having done the bulk of the research in the area in terms of the impact of the Leased Bases Agreement on the area. Most research done has been amateur genealogists researching their own family lines, without much concern for the greater historical view of the area.

As discussed in Section 6.4, Gander was a unique phenomenon in how it was constructed. Typically, Newfoundland communities were built around a resource. Predominately, that resource was fish, but some communities were based around lumber or minerals. Gander was built as it was the first suitable place found to build an airport (Hall and Vatcher 1935). With wartime expansions, Gander continued to differ from other communities where bases were being built. Bases in Stephenville, Placentia and St. John's all had to displace residents and as they all fell under the leased Bases Agreement, expansions could occur as the United States saw fit. The only exception was Goose Bay, which was a Canadian project and was held to different regulations. Goose Bay was established near the community of North-West River, but far enough away to not displace locals. Gander was never under the control of the USAAF, RCAF or RAF, rather, the airbase continued to belong to Newfoundland, but was managed by the other countries. As mentioned in Section 3.1.1, any expansion, even though it did not affect any local residents, had to be cleared with the Newfoundland Commission Government.

At the same time, this isolation may have had a greater impact on those living at Gander during the Second World War. Cardoulis (1993) tells stories of how Gander was a more relaxed atmosphere compared to other bases, perhaps owing to the isolation of the base and the interactions between people from the various countries represented at the base (see Section 6.1). While the airport was often visited by aircraft flying through, it was still isolated from other bases and the officers who maintained order and hierarchy. As mentioned in Section 6.4, a USAAF general was shocked at the relaxed attitude toward authority on the base, perhaps a bi-product of Gander's isolation.

In other communities, such as Stephenville or Argentia, there were protocols to maintain as an example to the local population who were literally living right outside the gate (High 2009).

In particular, the USAAF and USN held themselves to such high standards to be an example to the rest of the world (see Section 6.2) and even compared themselves as more disciplined than the Canadians they worked alongside at Gander (see Section 6.1). The Newfoundlanders who worked at Gander were clearly identified by their red barrettes and were base employees, not the general population (see Section 6.1), therefore protocol could be more relaxed. In situations where there was regular interaction between the Americans and the local population, the Americans expected the population to meet their standards, for example, the food quality standards of the U.S. Army and the USN had to be met by any local business looking to sell goods or services to American servicemen. This was all part of the “Little America” theory put forward by the Coca-Cola Company that overseas servicemen should live in as close an approximation to home as possible (see Section 6.2.1). The version of America portrayed was a higher standard than that of much of the United States, but rather an act to make the country look strong and powerful to other countries, something which attracted some Newfoundlanders after the war enough to propose a union with the Unites States instead of Canada (Hiller 2003, 45). In the case of Gander, the population allowed access was already greatly controlled therefore it probably was not as necessary to keep up appearances as at St. John’s, Argentia, Stephenville, and any small station where there might be interactions between the military and the local population.

The research methods used to study Gander can be expanded to research the Second World War and the Cold War in Stephenville. All but one building from the Second World War has been destroyed (Figure 8.1), and very few war era crash sites are in the area. The methods used here for crash sites can be expanded into commercial and Cold War crash site research. The same survey methods would apply as seen of the preliminary survey of the 1946 commercial crash of the AOA DC-3. While talking to Stephenville residents, stories have been shared of other crash sites and of working on the base (pers. comm. Leo Fitzgerald). A benefit to both the work done by the local museum in collecting stories and the Cold War nature of the site is that there will be more people alive who worked or grew up on the base, thus decreasing the reliance on secondary memory. While little remains of the war era building, excavation would be less likely than at Gander as the

war ear buildings were destroyed to make way for Cold War facilities such as hangars large enough

Figure 8.5: Cold War hangar in Stephenville designed to house B-36 bombers. Photo by author.

to house B-36 bombers (Figure 8.2). Many of these buildings now house other companies and whatever remains is most likely inaccessible under the tarmac. Second World War and Cold War expansion would have destroyed or covered much of the original farmland that was Stephenville before World War II, and while archaeology may not be able to be applied to the airbase, it can be used to learn more about the airplane sites and, like Gander, this information can be used to complement historical research and collection of memories to develop a better understanding of the history of Stephenville and Harmon Field.

CHAPTER 9: CONCLUSION

Aviation archaeology is a new branch of conflict archaeology; as such much of the analysis done in this work has had little precedent. The analysis of crash sites has developed as more of these sites have been visited and each accident report was acquired. The analysis of DgAo-01 and FbCj-01 lead by Michael Deal have been the major influence in shaping this research and developing an understanding of the creation and interpretation of each of the crash sites. Excavation at the Globe Theatre site was limited, but artifacts such as bottle glass and coins gave an initial understanding of the dynamics and interactions between the Canadians, Americans and Newfoundlanders living in the area. Bottle glass turned out to be the most useful artifact class recovered at the site. Those pieces that could be identified showed the movement of goods from different countries to shared spaces to be consumed by all. Those brands that were sent to international bases like Gander would be the goods that make the area feel most like "home" to the servicemen, like Gaden Aerated Soda for the Newfoundlanders and Coca-Cola for the Americans (Coca-Cola Company 1974).

The readily available history for World War II sites is characterised by official documentation and memories. This leaves gaps in the historical record. Official documentation tends not to be detailed. It is focused on finding out the details of the accident, but does not look at the recovery or what happened to the aircraft and crew after the incident. Memories are often fragmentary, and in many cases, those who were involved in the incident are not available to be contacted to share their memories. As discussed in Section 3.4, memory can be altered by the official record and by time, and memories are often not shared. Archaeology can help fill in some of the missing information and discover what happened to the site after the initial incident. The research, folklore and archaeology associated with this project has helped to get a fuller picture of what happened with each of these incidents. The official documentary record only tells a small portion of what happened with each site, whether a specific crash site or the Globe Theatre, and archaeological research has allowed for a better understanding of the history of each site and of the Gander Airbase as a whole.

9.1 The Social Context

Officially, there was an American side, a Canadian side, and a British side to the Gander Airbase. In documents such as *Propagander* (Thompson 1944) and *The Gander* (1943-1944), articles indicate that there was no crossing between the different areas of the base. The only ones who seemed to be in all areas were the Newfoundlanders, who were typically clearly identified. But other indicators, such as Goff's (2005) memoir and Flynn's (1999) collection, show that there was mixing between the countries, such as Christmas parties, picnics at Gander Lake, and weekly debates. Similarly, the crash report for the RCAF Hurricane and USAAF A-20 (see Section 5.6) states that the mock dogfight was discussed between the two pilots prior to the exercise. This indicates that the pilots were in contact, possibly socially, even though they were from different countries. In the incident reports for this crash and the RCAF Canso (see Section 5.5), both Canadian and American servicemen and investigators went to the sites to help with the rescue and recovery, showing both countries working together. If RAF reports were available, similar situations might have been uncovered.

The social aspect is mostly explored through memory and commemoration. Since starting this research, individuals have made contact to request information about specific sites and share what they know. The majority of these contacts have been interested in sites outside of this project, but in one case, USAAF navigator Andrew H. Hines, was an eye witness to another crash (see Section 5.8.1) and wanted to exchange his witness account for official information about the crash. Generally, witnesses, and even crew helping with investigations (but not investigators), were not given much information about crashes or the results of the investigations. Similarly, how the individuals on the base were affected by these incidents were not considered in the documentation. Many crews would have been passing through on ferrying flights, but in some cases, such as the RCAF Digby (see Section 5.1), the crew were Eastern Air Command based in Gander, and so would have had repeated contact with many of the people on base. While it is obvious from sources such as issues of *The Gander* (1943-1944) that friendships were formed, as these publications were designed to be sent home, deaths were not discussed besides small "In Memoriam" sections. The fact that the Commonwealth War Graves were established with a large memorial and personalized epitaphs indicates that individuals who died in the line of duty were important to the community of the Gander Airbase (Figure 7.1).

9.2 The Disturbed Context of Aviation Sites

All of the sites investigated under this project are disturbed. After a crash, the rescue/recovery team entered, aiding survivors and removing the victims. The site was searched to determine the cause of the crash, and sensitive and important material was recovered or destroyed (see Section 5.9). In rare cases, the entire aircraft was removed by the air force of that country for repair or scrap (see Section 5.6). After the war, the sites were used for a variety of purposes. They were salvaged for materials and scrap, destroyed due to construction projects, used as trail markers and training sites, or simply visited by people who have an interest in aviation. All of these events disturb the site in different ways, some more catastrophically than others. All of this contributes to the history of the site, and must be acknowledged by researchers.

While the plane crash sites are disturbed, they are typically difficult to access. The Globe Theatre, on the other hand, is a disturbed urban context, as it is part of the Gander Airbase. While the site was abandoned sometime in the 1960s, the site has never been completely left alone. The building was demolished. No official dates of demolition have been located, and informant reports vary from the 1960s to the 1980s, with some building left from the war still being lost to time and the weather (www.ganderourtown.ca). Added to that, the RCAF side of the base has been converted into walking and biking trails, and it is well-known to residents that the younger population uses the area for a variety of activities. For instance, a birdhouse was found on the surface of the Globe site, obviously having fallen from a tree. A couple of residents confirmed that a Boy Scout leader, a few years ago, used to have his group make birdhouses to erect throughout the area. Therefore, the area continued to be visited, and, without a clear date for demolition, all artifact proveniences are somewhat suspect, as there was mixing during the demolition of other buildings (e.g., the large amounts of slag found around the northern corner of the building).

All interpretations must take this disturbed state of the context into consideration. This, coupled with the fact that the site was in use after the war and the building was most likely stripped after it was abandoned, means that any interpretation can change with further excavation or new information regarding the history of the building.

9.3 Recovering Aviation Sites

As stated in Chapter 1, one of the goals of this project was to identify, record and analyse the history and archaeology of aviation sites in WWII era Gander. To accomplish this, methods for locating and surveying sites had to be developed. As discussed in Section 4.4, little previous work had been done around the province, therefore much of sections 4.5 and 4.7 focus on identifying and developing methods to research sites. It was established early in this research that each site was different and the methods used for survey had to be fluid. While the methods used in previous work, such as that done by JPAC and the underwater methods used by shipwreck archaeologists, were consulted and used to develop a guideline for survey methods for aviation sites, each individual site did require slightly different methods (Table 9.1). Site environments varied from bogs to forests, and varied in degrees of wetness. In some cases, multiple environment types were found in a single site, such as B-17 44-6344 (see Section 4.7.9) which was lightly forested for the most part, but a landing gear and other debris were located in a drainage pond next to the TCH, and B-25 KJ584 which was dispersed over both a bog and an adjacent densely forested area. The general guideline planned was to use a surveyor's level and measuring tape, as was used by Deal at DgAo-01 (Deal 2008), but this proved to be an unsuccessful method for densely forested areas, open bogs, and heavily scavenged sites. As such, alternate methods were used, often it could not be determined what methods should be used until researchers were on site and could assess the environment and state of the wreck.

As ten aircraft crash sites were investigated as part of this project, it became apparent that information regarding crash mechanics, crash damage, reuse and scavenging could be determine. Comparing the damage to sites allowed for the recognition of different types of damage, such as the zippering of aluminum (see Figure 4.2) which happened at the time of the crash, to ax or

Table 9.1: Survey methods used on each aircraft crash site.

Site name	Air Force	Site Environment	Site Condition	Survey Methods Used				
				Surveyor's Level and Measuring Tape	Surveyor's Level (measured from level)	Line and Compass	GPS	Metal Detector
Digby 742 (DfAp-10)	RCAF	Floating bog	Moderate, past site use evident	X	X			
Ventura AJ471 (DfAo-01)	RAF	Open bog	Moderate, some current site use	X	X			X
Hudson S/N FK 690 (DfAp-11)	RAF	Lightly forested	Scavenged			X		X
Canso 98107 (DfAp-07)	RCAF	Forested and wet	Good, limited visitation	X				
Lodestar 557 (DfAp-15)	RCAF	Bog on the edge of a forest	Good, limited visitation	X	X			
A-20 (DfAp-13)	USAAF	Forest on the edge of a bog	Good, limited visitation			X	X	
Hurricane 5496 (DfAp-16)	RCAF	Drained pond (heavy alder)	Removed					X
B-17 42-97493 (DfAp-09)	USAAF	Protected forest	Scavenged	X				
B-17 44-6344 (DfAp-08)	USAAF	Lightly forested	Somewhat scavenged			X	X	
B-25 KF 584 (DfAp-12)	RAF	Part bog, part dense forest	Good, limited visitation				X	

hatchet marks where aluminum was removed to be sold as scrap (Figure 9.1). Similarly, it was the comparison of sites that allowed for better determination as to which sites had been recovered at the time of the war and which have been visited later and to what extent. For the most part, it is difficult to assess how much a site has been visited by enthusiasts depending on how they treat the site. The removal of instruments, machine guns, and other interesting parts can be part of the recovery process at the time of the war, or due to collectors removing objects from the site. Scavenging is much more easily identified. The A-20 (see Section 5.6.2) and B-25 KJ584 (see Section 5.9.2) seemed at first to have been scavenged as nothing of interest remained on site, but as so much aluminum was present, it was more likely that the site was heavily recovered during the war era. Had the site been scavenged, it would contain very little aluminum, as seen with Hudson Mk. VI s/n FK 690 (see Section 5.4.2) and B-17 44-6344 (see Section 5.8.2).

Figure 9.1: Ax marks on Ventura AJ471. This piece has been removed from the main crash site (see Section 5.3.2). Photo by author.

In creating an inventory of WWII material culture resources around Gander, Newfoundland, methodologies and interpretations of site use have been developed which can be applied to other aircraft crash sites around Newfoundland, Labrador and elsewhere. A major consideration for any survey of a crash site is that methods much be fluid to best determine the methods necessary to each specific site. Similarly, while all sites have been disturbed to varying degrees (see previous section), the more sites that are surveyed and analysed, the better understood the different types of disturbance (war era recovery, reuse, collecting, scavenging) will be.

9.4 Future Work

A major part of this project was to inventory Second World War resources in Gander, Newfoundland. While not all sites around Gander have been identified and assessed, a large number of them have. It is difficult to say just how many crash sites are in the Gander region as there are always rumours of others, something someone stumbled across while hiking or hunting. But there are still other known sites in the area that could not be accessed during this project. A return Ferry Command B-24 is of great interest. The aircraft was returning with a full crew of pilots who were to ferry further aircraft overseas when it crashed. All were killed. A while after the crash, a resident of Gander who was at the initial recovery returned to the site to carve a memorial in the tail of the aircraft. It would be nice to know the status of this site, if the tail is still standing, and if the memorial is still visible.

Also of interest are three aircraft on the southern side of Gander Lake (two B-24s and a Canso; see Map 4.1). The Canso at least has been mildly scavenged as the Forestry Department at one point needed a new wheel for their own Canso, and as the one on the other side of the lake was useable, they removed it for their own use (pers. comm. Edward Blackmore 2010). Finally, the B-24 in Gander Lake is of interest to a number of residents and scuba divers. It is the final World War II site with missing servicemen that has not been investigated. The location of that aircraft is currently being investigated by Tony Merkle. Merkle and his team have been using side scan sonar to try to locate the wreckage, but after searching during the summer of 2014, have not yet located the wreckage in Gander Lake. If they do find the wreckage, dive teams will further investigate the site (pers. comm. Tony Merkle 2014).

The other two sites that still contain servicemen listed as missing in action are the Eagle site, where there are still three men unaccounted for even after archaeological investigation, and the Excalibur in Botwood Harbour that was surveyed by JPAC in 2008, and recovered in 2011 and 2013 (Hillier 2011; JPAC 2009). The full report on this recovery has not yet been released.

There are many aviation sites around Newfoundland and Labrador, and although not all of them are considered historically significant (see Section 4.4 for an outline of some of the more significant sites), all of these sites involved individuals, and whether they survived the crash or died, often far from home, the archaeology coupled with documentary research and local information, tells the story of these people, stories that should not be forgotten. There is interest in researching these sites, particularly for small community museums. For instance, the Stephenville Regional Museum of History and Art would like to see all crashes in the area researched and patrons of the museum are willing to share their stories about sites and donate related artifacts.

There are numerous non-crash related sites of interest around the province of Newfoundland and Labrador. In an aviation related area, there are rumoured to be Spitfire airplanes buried at the Torbay Airport. While excavation may not be possible, sub-surface survey could tell if the aircraft are present or if it is just a story.

Outside of actual aircraft, Newfoundland and Labrador has a great deal of war-related material culture. Excavations of any of the bases around the province, both naval and aerial, would complement the documentary research that is now being undertaken by historians in the province. Added to this, the construction and operation of these bases after World War II and into the Cold

War shaped many communities, such as Stephenville, Argentia (Placentia) and Goose Bay. Research and excavation could reveal more about not only Newfoundland's WWII history, but its role during the Cold War.

There are obvious challenges facing archaeological research into these areas. Contamination and environmental issues prevented excavation in many areas in Gander, so these communities and bases also have the potential to be heavily contaminated. The precautions common to industrial archaeology have to be taken to protect the health and safety of researchers. This researcher still believes that dump sites, whether for refuse produced by the towns or from catastrophic incidents, like the 1943 hangar fire, would yield important information into the lives of those living in war era settings.

9.5 Gander and Aviation

Many of the residents of Gander are proud of their history as an airport town. This research into the history of Gander and the airplane crashes in the area has been helped a great deal by those passionate about their town. Throughout this work, information has come from personal communications (see Informants) from individuals who have grown up, worked, and lived in Gander, some while it was still called The Newfoundland Airport. These are the individuals who have written memoirs, attended talks, researched crashes, aircraft, events and buildings of interest, and who volunteer with the North Atlantic Aviation Museum. While most of Newfoundland identifies with being founded on the fishery, and Labrador has a combination of native heritage, hunting, fishing and trapping, Gander is unique on the island for being founded on aviation. The only other community that can boast this in the province is Goose Bay, which was never as isolated and also became a shipping hub for Labrador. This sets the community of Gander apart and adds to the passion that is visible in the people and the town. Gander's streets, restaurants and bars are named for famous aviators, statues of aircraft fill the town, and memorial sites, such as Silent Witness, the Commonwealth War Graves and the Sabena crash site, are well maintained and cared for.

While no informants in Gander could be found to talk about the specific crashes discussed in this research, those interested in the aviation history of the area were quick to inform on what they knew of sites, whether it be the forest fire associated with the B-17 near the TCH (see Section 5.8), or the fact that community pride stopped a salvor from selling aircraft aluminum for scrap (pers. comm. Clyde Burt 2011). The residents shared what they knew while researchers shared the official histories. Those enthusiastic about Gander's history added a great deal to the historical record by filling in many of the gaps regarding what happened to aircraft after the war era. Now, as research is being done and individuals are becoming more aware and interested, those same people are ensuring that the material culture remains of World War II and Gander's inception are protected and preserved through education and vigilance.

INFORMANTS

The following have been cited as personal communications throughout the document. These individuals were invaluable in the research into the aviation history of Gander and for locating the crashed aircraft investigated.

Blackmore, Edward

- Director of the Thomas Howe Demonstration Forest, informing on the operations of the Demonstration Forest and the collection of artifacts by staff.

Burt, Clyde

- Long-time resident of Gander who lived on the Canadian side of the airbase.

Connors, Bryan

- Resident of Gander who has in his possession pieces of DfAp-11 collected when the Trans-Canada Highway was being constructed.

Deacy, C. (Constable)

- Constable with the Royal Newfoundland Constabulary and experienced with high explosives.

Dolan, William

- Son of Colonel William Dolan, the pilot of DgAo-01. Dolan Jr. readily gave information about what the family were told concerning his father's crash and what he remembered from the day his father took off on the ill-fated flight.

Fitzgerald, Leo

- Former base worker at Harmon Field (Stephenville) who was involved in the recovery operation after the 1946 AOA disaster.

Fudge, M. (Corporal)

- Member of the Canadian Armed Forces and acted as an escort to allow researchers access to DfAp-10. Discussed the use of the land around the plane crash and its restricted access.

Hillier, Darrel

- Former resident of Gander and amateur historian who has extensively researched the history of the airbase and the plane crash sites in the area and around the province.

Hines, Andrew H.

- Former navigator with the United States Army Air Force during World War II. His aircraft was on the runway and left shortly after USAAF B-17 44-6344 (DfAp-08) crashed.

Hoyle, Peter

- Resident of Gander who lived on the Canadian Side of the Gander Airbase during and after World War II.

Jarvis, Tony

- President of the Ventura Memorial Flight Association who has done a great deal of research into Ferry Command Ventura AJ471 (DfAo-01).

Maher, Robert

- Engineer with Provincial Airlines who helped identify aircraft fragments, as well as informed on site locations.

Merkle, Tony

- Avid diver and member of the Shipwreck Preservation Society of Newfoundland and Labrador. Currently searching for the RCAF B-24 in Gander Lake.

Pelley, Harold

- Resident of Glenwood who informed on the location of crash sites around Gander.

Sheppard, A. (Captain)

- 9 Wing Gander Public Affairs Officer who arranged for access to RCAF Douglas Digby 742 (DfAp-10).

Tibbo, Frank

- Long-time resident of Gander and author of a number of books relating to the area, and former contributor of history articles to the local newspaper, *The Gander Beacon*.

Warren, Nicole

- Resident of Gander who studied archaeology at Memorial University of Newfoundland.

Young, Dana

- Instructor in Aircraft Maintenance Engineering at College of the North Atlantic in Gander.

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Appendix A: Aircraft referred to in the text

Below are a list of specifications and an image of each of the aircraft mentioned in the text. As many aircraft have different models, the specifications listed are those that best reflect the aircraft referred to in the text as multiple models may have been encountered in this research, the exact model is unknown or the specifications for the exact model could not be found. This is designed as a guide for readers less familiar with aircraft to have a better understanding of the size and look of the aircraft prior to the crash

Boeing B-17G Flying Fortress	
Aircraft Type	10-seat heavy bomber
Powerplant	Four 1200hp (895kW) Wright R-1820-97 nine-cylinder radial engines
Dimensions	Span 31.63m; length 22.78m; height 5.82m
First Production	1935
Source	Chant 1999, 55-56; Crosby 2006, 55; Jackson and Winchester 2007, 81

Figure 2: Boeing B-17G Flying Fortress. From www.aviation-history.com.

Consolidated B-24J Liberator	
Aircraft Type	Eight/12-seat long-range heavy bomber
Powerplant	Four 1200hp (895kW) Pratt & Whitney R-1830-65 14-cyliner two-row radial engines
Dimensions	Span 33.53m; length 20.47m; height 5.49m
First Production	1939
Source	Chant 1999, 89-91; Crosby 2006, 67.

Figure 3: Consolidated B-24J Liberator. From www.aviation-history.com.

Consoliated PBY-5A Canso (Catalina)	
Aircraft Type	Nine-seat maritime reconnaissance and bomber amphibian flying boat
Powerplant	Two 1200hp (895kW) Pratt & Whitney R-1830-92 Twin Wasp 12-cylinder two-row radial engines
Dimensions	Span 31.70m; length 19.45m, height 5.76m
First Production	1935
Source	Chant 1999, 87-88, Crosby 2006, 69.

Figure 4: Consolidated PBY Canso outside of the North Atlantic Aviation Museum, Gander. Photo by author.

Convair B-36 Peacemaker

Aircraft Type	Heavy strategic bomber
Powerplant	Six Pratt & Whitney 3600hp (2832kW) R-4360-53 radial piston engines and four General Electric 2452kg (5400lb) thrust J47-19 turbojets
Dimensions	Span 70.1m; length 49.4m; height 14.22m
First Production	1946
Source	Crosby 2006, 176-7; Taylor 1989, 265.

Figure 5: Convair B-36 Peacemaker. Photo from www.globalaircraft.org.

Douglas A-20 Havoc/Boston	
Aircraft Type	Three-seat light attack bomber
Powerplant	Two 1700hp (1268kW) Wright R-2600-23 14-cylinder two-row radial engines
Dimensions	Span 18-96m; length 14.63m; height 5.36m
First Production	1938
Source	Chant 1999, 111

Figure 6: Douglas A-20. Photo from www.aviation-history.com.

Douglas C-54 Skymaster	
Aircraft Type	52 passenger, long-range heavy logistic transport
Powerplant	Four 1100 – 1450hp (820 – 1080kW) Pratt & Whitney Twin Wasp engines
Dimensions	Span 35.81m; length 28.6m; height 8.38m
First Production	1942
Source	Taylor 1989, 340-1

Figure 7: Douglas C-54 Skymaster. Photo from www.globalaircraft.org.

Douglas DC-3	
Aircraft Type	Sleeper transport
Powerplant	Four engines of various ranges from Wright Cyclone and Pratt & Whitney Twin Wasp engines ranging in power from 1000 to 1200hp (742 to 894kW)
Dimensions	Span 28.96m; length 19.63m
First Production	1936
Source	Taylor 1989, 338-9

Figure 8: Douglas DC-3. Photo from www.aviation-history.com.

Douglas Digby (B-18 Bolo)	
Aircraft Type	Twin engine medium bomber
Powerplant	Two wright 1000hp R-1820-53 Cyclone 9-cylinder radial engines
Dimensions	Span 27.28m; length 17.63m; height 4.62m
First Production	1935
Source	Crosby 2006 80-81

Figure 9: Douglas Digby. Photo from www.aviation-history.com.

Hawker Hurricane MkIV	
Aircraft Type	Single-seat ground-attack fighter
Powerplant	One 1620hp (1208kW) Rolls-Royce Merlin 24 or 27 12-cylinder Vee engine
Dimensions	Span 12.19m; length 9.81m; height 3.98m
First Production	1935
Source	Chant 1999, 161-163

Figure 10: Hawker Hurricane. Photo from www.aviation-history.com.

Lockheed Hudson	
Aircraft Type	Six-seat coastal reconnaissance bomber
Powerplant	Two 1100hp (820kW) Wright GR-1820-G102A Cyclone nine-cylinder single-row radial engines
Dimensions	Span 19.96m; Length 13.50m; height 3.32m
First Production	1938
Source	Chant 1999, 211; Crosby 2006, 125.

Figure 11: Lockheed Hudson from the collection of the North Atlantic Aviation Museum, Gander. Photo by author.

Lockheed Ventura	
Aircraft Type	Five-seat coastal reconnaissance bomber
Powerplant	Two 2000hp (1491kW) Pratt & Whitney R-2800-31 Double Wasp 10-cylinder two-row radial engines
Dimensions	Span 19.96m; length 15.77m; height 3.63m
First Production	1939
Source	Chant 1999, 215

Figure 12: Lockheed Ventura. Photo from www.rcafventura.ca (VMFA).

North American B-25C Mitchell	
Aircraft Type	Five-seat medium bomber
Powerplant	Two 1700hp (1267.5kW) Wright R-2600-13 18-cylinder two-row radial engines
Dimensions	Span 20.60m; length 16.12m; height 4.82m
First Production	1940
Source	Chant 1999, 215; Crosby 2006, 135

Figure 13: North American B-25 Mitchell. Photo from www.aviation-history.com.

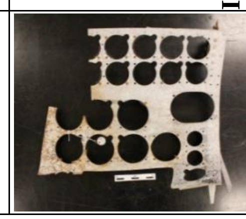
North American B-45 Tornado	
Aircraft Type	Multi-jet light tactical bomber
Powerplant	Four 22.24kN General Electric J47 turbojet engines
Dimensions	Span 11.91m; length 11.44m
First Production	1948
Source	Taylor 1989, 705-6

Figure 14: North American B-45 Tornado. Photo from www.aviastar.org.

Appendix B: Aircraft Artifact and Feature Catalogues

Below are the artifact and feature catalogues for the sites examined in this study. Artifacts are rare and only objects considered to be at risk of being removed from sites were taken for conservation. As of publication, artifacts are housed at the Archaeology Department at Memorial University of Newfoundland and Labrador. From a conservation perspective, features were stable and best to be left *in situ*. The following catalogues are listed in chronological order of crash date, the same order used throughout this paper. Note there is no catalogue for DfAp-16, RCAF Hurricane, as the aircraft was not found, but the site determined based on informants and crash images (see Section 4.7.7 and 5.6).

RCAF Digby 742 (DfAp-10) Artifact Catalogue

Borden	Artifact	Instrument Position	Elevation (m)	Distance (m)	Direction	Diameter (cm)	Length (cm)	Width (cm)	Thickness (cm)	Description	Conservation	Image Reference
DfAp-10	1	1P1	0.262	11.7	190°		47.48	45.72	14.88	Control panel for the aircraft	Dry brushed	

RCAF Digby 742 (DfAp-10) Feature Catalogue

Borden	Feature number	Field reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction (˚)	Image	Notes
DfAp-10	1	P1	Datum	IP1	0	0	.°		N48°56.599' W054°30.529' elev 147m
DfAp-10	2	P2		IP1	3.9	0.101	274.°		

Borden	Feature number	Field reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction (°)	Image	Notes
DfAp-10	3	P3		IP1	12.4	0.215	232.5°		
DfAp-10	4	P4		IP1	19	0.207	232.5°		
DfAp-10	5	P5		IP1	15.9	0.227	223.5°		
DfAp-10	6	P6		IP1	8.7	0.168	205.°		
DfAp-10	7	P7		IP1	10.8	0.335	152.5°		
DfAp-10	8	P8		IP1	14.2	0.132	147.°		

Borden	Feature number	Field reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction (°)	Image	Notes

Borden	Feature number	Field reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction (˚)	Image	Notes
DfAp-10	9	P9	U/I fuselage in pond	IP1	≈60	#VALUE!	341.°		
DfAp-10	10	P10	N corner of plane	IP1	16.1	0.117	174.°		
DfAp-10	11	P11	S corner of plane	IP1	10.7	0.202	174.°		
DfAp-10	12	P12		IP1	10.5	0.12	172.°		
DfAp-10	13	P13	E corner of plane and instrument panel	IP1	11.7	0.262	190.°		W corner submerged
DfAp-10	14	P14	Tail, tip, submerged	IP1	≈10 from P13	#VALUE!	188.°		

Borden | Feature number | Field reference | Object Description | Instrument Position | Distance (m) | Elevation (m) | Direction (˚) | Image | Notes

Borden	Feature number	Field reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction (°)	Image	Notes
DfAp-10	15	P15		IP1	18.4	0.149	164.°		
DfAp-10	16	P16	W side of wreckage	IP1	29.3	0.307	161.°		
DfAp-10	17	P17	E side of wreckage	IP1	29.9	0.244	166.5°	See DfAp-10:16	
DfAp-10	18	P18		IP1	30.8	0.172	167.°		
DfAp-10	19	P19	N corner of long wreckage	IP1	52.9	0.322	161.°		
DfAp-10	20	P20	S corner of long wreckage	IP1	50.9	0.222	150.°		
DfAp-10	21	P21		IP1	43.1	0.217	144.°		

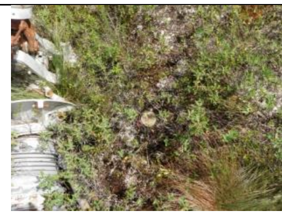
Borden	Feature number	Field reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction (˚)	Image	Notes
DfAp-10	22	P22	Pieces in mud swath	IP1	≈40	#VALUE!	132.5°		
DfAp-10	23	P23		IP1	34.4	0.172	147.°		
DfAp-10	24	P24		IP1	29.3	0.011	126.°		
DfAp-10	25	P25		IP1	30.3	0.116	133.°		
DfAp-10	26	P26		IP1	1.389	0.129	56.°		
DfAp-10	27	P27	Grid point	IP1	10	0.111	.°		
DfAp-10	28	P28	Grid point	IP1	10	0.174	90.°		
DfAp-10	29	P29	Grid point	IP1	≈10	0.362	180.°		Very deep mud, sinking
DfAp-10	30	P30	Grid point	IP1	10	0.167	270.°		Sinking as reading
DfAp-10	31	P31	Inaccessible wreckage	IP1	75		225.°		Measurements from Google Earth

RAF Ventura AJ471 (DfAo-01) Artifact Catalogue

Borden	Artifact	Instrument Position	Elevation (m)	Distance (m)	Direction	Length (cm)	Width (cm)	Thickness (cm)	Diameter (cm)	Description	Conservation	Image Reference
DfAo-01	1	IP1	18.25	1.098	259.°	12.61	11.71	4.4		Green bracket	Dry brushed	
DfAo-01	2	IP1	13.71	1.204	283.°					Camera Cover	In Conservation	
DfAo-01	3	IP1	13.62	1.15	283.°	428.3	196.2	39.5			Dry brushed	

RAF Ventura AJ471 (DfAo-01) Feature Catalogue

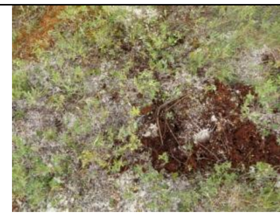
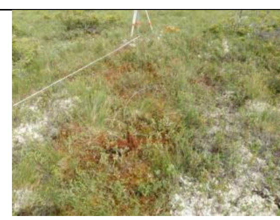
Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAo-01	1	P1	Datum - IP1			0	°		48°57'52.70"N 54°22'35.50"W elev 108m
DfAo-01	2	P2	Grid Point	IP1	10	0.069	°		
DfAo-01	3	P3	Grid Point	IP1	20	-0.079	°		
DfAo-01	4	P4	Grid Point	IP1	30	0.035	°		
DfAo-01	5	P5	Frame piece and pipe (7 pieces)	IP1	21.8	0.1	2°		
DfAo-01	6	P6	Fuselage fragment, E edge	IP1	20	0.149	11°		
DfAo-01	7	P7	Fuselage fragment, W edge	IP1	18.1	0.116	18°		
DfAo-01	8	P8	Helicopter rotor (points E)	IP1	10.4	0.057	6°		Left at site on SAR training

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAo-01	9	P9	Instrument housing?	IP1	9.05	0.031	7°		
DfAo-01	10	P10	Helicopter rotor (points N)	IP1	13.5	0.042	351°		Left at site on SAR training
DfAo-01	11	P11	Top of tin can	IP1	13.33	0.009	350°		
DfAo-01	12	P12	Aluminum strapping (2 pieces)	IP1	5.85	0.048	20°		
DfAo-01	13	P13	Piece of frame	IP1	1.5	0.134	35°		
DfAo-01	14	P14	Grid Point	IP1	10	-0.172	270°		
DfAo-01	15	P15	Grid Point	IP1	20	-0.419	270°		
DfAo-01	16	P16	Grid Point	IP1	30	-0.334	270°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAo-01	17	P17	Cockpit frame	IP1	22.45	-0.198	259°		
DfAo-01	18	P18	Wing tip (W)	IP1	21.74	-0.3205	269°		
DfAo-01	19	P19	Cut piece of aluminum	IP1	19.5	-0.181	263°		
DfAo-01	20	P20	Panel (ants)	IP1	17.2	-0.234	271°		
DfAo-01	21	P21	W corner of nose	IP1	17.45	-0.364	278°		
DfAo-01	22	P22	S corner of nose	IP1	16.61	-0.245	276°		
DfAo-01	23	P23	E corner of nose	IP1	13.85	-0.269	278°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAo-01	24	P24	N corner of nose	IP1	14.99	-0.263	286°		
DfAo-01	25	P25	Cut aluminum piece	IP1	14.03	-0.26	286°		"OK10 \933/ CLOCF"
DfAo-01	26	P26	Frame (whole) and door panel (hinged)?	IP1	10.3	-0.205	283°		
DfAo-01	27	P27	Aluminum band	IP1	11.8	-0.124	261°		
DfAo-01	28	P28	Tin can piece	IP1	11.9	-0.134	265°		
DfAo-01	29	P29	Frame piece with rubber	IP1	10.63	-0.113	261°		
DfAo-01	30	P30	Nails (2)	IP1	11.2	-0.104	250°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAo-01	31	P31	Spike	IP1	10.45	-0.167	250°		
DfAo-01	32	P32	Tin can piece	IP1	17	-0.224	266°		
DfAo-01	33	P33	Bracket (collected)	IP1	18.25	-0.256	259°		
DfAo-01	34	P34	Bracket	IP1	22.1	-0.234	267°		
DfAo-01	35	P35	Frame pieces (6)	IP1	8.55	-0.148	266°		
DfAo-01	36	P36	Larger frame with rubber	IP1	8.35	-0.129	255°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAo-01	37	P37	Aluminum strips (rivet holes)	IP1	7.05	-0.095	264°		
DfAo-01	38	P38	Aluminum bands	IP1	9.15	-0.155	277°		
DfAo-01	39	P39	Round plate/cover	IP1	8.3	-0.158	277°		
DfAo-01	40	P40	Cut aluminum (round tank hole?)	IP1	7.15	-0.131	277°		
DfAo-01	41	P41	Large bolt	IP1	7.02	-0.123	286°		
DfAo-01	42	P42	Aluminum wire	IP1	4.57	-0.063	286°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAo-01	43	P43	SW corner of cockpit	IP1	11.29	-0.194	292°		
DfAo-01	44	P44	SE corner of cockpit	IP1	9	-0.192	288°		
DfAo-01	45	P45	NW corner of cockpit	IP1	8.4	-0.213	300°		
DfAo-01	46	P46	NE corner of cockpit	IP1	10.97	-0.215	298°		
DfAo-01	47	P47	Cut piece from cockpit	IP1	10.97	-0.204	301°		
DfAo-01	48	P48	Triangular piece with rubber	IP1	10.67	-0.239	304°		
DfAo-01	49	P49	Small aluminum cover	IP1	12.3	-0.159	299°		
DfAo-01	50	P50	Rusted tank	IP1	13.2	-0.079	296°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAo-01	51	P51	Fuselage, punched hole	IP1	15.23	-0.349	304°		
DfAo-01	52	P52	Corrugated aluminum	IP1	16.25	-0.266	303°		
DfAo-01	53	P53	Aluminum tank (looks like small gas tank)	IP1	16.65	-0.225	303°		
DfAo-01	54	P54	Square cover	IP1	14.73	-0.144	296°		
DfAo-01	55	P55	NE corner of fuselage	IP1	15.02	-0.423	300°		
DfAo-01	56	P56	SE corner of fuselage	IP1	14.92	-0.411	293°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAo-01	57	P57	Aluminum pipe	IP1	14.47	-0.303	292°		
DfAo-01	58	P58	Camera cover (collected)	IP1	13.71	-0.15	283°		
DfAo-01	59	P59	Instrument cover (collected)	IP1	13.62	-0.204	283°		
DfAo-01	60	P60	Corrugated plate	IP1	12.68	-0.154	279°		
DfAo-01	61	P61	Instrument cover and green support	IP1	15.5	-0.194	288°		
DfAo-01	62	P62	Aluminum fragments (cut)	IP1	16.15	-0.168	289°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAo-01	63	P63	Aluminum pipe, frame with pipe and aluminum fragments	IP1	16.61	-0.153	286°		
DfAo-01	64	P64	Frame	IP1	12.3	-0.17	312°		
DfAo-01	65	P65	NE corner of cut wing	IP1	17.66	-0.289	311°		
DfAo-01	66	P66	Aluminum support strap	IP1	18.89	-0.259	308°		
DfAo-01	67	P67	Instrument cover	IP1	19.72	-0.238	306°		
DfAo-01	68	P68	Aluminum and rubber gasket	IP1	20.49	-0.227	307°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAo-01	69	P69	NW corner of cut wing	IP1	20.91	-0.109	305°		
DfAo-01	70	P70	"F" shaped frame	IP1	15.76	-0.157	323°		
DfAo-01	71	P71	Triangular instrument panel piece	IP1	7.7	-0.059	319°		
DfAo-01	72	P72	Aluminum tube	IP1	14.15	-0.244	307°		
DfAo-01	73	P73	Aluminum band "U shape"	IP1	17.52	-0.202	309°		
DfAo-01	74	P74	Long frame piece	IP1	20.1	-0.278	313°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAo-01	75	P75	"Dulcie" fragment	IP1	4.05	0.109	139°		
DfAo-01	76	P76	Aluminum panel	IP1	38	0.206	359°		Far off, distance taken from level
DfAo-01	77	P77	Aluminum fragment	IP1	40	-0.134	355°		Far off, distance taken from level
DfAo-01	78	P78	Wing flap	IP1	38	0.066	354°		Far off, distance taken from level
DfAo-01	79	P79	Aluminum band with wood attached	IP1	38	-0.094	350°		Far off, distance taken from level
DfAo-01	80	P80	IP2 on P16			0			Shot back to P1
DfAo-01	81	P81	Instrument strap	IP2	6.04	0.071	328°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAo-01	82	P82	Aluminum strap	IP2	7.24	0.015	316°		
DfAo-01	83	P83	Aluminum pipe, green	IP2	9.1	0.066	336°		
DfAo-01	84	P84	Corrugated aluminum (2 pieces)	IP2	11.43	0.037	320°		
DfAo-01	85	P85	Green aluminum strap	IP2	13.1	0.11	323°		"26977.H"
DfAo-01	86	P86	Aluminum Fragment	IP2	14.13	0.194	320°		
DfAo-01	87	P87	SW corner of fuselage	IP2	13.8	0.035	321°		
DfAo-01	88	P88	NW corner of fuselage	IP2	15.32	0.169	319°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAo-01	89	P89	Rubber triangle insulator	IP2	13.36	0.018	319°		
DfAo-01	90	P90	Aluminum strapping	IP2	15.55	0.076	316°		
DfAo-01	91	P91	"H" frame	IP2	15.9	0.151	311°		
DfAo-01	92	P92	Aluminum cut pieces (2) and strap	IP2	14.78	0.07	309°		
DfAo-01	93	P93	Aluminum pipe, fabric covered	IP2	17.1	0.245	311°		
DfAo-01	94	P94	Cut aluminum plate, white with green underside	IP2	17.33	0.096	309°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAo-01	95	P95	Outer fuselage, rivets and rubber	IP2	17	0.105	292°		
DfAo-01	96	P96	N end on wing fragment	IP2	18.96	-0.04	269°		
DfAo-01	97	P97	S end of wing fragment	IP2	17.92	-0.204	262°		
DfAo-01	98	P98	Bolt	IP2	9.81	0.05	301°		
DfAo-01	99		Fuselage						N48 57' 52.5" W54 22' 36.4" Elevation 104 m

RAF Hudson S/N FK 690 (DfAp-11) Artifact Catalogue

Borden	Artifact	Instrument Position	Elevation (m)	Distance (m)	Direction	Object Diameter (cm)	Length (cm)	Width (cm)	Thickness (cm)	Description	Conservation	Image Reference
DfAp-11	1	Datum	n/a	5.3	80	6.3	12			Tin can, possibly left by site visitors	Dry brushed	

RAF Hudson S/N FK 690 (DfAp-11) Feature Catalogue

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Direction	Image	Notes
DfAp-11	1	P1	Datum					N48°55.278' W054°34.449 elev 126m Measured with compass and tape, no elevation
DfAp-11	2	P2	Instrument cover	Datum	9.82	47°		
DfAp-11	3	P3	Exhaust pipe	Datum	3	78°		
DfAp-11	4	P4	Frame and can	Datum	5.34	80°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Direction	Image	Notes
DfAp-11	5	P5	Ribbing	Datum	9.47	90°		
DfAp-11	6	P6	Pile of scrap	Datum	7	255°		
DfAp-11	7	P7	Skin (under tree)	Datum	5.24	250°		
DfAp-11	8	P8	Road	Datum	≈30			
			Hydraulic gear					In the possession of Bryan Connors of Gander
			Cover					In the possession of Bryan Connors of Gander

RCAF Canso 98107 (DfAp-07) Feature Catalogue

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-07		P1	IP1 - Datum			0	*		N=0
DfAp-07		P2	Grid Point	IP1	10	0.252	.°		N48.93287° W054.57377° elev 145m
DfAp-07		P3	Grid Point	IP1	20	0.327	.°		
DfAp-07		P4	Grid Point	IP1	12.2	-0.088	180.°		10m is in a stream, taking measurement on banks to compensate.
DfAp-07		P5	Grid Point	IP1	8.4	-0.161	180.°		
DfAp-07		P6	Grid Point	IP1	20	-0.211	180.°		
DfAp-07		P7	Grid Point	IP1	5	0.134	180.°		
DfAp-07		P8	Grid Point	IP1	10	-0.188	90.°		
DfAp-07		P9	Grid Point	IP1	13.7	-0.148	90.°		Cannot measure at 10m due to a large, deep, pool of water and upturned trees
DfAp-07	1	P10	Step	IP1	2.66	-0.06	82.1°		From the right side? The left is still on the fuselage
DfAp-07		P11	IP2 on P1			0			N=0. Shot back to P2
DfAp-07	2	P12	Triangular section	IP2	1.83	0.034	347.5°		Piece of the tail?
DfAp-07	3	P13	Long panel	IP2	2.22	0.04	34.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-07	4	P14	Exhaust pipe	IP2	2.75	-0.149	53.5°		
DfAp-07	5	P15	Mangled wreckage under tree	IP2	3.75	-0.107	34.°		
DfAp-07	6	P16	Step	IP2	2.52	-0.083	80.9°		
DfAp-07	7	P17	Deteriorated aluminum skin	IP2	0.94	-0.029	40.°		
DfAp-07	8	P18	Aluminum pipe	IP2	0.55	0.056	337.°	No image	
DfAp-07	9	P19	Top tip of tail	IP2	5.12	0.14	.9°		
DfAp-07	10	P20	Fireman's axe skin	IP2	4.15	0.075	6.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-07	11	P21	Instrument cover	IP2	0.79	0.044	189.°		
DfAp-07	12	P22	Tail flap with fabric	IP2	1.24	0.001	190.8°		
DfAp-07	13	P23	Wreckage pieces (2)	IP2	2.53	-0.068	155.2°		
DfAp-07	14	P24	Fuselage with window holes and red paint	IP2	3.1	-0.035	172.°		
DfAp-07	15	P25	Deteriorated fuselage with fabric belt	IP2	3.59	-0.099	144.5°	No image	
DfAp-07	16	P26	Door	IP2	2.13	-0.007	282.°		Moved to this location on a previous visit

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-07	17	P27	Washers, label fragment, fabric, Bakelite, metal stripping	IP2	2.82		276.5°		Found inside of aircraft, cannot take elevation due to enclosed space
DfAp-07	18	P28	South-East corner of tail	IP2	2.83	0.015	228.°		
DfAp-07	18	P29	Inside corner of tail	IP2	5.41	0.214	344.5°		Where tail attaches to fuselage
DfAp-07		P30	IP3 on P8			0			W=0. Shot back to P2
DfAp-07	19	P31	Jagged wreckage	IP3	4.37	0.094	10.°	No image	
DfAp-07	20	P32	Wreckage - joint with many bolts	IP3	3.61	0.031	12.°		
DfAp-07	21	P33	Pipe with wires and a long panel	IP3	2.32	0.044	39.°		
DfAp-07	22	P34	Mangled wreckage with step	IP3	3.75	-0.043	43.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-07	23	P35	Seam (under trees)	IP3	4.75	-0.09	32.°		
DfAp-07	24	P36	Mangled wreckage (3 pieces)	IP3	7.45	0.135	45.°		
DfAp-07	25	P37	Wreckage 2 on 1 circle	IP3	7.06	0.149	32.5°		
DfAp-07	26	P38	Hatch	IP3	9.44	0.223	31.°		
DfAp-07	18	P39	Rear tip of tail	IP3	14.3	0.41	37.°		
DfAp-07	27	P40	Tail flap	IP3	3.5	-0.1	132.°		
DfAp-07	28	P41	Door, wreckage with canvass, wreckage (2 pieces)	IP3	4.75	0.048	163.2°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-07	29	P42	Skin with bolts with numbers	IP3	6.37	0.01	154.°		
DfAp-07	30	P43	Unidentified wreckage under trees	IP3	2.27	0.041	166.°		
DfAp-07	31	P44	Instrument panel?	IP3	0.34	-0.018	339.°		
DfAp-07	32	P45	Wing flap	IP3	0.79	0.036	265.°		Originally "wreckage under tree" but was better identified when Hurricane Igor uprooted the tree it was under.
DfAp-07	33	P46	NE corner body of plane	IP3	4.36	0.005	261.°		
DfAp-07	33	P47	SE corner body of plane	IP3	6.04	-0.027	264.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-07	33	P48	NW corner body of plane	IP3	4.69	0.065	308.5°		
DfAp-07		P49	IP4 on P2			0			N=0. Shot back to P3
DfAp-07	34	P50	Tubing with wire and wreckage	IP4	5.23	0.011	240.°		
DfAp-07	35	P51	Corner of tail wreck	IP4	5.11	-0.015	239.°		
DfAp-07	36	P52	Triangle tail end	IP4	6.97	-0.001	234.°		
DfAp-07	37	P53	Skin pieces (strips), wreckage, long thing spring	IP4	9.33	-0.04	225.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-07	38	P54	Step (behind plane)	IP4	9.13	0.009	228.°		
DfAp-07	39	P55	Instrument cover (rusted)	IP4	4.95	-0.035	228.°		
DfAp-07		P56	Grid Point	IP4	5	-0.05	225.°		
DfAp-07	40	P57	Scrap and ladder side?	IP4	9.26	-0.025	231.°		
DfAp-07	41	P58	Skin with rubber, scrap with frame	IP4	11.5	-0.094	228.°		
DfAp-07	42	P59	Rippled board	IP4	11.6	-0.001	235.°		
DfAp-07	43	P60	Long seam (under tree)	IP4	9.37	0.035	238.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-07	44	P61	Skin with pipe attached (exhaust? Fuel?) "seats"	IP4	11.5	0.05	239.°		
DfAp-07	45	P62	Turret cover? Rippled board (in stream)	IP4	14.4	0.255	239.°		
DfAp-07		P63	IP5 on P56			0			NE=0. Shot back to P49
DfAp-07		P64							Number skipped
DfAp-07	46	P65	Rusted frame	IP5	6.79	0.098	230.°		
DfAp-07		P66	Grid Point	IP5	5	0.082	225.°		
DfAp-07		P67	IP6 on P66			0			E=0. Shot back to P56
DfAp-07	47	P68	Corner piece	IP6	??	-0.17	99.°	No image	
DfAp-07	48	P69	SE corner of wing piece	IP6	10.4	0.151	185.°		Spread across a stream
DfAp-07	48	P70	SW corner of wing piece	IP6	11.5	0.032	184.°	See DfAp-07:69	Spread across a stream
DfAp-07	48	P71	NE corner of wing piece	IP6	10.2	0.08	221.°		Spread across a stream
DfAp-07	48	P72	NW corner of wing piece	IP6	11.6	0.025	211.°	See DfAp-07:71	Spread across a stream

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-07	49	P73	Large silver canister (fuel?)	IP6	7.75	0.09	213.°		
DfAp-07	50	P74	Valve	IP6	7.55	0.172	239.°		
DfAp-07		P75	Grid Point	IP6	15	-0.345	90.°		
DfAp-07		P76	IP7 on P75			0			N=0. Shot back to P67
DfAp-07	33	P77	SW corner body of plane	IP7	16.4	-0.11	86.°		
DfAp-07	33	P78	SE corner body of plane	IP7	18.1	-0.15	86.°	See DfAp-07:77	
DfAp-07	51	P79	N side of fuselage "HOIST"	IP7	14.6	-0.12	92.5°		
DfAp-07	51	P80	S side of fuselage "HOIST"	IP7	13.8	-0.085	100.°	See DfAp-07:79	
DfAp-07		P81	Grid Point	IP7	10	0.12	225.°		
DfAp-07		P82	IP8 on P81			0			NE=0. Shot back to P75

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-07	52	P83	"mail slot" and frame wreckage	IP8	9.88	-0.062	256.5°		
DfAp-07	53	P84	Frame	IP8	13.8	-0.148	236.5°		
DfAp-07	48	P85	SE corner of wing	IP8	17	-0.174	234.°		
DfAp-07	48		SW corner of wing piece	IP8	18	-0.223	231.°	See DfAp-07:85	
DfAp-07		P86	Grid Point	IP8	30	-0.489	217.°		
DfAp-07		P87	Grid Point	IP8	41	-0.338	217.°		
DfAp-07		P88	IP9 on P87			0			Shot back to P81
DfAp-07	54	P89	Wreckage floor?	IP9	2.79	0.05	29.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-07	55	P90	Triangular skin	IP9	7.38	0.229	346.°		
DfAp-07	56	P91	NW corner of wing	IP9	15.5	0.371	50.°		
DfAp-07	56	P92	NE corner of wing	IP9	18.2	0.269	49.°		
DfAp-07	95	P93	Side of pond	IP9	18.4	0.481	40.°		Pond measures 6.82m in diameter and approx. 1.27m deep
DfAp-07	96	P94	Fuselage floor?	IP9	12.2	0.482	20.°		
DfAp-07	97	P95	Grid Point	IP9	20	0.57	1.5°		
DfAp-07	98	P96	IP10 on P95			0			Shot back to P88

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-07	99	P97	Wreckage and exhaust	IP10	3.21	0.005	31.°		
DfAp-07	100	P98	3 pieces, shiny with holes	IP10	2.5	0.022	328.5°		
DfAp-07	101	P99	Fuselage under tree	IP10	2.65	0.06	201.5°		
DfAp-07	102	P100	Fuselage, green	IP10	4.53	0.029	218.°	See DfAp-07:100	
DfAp-07	103	P101	Fuselage	IP10	4.14	0.033	178.°	See DfAp-07:100	
DfAp-07	104	P102	Fuselage	IP10	2.11	0.031	154.5°	See DfAp-07:100	
DfAp-07	105	P103	Big triangle with exhaust and holes	IP10	10.3	0.221	176.°		
DfAp-07	106	P104	Long piece	IP10	12.9	0.26	175.°		
DfAp-07	106	P105	Centre of long piece	IP10	12.3	0.214	168.5°	See DfAp-07:106	Piece measures 3.79m

RCAF Lodestar 557 (DfAp-15) Feature Catalogue

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-15	1	P1	Fuselage Aluminum	IP1	9.2	6.26	76.°		
DfAp-15	2	P2	Fuselage Aluminum	IP1	38	-0.32	77.°		
DfAp-15	3	P3	Canister/tank	IP1	38	-0.25	69.°		
DfAp-15	4	P4	Wing fragment (1.1mx1m)	IP1	15	0.01	39.°		
DfAp-15	5	P5	Fuselage, where wing attached? (2mx1.2m)	IP1	15	-0.03	27.°		

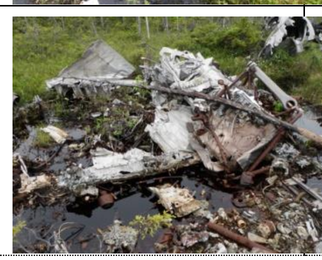
Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-15	6	P6	Tank/canister	IP1	13	0.07	34.°		
DfAp-15	7	P7	Aluminum fragment	IP1	13	0.09	38.°		
DfAp-15	8	P8	East point on wing	IP1	12	-0.02	44.°		
DfAp-15	9	P9	West point on wing	IP1	14	-0.04	48.°		
DfAp-15	10	P10	Fuselage with fabric	IP1	11	-0.02	43.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-15	11	P11	Aluminum fragment	IP1	10	-0.05	40.°		
DfAp-15	12	P12	Steel fragment	IP1	10	0.08	30.°		
DfAp-15	13	P13	Small tail fragment or control panel	IP1	5.8	0.06	2.°		
DfAp-15	14	P14	West corner of tail	IP1	4.6	0.08	21.°		
DfAp-15	15	P15	South corner of tail	IP1	5.4	0.07	351.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-15	16	P16	East corner of tail	IP1	2.6	0.01	9.°		
DfAp-15	17	P17	Aluminum fragment	IP1	2.4	0.01	22.°		
DfAp-15	18	P18	Steep pipe and 2 al fragments	IP1	4.6	0.1	327.°		
DfAp-15	19	P19	Aluminum fragment	IP1	2.7	0.14	314.°		
DfAp-15	20	P20	Supercharger	IP1	3.9	0.1	291.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-15	21	P21	Large aluminum fragment	IP1	2.9	0.05	235.°		
DfAp-15	22	P22	4 aluminum fragments	IP1	5.6	0.15	280.°		
DfAp-15	23	P23	Fuselage body east	IP1	8.9	0.19	303.°		
DfAp-15	24	P24	Fuselage body tail tip North	IP1	5.1	0.18	343.°		
DfAp-15	25	P25	Fuselage body centre tail West	IP1	7.5	0.16	342.°		
DfAp-15	26	P26	Fuselage body tail tip South	IP1	8.9	0.13	340.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-15	27	P27	Instrument cover aluminum fragment 3 pieces	IP1	7	0.14	295.°		
DfAp-15	28	P28	Aluminum and melted 4 pieces	IP1	7.5	0.15	270.°		
DfAp-15	29	P29	Tank	IP1	11	0.17	258.°		
DfAp-15	30	P30	Aluminum fragment	IP1	12	0.15	260.°		
DfAp-15	31	P31	Large aluminum fragment and small aluminum fragment	IP1	21	0.24	286.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-15	32	P32	Landing gear middle	IP1	15	0.3	295.°		
DfAp-15	33	P33	Landing gear South	IP1	15	0.28	293.°		
DfAp-15	34	P34	Landing gear North	IP1	14	0.35	289.°		
DfAp-15	35	P35	Big wreckage south	IP1	13	0.29	296.°		
DfAp-15	36	P36	Big wreckage West	IP1	9.4	0.34	300.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-15	37	P37	Big wreckage North (large)	IP1	9.5	0.24	279.°		
DfAp-15	38	P38	Edge of burn	IP1	7.9	0.19	269.°		
DfAp-15	39	P39	Tank	IP1	16	0.24	277.°		
DfAp-15	40	P40	Engine	IP1	14	0.06	281.°		

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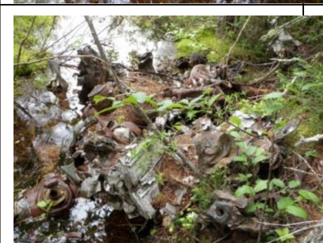
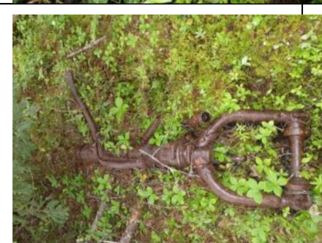
Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Direction	GPS Position	Altitude	Image	Notes
DfAp-13	1	1	Aluminum and rope	Datum	6.85	282°				Datum N48°57'52.7" W054°22'35.5" Note artifacts measured from the datum are measured using a line and compass and therefore no elevation was taken.
DfAp-13	2	2	Aluminum piece		6.95	282°				
DfAp-13	3	3	Aluminum and rope		7.35	282°				
DfAp-13	4	4	Aluminum and rubber		5.2	300°				
DfAp-13	5	5	Iron and aluminum cylinder		5.7	278°				

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Direction	GPS Position	Altitude	Image	Notes
DfAp-13	6	6	Iron cog		5.8	270°				
DfAp-13	7	7	Medium piece of aluminum		6.1	270°				
DfAp-13	8	8	Auxiliary aluminum switch piece		4.5	240°				Part of the cockpit
DfAp-13	9	9	3 pieces aluminum		4.5	240°				Found under 8
DfAp-13	10	10	Landing gear - hydraulics, big cylinder, iron with aluminum band		3.9	270°				
DfAp-13	11	11a	Twisted metal with green paint, large piece of Fuselage, O2 canister		0.28	250°				

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Direction	GPS Position	Altitude	Image	Notes
DfAp-13	12	11b	Twisted metal with green paint, large piece of Fuselage, O2 canister		0.61	210°				
DfAp-13	13	12	Blue star		0.29	205°				
DfAp-13	14	13	Riveted aluminum piece		0.44	110°				
DfAp-13	15	14	Engine piece, strut, hinge, med iron piece		0.11	160°				
DfAp-13	16	15	2 fragments of aluminum (green paint)		0.17	220°				
DfAp-13	17	16	Small fragment of aluminum, rubber and iron ring		0.85	260°				

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Direction	GPS Position	Altitude	Image	Notes
DfAp-13	18	17	Aluminum and steel cylinder		0.65	240°				
DfAp-13	19	18	Aluminum cylinder piece and aluminum with green pain		0.15	280°				
DfAp-13	20	19a	Engine		3.7	330°	N48 55.213 W54 33.172	150m		
DfAp-13	21	19b	Engine		2.7	345°				
DfAp-13	22	19c	Engine		3.4	300°				
DfAp-13	23	19d	Engine		1.9	325°				

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Direction	GPS Position	Altitude	Image	Notes
DfAp-13	24	20	Aluminum, iron with green, pipe		0.27	342°				
DfAp-13	25	21	Medium piece of aluminum with wood, fuse, painted red		0.23	40°				
DfAp-13	26	22	Medium piece of aluminum , partially buried, green paint		0.23	60°				
DfAp-13	27	23	Aluminum piece with fire written on it		4.3	30°				
DfAp-13	28	24	Landing gear - hydraulics, big cylinder, iron with aluminum band		0.53	20°				
DfAp-13	29	25	Aluminum		6.3	°				

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Direction	GPS Position	Altitude	Image	Notes
DfAp-13	30	26	Green aluminum		4.3	10°				
DfAp-13	31	Pt1	Aluminum Fuselage fragment?				N48 55.197 W54 33.242	121m		
DfAp-13	32	Pt2	Floor				N48 55.197 W54 33.228	117m		
DfAp-13	33	Pt3	Aluminum				N48 55.197 W54 33.225	119m		
DfAp-13	34	Pt4	Fuselage				N48 55.199 W54 33.226	121m		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Direction	GPS Position	Altitude	Image	Notes
DfAp-13	35	Pt5	Strap				N48 55.201 W54 33.221	123m		
DfAp-13	36	Pt6	Fuselage and fuel tank				N48 55.201 W54 33.220	123m		
DfAp-13	37	Pt7	corrugated aluminum				N48 55.201 W54 33.218	125m		
DfAp-13	38	Pt8	Deep aluminum				N48 55.202 W54 33.213	129m		
DfAp-13	39	Pt9	Aluminum under tree				N48 55.207 W54 33.211	129m		
DfAp-13	40	Pt10	Black aluminum				N48 55.204 W54 33.205	130m		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Direction	GPS Position	Altitude	Image	Notes
DfAp-13	41	Pt11	Girder, hinged (wing spar?)				N48 55.208 W54 33.187	130m		
DfAp-13	42	Pt12	Girder grey heavily riveted				N48 55.208 W54 33.182	131m		
DfAp-13	43	Pt13	10 pieces aluminum, rusted plate, cog, etc.				N48 55.209 W54 33.182	130m		
DfAp-13	44	Pt14	Engine cylinder and aluminum pipe				N48 55.209 W54 33.181	131m		
DfAp-13	45	Pt15	3 pieces aluminum strapping, aluminum crumple, aluminum with rubber edge				N48 55.214 W54 33.165	125m		
DfAp-13	46	Pt16	Aluminum fragment, first find				N48 55.200 W54 33.138	125m		

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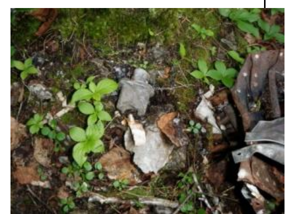
Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation	Direction	Image	Notes
DfAp-08	1	P1	Datum			132m		N48°55.603' W054°34.798' elev 132	Measured with tape and compass, no elevation.
DfAp-08	2	P2	NW side of landing gear	Datum	1.191		5°		
DfAp-08	3	P3	N side of landing gear	Datum	2.129		355°		
DfAp-08	4	P4	W side of landing gear	Datum	2.873		45°		
DfAp-08	5	P5	Melted aluminum pile and copper coil	Datum	2.16		300°		
DfAp-08	6	P6	Engine cover?	Datum	3.188		310°		
DfAp-08	7	P7	Landing gear shock and pieces	Datum	2.95		40°		
DfAp-08	8	P8	Iron gasket (ring), coolant?, rubber, pipe mount	Datum	4		65°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation	Direction	Image	Notes
DfAp-08	9	P9	Rubber and aluminum tubing	Datum	5.93		60°		
DfAp-08	10	P10	Instrument case with numbers	Datum	7.4		140°		
DfAp-08	11	P11	Pop bottle lunch site	Datum	6.94		150°		
DfAp-08	12	P12	Gasket	Datum	2.64		270°		
DfAp-08	13	P13	Melted skin and rusty thing (wheel?)	Datum	3.99		270°		
DfAp-08	14	P14	Frame	Datum	4.38		280°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation	Direction	Image	Notes
DfAp-08	15	P15	Small electric motors	Datum	3.57		290°		
DfAp-08	16	P16	Engine and prop mount	Datum	11		235°		
DfAp-08	17	P17	Frame under tree	Datum	3.86		295°		
DfAp-08	18	P18	Antenna	Datum	37.2		199°		Accuracy 9m, N48°553584', W054°34.808'
DfAp-08	19	P19	Engine pan	Landing Gear	4.98		90°		
DfAp-08	20	P20	Girder (internal bracing)	Landing Gear	6.73		80°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation	Direction	Image	Notes
DfAp-08	21	P21	Gear and rubber	Landing Gear	6.55		70°		
DfAp-08	22	P22	Internal support	Landing Gear	7.1		125°		
DfAp-08	23	P23	Mangled aluminum and iron	Landing Gear	5.74		60°		
DfAp-08	24	P24	Mangled cover?	Landing Gear	5.04		120°		
DfAp-08	25	P25	Skin and support	Landing Gear	3.85		140°		
DfAp-08	26	P26	Metal sheet	Landing Gear	1.45		165°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation	Direction	Image	Notes
DfAp-08	27	P27	Landing gear in water	Datum	21.48		120°		
DfAp-08	28	P28	Struts	Datum	17.73		90°		
DfAp-08	29	P29	Gasket fuel, large	Datum	57.7	105	243°		Accuracy 7m, N48.92648°, W054.58067°
DfAp-08	30	P30	Frame, mangled metal	Datum	≈11 to prop housing	135	≈270°		Accuracy 8m, N48.92654°, W054.58018°

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Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-09	1	P1	IP1			0			N48°55'35.18" W054°35'2.65" Elev 134m
DfAp-09	2	P2	Grid Point	IP1	10	-0.02	.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-09	3	P3	Grid Point	IP1	15	-0.725	.°		Land rises too high, can't measure at 20m
DfAp-09	4	P4	Grid Point	IP1	10	0.215	90.°		Wreckage stops at the heavy tree line, too thick to go 20m
DfAp-09	5	P5	Grid Point	IP1	5	0.376	90.°		In a boggy spot
DfAp-09	6	P6	Grid Point	IP1	7.7	0.004	180.°		Trees too thick to continue
DfAp-09	7	P7	Grid Point	IP1	5	0.032	180.°		
DfAp-09	8	P8	Grid Point	IP1	10	-0.389	270.°		
DfAp-09	9	P9	Engine frame, instruments, frame and scrap	IP1	9	-0.405	261.°		
DfAp-09	10	P10	Wires	IP1	4.4	-0.294	297.°		
DfAp-09	11	P11	Deteriorated frame (in water)	IP1	2.7	-0.064	274.°		
DfAp-09	12	P12	Deteriorated frame (on land)	IP1	1.3	-0.11	259.°		
DfAp-09	13	P13	Pipe, wide	IP1	1.4	-0.064	216.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-09	14	P14	Rubber pipe	IP1	2.5	0.011	292.°		
DfAp-09	15	P15	Angular degraded frame	IP1	1.9	0.075	318.°		
DfAp-09	16	P16	Flat aluminum (from engine?)	IP1	1.8	0.086	348.°		
DfAp-09	17	P17	Instrument cover	IP1	0.9	0.065	340.°		
DfAp-09	18	P18	Flat aluminum (piece from P16)	IP1	0.9	0.21	6.°		

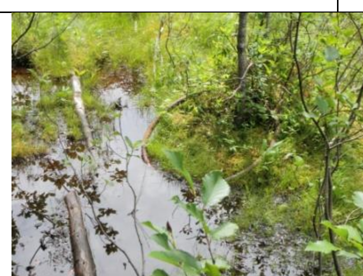
Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-09	19	P19	Landing gear frag (looks like can)	IP1	2.9	0.205	60.°		
DfAp-09	20	P20	Cog	IP1	3.3	0.234	59.°		
DfAp-09	21	P21	Fuel tank frag? With rubber tubes	IP1	3.4	0.241	70.°		
DfAp-09	22	P22	"wheel" disk covered in material	IP1	1.9	0.22	88.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-09	23	P23	Engine instrument (cylinder?)	IP1	2.2	0.259	103.°		
DfAp-09	24	P24	Landing gear piece	IP1	3.4	0.161	137.°		
DfAp-09	25	P25	Aluminum and pipe (landing gear fragment?)	IP1	6.8	0.291	111.°		
DfAp-09	26	P26	Rusted circle with wire coil	IP1	5.9	0.3	102.5°		
DfAp-09	27	P27	Landing gear SE corner	IP1	6.2	0.344	93.°		
DfAp-09	28	P28	Landing gear NE corner	IP1	8.6	0.246	88.°		
DfAp-09	29	P29	Gears and pipe piece	IP1	3.2	0.05	345.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-09	30	P30	Crumpled metal (P16)	IP1	3.7	0.069	357.°		
DfAp-09	31	P31	Frame and instrument cover	IP1	4.3	0.089	359.°		
DfAp-09	32	P32	Cover	IP1	5.5	0.092	.°	See P32	
DfAp-09	33	P33	Rusted pipe	IP1	7.7	-0.09	350.5°		
DfAp-09	34	P34	Pipe with holes	IP1	8.7	-0.222	337.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-09	35	P35	Landing gear fragment	IP1	8.7	-0.154	342.°		
DfAp-09	36	P36	Landing gear piece	IP1	9.2	-0.027	342.°		
DfAp-09	37	P37	Landing gear	IP1	8.8	-0.022	350.°		
DfAp-09	38	P38	Deteriorated gear fragment	IP1	9.3	0.027	354.°		
DfAp-09	39	P39	Strapping	IP1	9.8	-0.05	355.°		
DfAp-09	40	P40	Pipe with prongs	IP1	9	0.047	359.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-09	41	P41	Flat sheets and mystery under tree	IP1	11	-0.148	353.°		
DfAp-09	42	P42	Pile of strapping and "beams"	IP1	11	-0.07	.°		
DfAp-09	43	P43	Smaller pile of strapping	IP1	12	-0.33	4.°		
DfAp-09	44	P44	"girder or pipe" 1 NW end	IP1	14	-0.511	355.°		
DfAp-09	45	P45	"girder or pipe" 1 NE end	IP1	13	-0.299	14.°		
DfAp-09	46	P46	"girder or pipe" 2 NE end	IP1	13	-0.325	8.°		
DfAp-09	47	P47	"girder or pipe" 2 NW end	IP1	16	-0.668	1.°		
DfAp-09	48	P48	IP2 on P8			0			E=0. Shot back to P1
DfAp-09	49	P49	Landing gear wheel base?	IP2	6.6	-0.043	219.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-09	50	P59	Landing gear SE side	IP2	9.1	-0.418	259.°		
DfAp-09	51	P60	Landing gear NE side	IP2	10	-0.658	255.°		
DfAp-09	52	P61	IP3 on P5			0			Shot back to P1
DfAp-09	53	P62	Grid Point	IP3	10	0.126	270.°		
DfAp-09	54	P63	Grid Point	IP3	15	-0.455	270.°		
DfAp-09	55	P64	IP4 on P63			0			Shot back to P61
DfAp-09	56	P65	Large rusted ring	IP4	5.1	0.471	9.5°		
DfAp-09	57	P66	Engine	IP4	4.7	0.766			
DfAp-09	58	P67	Metal "belt"	IP4	2.7	0.644	42.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-09	59	P68	Grid Point	IP4	5	0.131	135.°		
DfAp-09	60	P69	IP5 on P68			0			Shot back to P64
DfAp-09	61	P70	Strapping	IP5	0.5	-0.132	8.°		
DfAp-09	62	P71	Shoe piece	IP5	2.4	0.008	243.°		
DfAp-09	63	P72	Frame and skin	IP5	1.4	0.129	162.5°		
DfAp-09	64	P73	Small pieces of skin	IP5	3.7	-0.651	228.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-09	65	P74	Frame piece	IP5	6.3	0.341	173.°		
DfAp-09	66	P75	Skin and frame	IP5	14	0.115	193.°		
DfAp-09	67	P76	Scrap	IP5	18	-0.819	204.°		
DfAp-09	68	P77	Round engine component (prop mount)	IP5	18		≈175°		Trees too thick and are not permitted to clear them
DfAp-09	69	P78	Grid Point	IP5	5	-1.281	270.°		
DfAp-09	70	P79	IP6 on P78			0			Shot back to P68

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-09	71	P80	Engine piece and scrap	IP6	1.3	0.045	105.°		
DfAp-09	72	P81	Rubber insulated pipe	IP6	1.2	-0.246	225.°		
DfAp-09	73	P82	Engine	IP6	1.5	-0.214	206.°		
DfAp-09	74	P83	Centre of trail	IP6	6.6	-0.914	207.5°		
DfAp-09	75	P84	Centre of interpretive sign	IP6	5.6	-0.864	225.°		

Borden	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Image	Notes
DfAp-09	76	P85	Piece of rubber	IP6	10	0.246	104.°		

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Borden	Feature Number	Field Reference	Object Description	GPS coordinates		Altitude (m)	accuracy (±m)	Image	Notes
DfAp-14	1			N48 56.214'	W054 33.149'				Engines removed from site by 103 Gander
DfAp-14	2		Fuselage mid	N48 56.211'	W054 32.211'	129	4.1		

Borden	Feature Number	Field Reference	Object Description	GPS coordinates		Altitude (m)	accuracy (±m)	Image	Notes
DfAp-14	3	Pt01	Rusted round cylindrical piece	N48 56.201'	W054 32.770'	129	4		
DfAp-14	4	Pt02	Wing 1 north end	N48 56.202'	W054 32.769'	133	4		Wing length N-S end 405cm
DfAp-14	5	Pt03	Wing 1 middle	N48 56.202'	W054 32.769'	132	3.1		Wing length N-S end 405cm
DfAp-14	6	Pt04	Wing 1 south end	N48 56.203'	W054 32.769'	130	3.8		Wing length N-S end 405cm
DfAp-14	7	Pt05	Rusted plate with supports. Rusted cylinder (bomb?)	N48 56.203'	W054 32.767'	131	4.2		
DfAp-14	8	Pt06	Aluminum piece (small)	N48 56.201'	W054 32.772'	130	4.3		

Borden	Feature Number	Field Reference	Object Description	GPS coordinates		Altitude (m)	accuracy (±m)	Image	Notes
DfAp-14	9	Pt07	Rubber and Aluminum, internal Al components, one edge lined in rubber	N48 56.203'	W054 32.775'	131	3.9		Part of the cockpit
DfAp-14	10	Pt08	Aluminum chunk (Fuselage frag)	N48 56.203'	W054 32.764'	131	4		Found under 8
DfAp-14	11	Pt09	Fuselage with iron bar	N48 56.205'	W054 32.761'	130	3.6		
DfAp-14	12	Pt10	Corroded aluminum (2 pieces)	N48 56.204'	W054 32.765'	129	4.3		
DfAp-14	13	Pt11	Aluminum wing fragment (inside wing)	N48 56.204'	W054 32.766'	127	4.5		

Borden	Feature Number	Field Reference	Object Description	GPS coordinates		Altitude (m)	accuracy (±m)	Image	Notes
DfAp-14	14	Pt12	From inside of wing (Fuselage to wing)	N48 56.204'	W054 32.766'	128	4.31		1 meter west of Pt11
DfAp-14	15	Pt13	Fuselage fragment	N48 56.205'	W054 32.767'	127	4.2		
DfAp-14	16	Pt14	Air intake?	N48 56.207'	W054 32.771'	128	4.1		
DfAp-14	17	Pt15	Landing gear piece - mainly submerged	N48 56.207'	W054 32.769'	128	3.3		
DfAp-14	18	Pt16	Propeller mount	N48 56.209'	W054 32.768'	126	5.6		

Borden	Feature Number	Field Reference	Object Description	GPS coordinates		Altitude (m)	accuracy (±m)	Image	Notes
DfAp-14	19	Pt17	Sheet aluminum (Fuselage?)	N48 56.212'	W054 32.763'	119	4.2		
DfAp-14	20	Pt18	East end of Fuselage	N48 56.212'	W054 32.761'	121	2.2		Fuselage piece is 5.2m x 1.4m
DfAp-14	21	Pt19	West end of Fuselage	N48 56.213'	W054 32.761'	125	3.4		
DfAp-14	22	Pt20	Wing fragment	N48 56.212'	W054 32.759'	128	4.2		
DfAp-14	23	Pt21	Aluminum fragment	N48 56.213'	W054 32.758'	130	3.3		

Borden	Feature Number	Field Reference	Object Description	GPS coordinates		Altitude (m)	accuracy (±m)	Image	Notes
DfAp-14	24	Pt22	Round pieces (submerged)	N48 56.214'	W054 32.756'	130	4.1		
DfAp-14	25	Pt23	Fuselage fragment	N48 56.213'	W054 32.755'	130	4.2		
DfAp-14	26	Pt24	Aluminum fragments	N48 56.215'	W054 32.755'	129	3.1		
DfAp-14	27	Pt25	Aluminum fragment (partially submerged)	N48 56.215'	W054 32.754'	128	4		
DfAp-14	28	Pt26	Aluminum fragments	N48 56.216'	W054 32.754'	130	4.9		

Borden	Feature Number	Field Reference	Object Description	GPS coordinates		Altitude (m)	accuracy (±m)	Image	Notes
DfAp-14	29	Pt27	Wing fragment 2	N48 56.220'	W054 32.747'	132	4.2		2.291m long 90°
DfAp-14	30	Pt28	Aluminum fragment	N48 56.201'	W054 32.779'	134	2.7		

Appendix C: The Globe Theatre Artifact and Feature Catalogue

Below is the artifact and feature catalogue for the Globe Theatre on the Royal Canadian Air Force side of the Gander Airbase. As of publication, artifacts are housed at the Archaeology Department at Memorial University of Newfoundland and Labrador.

The Goble Theatre (DfAp-12) Artifact Catalogue

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	1	Newfoundland 50 cent piece from 1909	unit 2					62.5	34.6	51.7	29.48			1.83	Newfoundland 50 cent piece from 1909, good condition
DfAp-12	2	American 1 cent coin	unit 2					24	23	79	19.34			1.76	American 1 cent coin
DfAp-12	3	Canadian (?) 25 cent piece	unit 2					26	87	79	23.83			2.31	Canadian (?) 25 cent piece, poor preservation
DfAp-12	4	Newfoundland 5 cent piece 1929	unit 2					89	52	83	15.52			0.85	Newfoundland 5 cent piece 1929
DfAp-12	5	Newfoundland 5 cent piece 1943	unit 2					29	69	74	15.53			0.77	Newfoundland 5 cent piece 1943
DfAp-12	6	Gaden pop bottle piece	East Wall	IP1	1.565	17.28	323					44.8	28.59	6.16	Gaden pop bottle piece, section of writing
DfAp-12	7	Ceramic plate?	Unit 2					68	9	53		38.76	30.51	6.09	Ceramic piece, possible plate, with a crown painted on
DfAp-12	8	Bullet casing	unit 2					31	42	81	9.09	35.54			Long bullet casing
DfAp-12	9	Bottle glass	SE corner									70.88	41.5	6.82	Large piece of clear bottle glass with some embossed writing and ridges
DfAp-12	10	Bullet casing	unit 2					100	15	76	11.03	19.35			Bullet casing, small piece missing
DfAp-12	11	Gaden pop bottle piece	East Wall	IP1	1.375	28.16	359					54.6	51.41	6.32	Gaden bottle, red paint with white letters. Used to read "KEEP COOL"

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	12	Pepsi bottle fragment	unit 6					83.3	42.5	21.7		36.46	16.54	4	Pepsi Cola bottle fragment, white paint with red lettering
DfAp-12	13	Bullet casing		IP4	0.955	31.21	33				11.8	19.36			Spent .45 casing, good condition
DfAp-12	14	Bottle glass, neck	unit 7					73.1	36.3	91		57.55	26.26	5.58	Clear glass bottle neck
DfAp-12	14	Bottle fragment	unit 7					73.1	36.3	91		41.72	15.9	5.46	Clear glass cola bottle , Coca-Cola bottle based on loops
DfAp-12	14	Bottle fragment	unit 7					73.1	36.3	91		34.99	21.11	3.24	Clear glass fragment
DfAp-12	15	Coke bottle piece	unit 8					85	100	78		133.7	59.75	8.2	Large piece of a Coca-Cola bottle, green glass
DfAp-12	16	Bottle glass	unit 6					66.4	48.2	37.5		42.13	14.8	4.71	Clear glass, possibly Coca Cola bottle
DfAp-12	17	Glass	West wall									68.59	36.08	2.12	Clear glass, possibly window
DfAp-12	18	Glass	West wall									30.28	22.5	2.04	Clear glass, possibly window
DfAp-12	19	Ceramic insulator	West wall									53.38	34.98	19.16	Ceramic pipe fragment, painted black
DfAp-12	20	Green bottle glass	West wall									71.76	36.26	3.72	Green bottle glass
DfAp-12	21	Green bottle glass	West wall									63.2	39.23	2.8	Green bottle glass
DfAp-12	22	Green bottle glass	West wall									99.74	30.28	6.1	Green bottle glass
DfAp-12	23	Green bottle glass	West wall									47.28	26.66	4.73	Green bottle glass
DfAp-12	24	Green bottle glass	West wall									40.5	14.36	5.54	Green bottle glass
DfAp-12	25	Green bottle base		IP4	0.964	30.88	30					84.93	39.44	38.43	Green bottle base, possibly a scotch bottle
DfAp-12	26	Window glass	SE corner									127.5	108.44	6.14	Window fragments, 4 triangular pieces
DfAp-12	27	Green bottle glass	unit 6									58	24.44	5.03	Green bottle glass
DfAp-12	28	Melted glass	unit 6									56.1	43.18	19.71	Clear melted glass

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	29	Painted glass	unit 6									24.07	16.16	2.72	Clear glass with black paint
DfAp-12	30	Green glass	unit 6									42.81	25.84	4.47	Green bottle glass
DfAp-12	31	Blue glass	unit 6									29.43	22.48	3.52	Blue glass, bottle?
DfAp-12	32	Green glass	unit 6									24.39	18.42	3.82	Green glass, bottle?
DfAp-12	33	Handle	unit 6									22.25	7	6.61	Red mug? Handle
DfAp-12	34	Clear glass	unit 6									38.12	25.44	2.26	Clear, thin glass
DfAp-12	35	Clear glass	unit 6									34.77	21.9	5.3	Clear glass, bottle?
DfAp-12	36	Clear glass	unit 6									24.79	19.34	9.35	Clear glass, bottle base?
DfAp-12	37	Clear glass	unit 6									36	30.44	4.57	Clear glass, bottle?
DfAp-12	38	Melted glass	unit 6									77.44	31.96	10.82	Clear melted glass
DfAp-12	39	Melted glass	unit 6									45.31	31.07	13.08	Clear melted glass
DfAp-12	40	Glass jar?	unit 6									73.17	20.82	22.6	Clear, threaded glass. Top of a jar?
DfAp-12	41	Clear glass	unit 6									40.4	14.39	5.29	Clear glass, slightly melted
DfAp-12	42	Clear glass	West wall front									21.47	14.66	2.16	Clear, thin glass
DfAp-12	43	Clear bottle glass	West wall front									63.41	31.39	4.1	Clear bottle glass
DfAp-12	44	Clear glass	West wall front									38.77	30.7	2.17	Clear, thin glass
DfAp-12	45	Clear bottle neck	West wall middle									33.63	19.41	5.98	Clear bottle neck
DfAp-12	46	Clear glass	West wall front									24.45	20.23	3.88	Clear glass with a gray tint
DfAp-12	47	Clear glass	unit 1									30.5	24.88	3.45	Clear glass, slightly melted
DfAp-12	48	Clear glass	unit 1									24.06	15.81	2.51	Clear glass, slightly melted

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	49	Bottle glass	unit 3									41.74	27.06	6.51	Clear glass with red/beige paint (Keep cool?)
DfAp-12	50	Clear glass	unit 1									20.32	6.95	3.21	Clear glass, bubbled texture
DfAp-12	51	Green glass	unit 1									21.19	18.41	5.12	Green glass, bottle?
DfAp-12	52	Clear glass with red paint	unit 8									44.92	36.56	2.14	Clear glass with some red paint, window?
DfAp-12	53	Clear glass	unit 8									46.69	31.63	2.57	Clear, thin glass, window?
DfAp-12	54	Clear glass bottle	unit 8									42.15	29.97	4.11	Clear bottle glass
DfAp-12	55	Clear glass	unit 8									34.88	19.32	2.02	Clear, thin glass, window?
DfAp-12	56	Clear glass	unit 8									27.74	13.17	3.26	Clear, thin glass
DfAp-12	57	Clear glass	unit 8									16.42	14.6	2.14	Clear glass with red paint
DfAp-12	58	Clear glass	unit 8									36.15	11.46	3.75	Clear, flat glass with a bubbled texture
DfAp-12	59	Green glass	unit 8									42	21.07	3.98	Green bottle glass
DfAp-12	60	Green glass	unit 8									19.52	18.48	4.42	Green glass
DfAp-12	61	Brown glass	West wall middle									15.71	12.23	2.49	Brown glass, bottle?
DfAp-12	62	Green bottle glass	West wall									51.7	33.35	8.67	Base of a green bottle with Made in Canada and a maker's mark on the convex surface
DfAp-12	63	Porcelain	unit 7					47.8	26.5	66		58.21	31.91	26.99	Two pieces of porcelain, possibly part of a toilet?
DfAp-12	64	White glass	unit 7					47.8	26.5	66		58.18	20.43	2.52	Three pieces of white glass, one is rippled
DfAp-12	65	Fuse	East Wall								26.83	32.36			Three pieces of a fuse, glass, porcelain and metal

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	66	Tin can	East Wall								61.26			24.36	Top to a tin can, with a yellow striped label with red detail
DfAp-12	67	Tin can	South Wall								59.16			39.5	Top to a tin can with red label and green lettering "NTA"
DfAp-12	68	Clear glass	North wall extension									26.01	16.07	3.72	Clear glass, bubbled texture
DfAp-12	69	Bottle neck	West wall	IP1	1.139	14.94	27					81.96	42.37	4.15	Clear glass bottle neck
DfAp-12	70	White glass	West wall									31.63	22.56	2.91	White glass fragment
DfAp-12	71	Green bottle glass	Inner North wall									40.35	34.37	4.94	Green bottle glass
DfAp-12	72	Green bottle glass	Inner North wall									47.64	26.55	4.01	Green bottle neck
DfAp-12	73	Brown bottle glass	Inner North wall									44.36	19.55	3.33	Brown bottle glass
DfAp-12	74	Clear glass	Inner North wall									30.36	16.43	3.24	Clear window glass
DfAp-12	75	Clear window glass	Inner North wall									41.29	23.81	2.09	Clear window glass
DfAp-12	76	Clear window glass	Inner North wall									32.83	20.87	2.15	Clear window glass, dirty coating
DfAp-12	77	Clear glass	South wall									28.03	26.21	3.86	Clear window glass
DfAp-12	78	Clear bottle glass	South wall									37.5	23.21	3.19	Clear bottle glass
DfAp-12	79	Clear glass	South wall									26.37	24.94	2.64	Clear window glass
DfAp-12	80	Mug handle	South wall									44.29	11.16	8.09	Blue porcelain mug handle
DfAp-12	81	Ceramic	unit 2									38.03	15.81	8.79	White ceramic
DfAp-12	82	Clear glass	unit 2									24.85	11.92	7.24	Clear glass, slightly melted, small lip
DfAp-12	83	Clear glass	unit 2									16.76	12.51	3.4	Clear, melted glass
DfAp-12	84	Clear glass	unit 2									20.84	26.2	3.57	Clear, concave glass
DfAp-12	85	Clear glass	unit 2									21.83	11.52	4.25	Clear glass

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	86	Clear glass	unit 2									21.67	15.55	2.1	Clear window glass
DfAp-12	87	Clear glass	unit 2									33.76	11.72	3.44	Cloudy glass with a slight lip
DfAp-12	88	Clear glass	unit 2									26.8	16.18	1.01	Concave thin piece of clear glass
DfAp-12	89	Clear glass	unit 2									55.56	32.74	2.01	Clear window glass
DfAp-12	90	Clear glass	unit 2									23.41	21.92	20.6	Thick, clear glass
DfAp-12	91	Clear glass	unit 2									30.44	27.01	18.45	Thick, clear glass
DfAp-12	92	Clear glass	unit 2									25.17	15.24	10.34	Clear glass, slightly melted
DfAp-12	93	Clear glass	unit 2									31.6	19.67	7.35	Clear glass
DfAp-12	94	Clear glass	unit 2									18.57	15.44	2.67	Clear glass, slightly melted
DfAp-12	95	Tile	unit 2									47.36	28.52	3.99	Grey/brown tile, waffled bottom
DfAp-12	96	Painted glass	unit 2									48.3	40.36	2.12	Clear window glass, painted black
DfAp-12	97	Painted glass	unit 2									31.13	26.03	2.26	Clear window glass, painted black
DfAp-12	98	Painted glass	unit 2									36.41	44.52	2.16	Clear window glass, painted black
DfAp-12	99	Film fragment	unit 2									43.57	10.55	0.16	Fragment of movie film
DfAp-12	100	Blue glass	unit 2									32.34	30.91	3.73	Blue glass
DfAp-12	101	Roofing tile	unit 2									66.74	39.08	1.8	Small fragment of roofing tile
DfAp-12	102	Painted glass	unit 2									30.87	30.3	2.21	Clear window glass, painted black
DfAp-12	104	Clear bottle glass	unit 2									47.64	31.73	3.15	Clear bottle glass, edge of the base of the bottle
DfAp-12	105	Clear glass	unit 2									52.08	27.31	2.03	Window glass, dirty colour
DfAp-12	106	Green glass	unit 2									17.49	14.79	4.85	Green glass
DfAp-12	107	Green glass	unit 2									13.89	11.7	4.1	Green glass

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	108	Clear glass	unit 2									31.85	22.28	5.71	Thick clear glass
DfAp-12	109	Brown glass	unit 2									21.59	12.04	3.83	Brown bottle glass
DfAp-12	110	Blue glass	unit 2									20.9	6.98	5.06	Lip of a blue bottle
DfAp-12	111	Clear glass	unit 2									16.1	14.47	3.22	Clear glass
DfAp-12	112	Clear glass	unit 2									25.22	21.01	7.66	Thick clear glass
DfAp-12	113	Green bottle glass	unit 2									17.95	17.72	4.42	Green bottle glass, neck
DfAp-12	114	Painted glass	unit 7									41.11	41.29	2.19	Clear glass painted black
DfAp-12	115	Painted glass	unit 7									40.88	20.28	4.2	Clear glass painted black
DfAp-12	116	Blue glass	unit 7									32.39	25.53	6.06	Blue glass
DfAp-12	117	Brown glass	unit 7									30.73	27.46	4.34	Brown bottle glass
DfAp-12	118	Brown glass	unit 7									16.47	10.99	2.29	Brown glass with waffled texture
DfAp-12	119	Clear bottle glass	unit 7									60.93	23.73	7.87	Clear, ridged bottle glass. Coke bottle?
DfAp-12	120	Clear glass	unit 7									42.76	22.66	3.62	Clear glass with bubbled texture
DfAp-12	121	Clear glass	unit 7									20.79	16.89	3.55	Clear glass with bubbled texture
DfAp-12	122	Melted glass	unit 7									46.71	17.7	10.47	Clear melted glass
DfAp-12	123	Melted glass	unit 7									30.64	29.92	10.23	Clear melted glass
DfAp-12	124	Clear glass	unit 7									26.81	21.83	1.32	Clear glass with dirty colour
DfAp-12	125	Bottle neck	unit 7									56.87	31.95	5.02	Clear bottle neck
DfAp-12	126	Mirror glass	unit 7									61.4	25.1	2.07	Clear glass with mirror paint
DfAp-12	127	Clear glass	unit 7									23.9	12.26	6.16	Thick clear glass
DfAp-12	128	Clear glass	unit 7									52.05	21.01	2.33	Clear glass, slightly melted

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	129	Clear glass	unit 7									45.71	15.43	2.83	Clear window glass
DfAp-12	130	Clear glass	unit 7									34.2	24.5	2.74	Clear window glass
DfAp-12	131	Clear glass	unit 7									30.48	27.22	4.18	Cloudy clear glass
DfAp-12	132	Clear glass	unit 7									14.76	13.97	6.28	Thick clear glass
DfAp-12	133	Clear glass	unit 7									30.48	22.89	2.88	Clear, concave glass
DfAp-12	134	Ceramic	unit 7									20.48	14.01	2.83	Ceramic chip
DfAp-12	135	Clear glass	unit 7									28.47	13.54	2.7	Clear window glass
DfAp-12	136	Mirror glass	unit 7									36.72	15.94	2.13	Clear glass with mirror paint
DfAp-12	137	Clear glass	unit 7									19.53	11.66	4.84	Thick clear glass
DfAp-12	138	Clear painted glass	unit 1									46.79	22.11	2.24	Clear glass with black paint
DfAp-12	139	Clear painted glass	unit 1									44.44	20.78	2.14	Clear glass with black paint
DfAp-12	140	Clear painted glass	unit 1									75.98	33.27	2.21	Clear glass with black paint
DfAp-12	141	Clear painted glass	unit 1									90.06	24.63	2.34	Clear glass with black paint
DfAp-12	142	Clear painted glass	unit 1									97.97	29.93	2.27	Clear glass with black paint
DfAp-12	143	Clear painted glass	unit 1									46.01	29.56	2.03	Clear glass with black paint
DfAp-12	144	Clear painted glass	unit 1									61.16	9.5	2.14	Clear glass with black paint
DfAp-12	145	Clear painted glass	unit 1									90.85	71.35	2.3	Clear glass with black paint
DfAp-12	146	Green bottle glass	unit 7					92.1	76.2	54.4		83.66	29.91	14.09	Green bottle fragments
DfAp-12	147	Green bottle glass	unit 7					75.4	84.4	56.8	66.07			54.05	Green bottle fragments
DfAp-12	148	Stoneware	South wall									68.43	69.46	15	Large piece of brown ceramic
DfAp-12	149	Green bottle glass	South wall									54.42	27.82	4.81	Green bottle glass

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	150	Green bottle glass	South wall									46.26	35.75	4.6	Green bottle glass
DfAp-12	151	Green bottle glass	South wall									59.9	20.29	4.79	Green bottle glass
DfAp-12	152	Green bottle glass	South wall									36.11	21.14	5.2	Green bottle glass
DfAp-12	153	Stone tile?	South wall									101.4	45.56	10.22	Slate tile with holes
DfAp-12	154	Painted glass	South wall									47.5	29.07	2.17	Clear glass painted black
DfAp-12	155	Clear glass	South wall									25.77	21.29	2	Clear glass, cloudy black
DfAp-12	156	Clear bottle glass	South wall									45.46	40.09	11.23	Clear bottle glass, base
DfAp-12	157	Clear glass	South wall									64.83	37.86	2.08	Clear window glass
DfAp-12	158	Film fragment	unit 6					51.2	74.5	46.2		30.76	33.6	0.13	Movie film, blank
DfAp-12	159	Porcelain	unit 6					37	9.3	16.8		31.75	31.7	11.96	Porcelain piece, toilet piece
DfAp-12	160	Bullet casing	unit 2					100	37	87	10.06	19.09			.45 bullet casing
DfAp-12	161	Chewing gum	unit 2					70	19	86		14.62	12.26	2.91	Used chewing gum, with tread marks. Was broken in the field, inside is blue and slightly minty scented
DfAp-12	162	Painted glass	unit 7					0	79.6	52.2		33.58	8.64	2.15	Clear glass painted green
DfAp-12	163	Light bulb base	unit 7					0	79.6	52.2		101.8	101.49	65.53	Possible base to a large light bulb or spotlight
DfAp-12	164	Wooden circle	East wall, SE corner									60.66	26.16	10.36	Half of a wooden circle
DfAp-12	165	Green glass	East wall, SE corner									27.13	20.89	3.5	Green bottle glass
DfAp-12	166	Clear glass	East wall, SE corner									38.51	34.05	4.36	Clear bottle glass
DfAp-12	167	Clear glass	East wall, SE corner									33.35	37.85	12.12	Thick clear glass, base
DfAp-12	168	Clear glass	East wall, SE corner									46.33	38.24	2.83	Clear bottle glass

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	169	Clear glass	East wall, SE corner									20.23	21.77	6.83	Clear bottle glass, ridged, possibly Coke or Pepsi bottle
DfAp-12	170	Clear glass	East wall, SE corner									53.12	42.8	2.18	Clear window glass
DfAp-12	171	Clear glass	East wall, SE corner									44.1	35.45	2.07	Clear window glass
DfAp-12	172	Clear glass	East wall, SE corner									35.31	29.65	2.11	Clear window glass
DfAp-12	173	Mirror glass	East wall, rear	IP1	1.46	9.46	321					22.77	18.95	2.88	Mirror glass
DfAp-12	174	Button	unit 2					36	49	87	16.96			2.9	Beige plastic button
DfAp-12	175	Clear glass	North wall, back									45.47	27.65	5.6	Clear bottle glass, hatching pattern with portion of word 'LA". Pepsi-Cola bottle
DfAp-12	176	Clear glass	North Wall		1.46	9.46	321					55.25	27.95	3.86	Clear glass, bubble texture
DfAp-12	177	Clear glass	North wall									25.19	15.72	2.23	Clear window glass
DfAp-12	178	Clear glass	North wall									22.75	21.1	2.09	Clear window glass
DfAp-12	179	Clear glass	North wall									40.54	14.32	2.09	Clear window glass
DfAp-12	180	Clear glass	North wall									25.07	16.38	5.01	Thick clear glass
DfAp-12	181	Clear glass	North wall									39.02	15.51	2.09	Clear window glass
DfAp-12	182	Clear glass	North wall									25.82	11.49	2.07	Clear window glass
DfAp-12	183	Green Glass	North wall									23.4	9.72	5.61	Clear (green tinted) bottle glass, ridge on outside
DfAp-12	184	Clear glass	North wall									31.25	13.77	6.9	Thick clear bottle glass
DfAp-12	185	Red brick	North wall									25.34	18.13	18.4	Red brick, exterior portion
DfAp-12	186	Clear glass	North wall									31.16	21.3	7	Clear bottle glass
DfAp-12	187	Clear glass	North wall									22.35	11.05	2.07	Clear window glass
DfAp-12	188	Nail	North wall								2.37	45.79			Copper nail

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	189	Nail	North wall								3.48	39.34			Iron roofing nail, portion of roofing tile remaining around head of nail
DfAp-12	190	Nail	North wall								3.73	32.8			Iron roofing nail, portion of roofing tile remaining around head of nail
DfAp-12	191	Iron drawer handle	West wall									62.01	61.83	15.06	Iron drawer handle, attachment hole at each end, curved along the length
DfAp-12	192	Nail	West wall		1.425	10.44	324				3.83	28.44			Iron roofing nail, portion of roofing tile remaining around head of nail
DfAp-12	193	Nail	West wall								3.71	26.79			Iron roofing nail, portion of roofing tile remaining around head of nail
DfAp-12	194	Nail	West wall								3.82	38.72			Iron roofing nail, portion of roofing tile remaining around head of nail
DfAp-12	195	Nail	West wall								5.67	101.5			Iron nail
DfAp-12	196	Nail	West wall								5.81	105			Iron nail
DfAp-12	197	Wire	West wall								2.77	189			Iron wire
DfAp-12	198	Clear glass	West wall									24.27	13	3.57	Thick clear glass
DfAp-12	199	Wooden circle	West wall									42.23	11.41	5.44	Wooden window mullion, two pieces, white and green paint
DfAp-12	200	Clear glass	West wall									53.42	40.42	7.49	Clear bottle glass, Coke bottle?
DfAp-12	201	Clear glass	West wall									58.24	29.78	4.3	Clear bottle glass, neck portion, Coke bottle?

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	202	Green glass	West wall									14.76	7.99	3.52	Green bottle glass
DfAp-12	203	Clear glass	West wall									44.01	34.31	6.69	Clear bottle glass, Coke bottle?
DfAp-12	204	Clear glass	West wall									36.15	15.88	6.51	Clear bottle glass Writing on two line FLA on first, M on second
DfAp-12	205	Clear glass	West wall									23.68	15.01	2.7	Clear window glass
DfAp-12	206	Clear glass	West wall									42.72	31.49	6.47	Clear bottle glass, Coke bottle?
DfAp-12	207	Clear glass	West wall									59.6	36.49	9.54	Clear glass bottle , base with `"3D" & "50" separated by a diamond with a "D' in it, Coke bottle?
DfAp-12	208	Green glass	West wall									25.02	15.44	4.06	Green bottle glass
DfAp-12	209	Clear glass	West wall									23.55	10.8	1.42	Clear bottle glass
DfAp-12	210	Clear glass	West wall									48.13	18.06	8.04	Clear bottle glass, Coke bottle?
DfAp-12	211	Green glass	West wall									23.23	16.4	3.82	Green bottle glass
DfAp-12	212	Clear bottle glass	West wall									38.41	21.81	5.6	Clear bottle glass, Coke bottle?
DfAp-12	213	Clear glass	West wall									28.02	11.29	7.7	Clear bottle glass
DfAp-12	214	Clear glass	West wall									30.08	18.87	5.7	Clear bottle glass, Coke bottle?
DfAp-12	215	Clear glass	West wall									36.28	14.19	6.12	Clear bottle glass, Coke bottle? Neck portion
DfAp-12	216	Clear glass	West wall									74.27	31.5	6.89	Clear bottle glass, Coke bottle?
DfAp-12	217	Window frame	East wall									125.9	34.54	17.59	Green and white painted window frame with some glass
DfAp-12	218	Clear glass bottle	East wall									45.14	56.66	33.75	Base to a clear bottle, diamond shapes on the body

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	219	Green glass	East wall									49.43	16.3	4.5	Green bottle glass
DfAp-12	220	Clear glass	East wall									36.21	29.6	3.97	Clear bottle glass
DfAp-12	221	Clear glass	East wall									22.84	17.67	4.71	Clear bottle glass, could be Coke
DfAp-12	222	Clear glass	East wall									36.17	27.25	3.62	Clear glass, ridged
DfAp-12	223	Clear glass	East wall									22.45	19.48	4.3	Clear bottle glass, neck
DfAp-12	224	Clear glass	East wall									44.17	44.57	2.1	Clear window glass
DfAp-12	225	Porcelain	East wall									15.41	7.87	4.47	Porcelain with black paint
DfAp-12	226	Clear glass	East wall									20.58	13.13	6.16	Bottle glass, neck
DfAp-12	227	Clear glass	East wall									16.37	19.27	3.97	Bottle glass
DfAp-12	228	Clear glass	East wall									38.36	16.02	5.53	Bottle glass
DfAp-12	229	Brick	West corner									29.16	27.81	14.78	Red brick
DfAp-12	230	Nails in concrete	West corner									66.16	31.54	20.51	Two nails in concrete
DfAp-12	231	Doorknob	Peg 1		1.492	17.84	328				49	110.9			Doorknob
DfAp-12	232	Brick	West corner									56.97	59.94	32.5	Red brick
DfAp-12	233	Glass	West corner									30.57	18.59	2.91	Window glass
DfAp-12	234	Brick	Peg 8		1.391	15.97	305					29.71	26.14	20.69	Pink brick or stoneware, slightly curved outer surface on some pieces
DfAp-12	235	Slag	North wall									79.44	59.04	50.11	Representative piece of slag, slag was found throughout the site
DfAp-12	236	Painted glass	West corner									28.33	16.34	2.18	Window glass with black paint
DfAp-12	237	Clear glass	Unit 3									25.75	25.75	2.23	Window glass

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	238	Clear glass	Unit 3									35.67	18.59	2.81	Window glass
DfAp-12	239	Clear glass	Unit 3									30.96	36.27	2.71	Window glass
DfAp-12	240	Clear glass	North wall									33.71	7.92	5.33	Melted glass
DfAp-12	241	Plastic wrapper	West wall									31.03	23.09	0.06	Plastic label
DfAp-12	242	Shingle	Unit 3									91.61	81.07	3.98	Broken shingle
DfAp-12	243	Nail	West wall									40.22	15.6	12.02	Nail with roofing material
DfAp-12	244	Nut	South East corner									39.84	35.42	16.63	Capping Nut
DfAp-12	245	Under flooring	Unit 7					71	10.5	93.7		119.9	76.93	3.59	Under flooring
DfAp-12	246	Film	Unit 3					61	72	77		80.59	35.15	0.15	Projector film
DfAp-12	247	Gin Bottle	Peg 13	ip 4	0.955	31.21	33					187.6	80.62	47.79	Gin Bottle
DfAp-12	248	Melted glass	West wall									30.11	11.84	4.63	Twist of melted glass
DfAp-12	249	Film	South East corner	IP1	1.548	30.95	1					110.2	33.82	0.2	Projector film
DfAp-12	250	Wire	West wall								37.91	283.8			Wire
DfAp-12	251	Porcelain Insulator	West wall									75.52	43.07	13.85	Porcelain electrical insulator
DfAp-12	252	Metal ring	unit 7	IP1	1.53	14.23	28				72.35			20.43	Metal ring with some wood remaining
DfAp-12	253	Window frame	North wall									82.86	17.17	18.82	Green and white window frame
DfAp-12	254	Wire	unit 7								3.58	216.8			Cloth covered wire
DfAp-12	255	Nail	unit 7								6.04	45.74			Copper nail
DfAp-12	256	Wood	unit 7									151	26.86	14.37	Quarter round with green paint
DfAp-12	257	Copper wire	unit 7								2.08	91.83			Thick copper wire
DfAp-12	258	Nail	unit 7								10.17	41			Roofing nail

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	259	Nail	East wall								10.46	34.61			Nail
DfAp-12	260	Nail	West wall								10.11	32.34			Nail
DfAp-12	261	Clear glass	East wall									27.94	24.7	2.17	Window glass
DfAp-12	262	Clear glass	East wall	IP1	1.708	9.86	307					29.07	20.77	5.61	Coke green bottle glass
DfAp-12	263	Grounding wire	North wall								14.15	12.4.74			Possible grounding rod, spring surrounded by metal tube
DfAp-12	264	Nail	West wall								6.49	45.35			Copper nail
DfAp-12	265	Nail	West wall								10.55	33.24			Roofing nail
DfAp-12	266	Bolt	Unit 3								14.03	140.7	23.96	25.41	Bolt
DfAp-12	267	Bolt	Unit 3								13.39	140	23.49	22.15	Bolt
DfAp-12	268	Nail	West wall								10.61	39.92			Small nail, roofing
DfAp-12	269	Green glass	West wall									28.11	17.25	4.3	Green bottle glass
DfAp-12	270	Green glass	West wall									40.19	10.97	4.25	Green bottle glass
DfAp-12	271	Bolt	Unit 3								13.1	248.7	20.06	20.06	Bolt
DfAp-12	272	Nail	North wall								10.5	33.35			Roofing nail
DfAp-12	273	Nail	North wall								6.6	45.68			Copper nail
DfAp-12	274	Nail	West wall								13.37	31.79			Nail
DfAp-12	275	Nail	North wall								10.38	39.96			Nail
DfAp-12	276	Spool	Unit 3								79.68			13.12	Spool
DfAp-12	277	Spool	Unit 3								75.06			20.85	Spool end
DfAp-12	278	Rebar	East wall								21.23	56.05			Small section of rebar

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	279	Nail	North wall								5.65	45.48			Copper nail
DfAp-12	280	Clear glass	North wall east									36.15	15.63	3.08	Window glass
DfAp-12	281	Clear glass	East wall									44.61	21.66	8.26	Clear, ridged, bottle glass
DfAp-12	282	Brown glass	unit 3									27.74	15.51	2.71	Brown bottle glass, neck
DfAp-12	283	Clear glass	West wall									23.89	11.72	4.94	Clear bottle glass
DfAp-12	284	Green glass	unit 3									18.7	12.31	3.27	Green bottle glass
DfAp-12	285	Clear glass	unit 3									20.89	14.13	11.61	Clear bottle glass
DfAp-12	286	Clear glass	West wall									20.66	10.91	2.08	Window glass
DfAp-12	287	White glass	West wall									20.47	11.66	1.92	White glass
DfAp-12	288	Clear glass	West wall									20.37	19.45	1.96	Window glass
DfAp-12	289	Clear glass	West wall									22.15	16.58	2.68	Window glass
DfAp-12	290	Brown glass	West wall									14.67	14.08	5.9	Brown bottle glass, neck
DfAp-12	291	Clear glass	West wall									34.09	23.85	3.59	Bottle glass
DfAp-12	292	Clear glass	West wall									46.01	11.65	2.06	
DfAp-12	293	Nail	West wall								6.44	45.01			Copper nail
DfAp-12	294	Rubber tube	East wall									181.2	8.59	5	Black rubber tube
DfAp-12	295	Pipe	East wall									115.5	36.42	35.74	Pipe with screw fitting at the end
DfAp-12	296	Clear glass	unit 3									24.64	16.35	3.85	Clear bottle glass
DfAp-12	297	Clear glass	North wall									29.19	21.74	1.95	Window glass
DfAp-12	298	Clear glass	North wall									29.99	19.14	3.68	Clear glass with bubbles
DfAp-12	299	Clear glass	North wall									29.82	13.02	3.39	Clear glass with bubbles

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	300	Nail	West wall								14.63	27.12			Short nail with a wide head
DfAp-12	301	Clear glass	unit 3									21.72	22.73	4.34	Clear bottle glass
DfAp-12	302	Clear glass	West wall									37.58	21.36	2.05	Window glass
DfAp-12	303	Clear glass	unit 3									41.17	34.94	4.57	Clear bottle glass
DfAp-12	304	Rebar	North wall								9.97	124.5			Rebar
DfAp-12	305	Clear glass	North wall									37.64	27.22	2.19	Window glass
DfAp-12	306	Clear glass	North wall									28.2	29.68	4.61	Clear bottle glass
DfAp-12	307	Clear glass	North wall									34.39	26.38	1.89	Window glass
DfAp-12	308	Clear glass	North wall									30.76	25.07	1.99	Window glass
DfAp-12	309	Clear glass	North wall									38.66	25.1	2.03	Window glass
DfAp-12	310	Clear glass	unit 3									23.29	9	7.31	Clear bottle glass
DfAp-12	311	Clear glass	unit 3									23.02	16.12	0.8	Clear concave glass
DfAp-12	312	Nail	North wall								7.19	45.47			Copper nail
DfAp-12	313	Nail	North wall								10.47	40.99			Nail
DfAp-12	314	Clear glass	unit 3									34.15	15.07	4.9	clear, melted glass
DfAp-12	315	Green glass	East wall									28.28	14.61	4.24	Green bottle glass
DfAp-12	316	Green glass	East wall									39.98	24.59	7.84	Green bottle glass
DfAp-12	317	Nail	East wall								10.43	32.39			Roofing nail
DfAp-12	318	Green glass	East wall									48.93	64.08	35.79	Green bottle glass
DfAp-12	319	Clear glass	East wall									64.5	38.98	2.09	
DfAp-12	320	Clear glass	East wall									22.78	19.71	1.83	Clear concave glass

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	321	Clear glass	East wall									44.5	33.18	4.5	Clear bottle glass
DfAp-12	322	Clear glass	East wall									59.39	28.81	4.22	Clear bottle glass
DfAp-12	323	Clear glass	East wall									39.05	19.75	2.15	Clear bottle glass
DfAp-12	324	Clear glass	East wall									59.62	13.35	2.21	Brown, dimpled glass
DfAp-12	325	Brown glass	East wall									21.05	12.87	2.69	Brown glass
DfAp-12	326	Orange plastic	East wall									53.29	34.98	2.49	Orange plastic (modern?)
DfAp-12	327	Clear glass	East wall									40.8	31.81	3.27	Clear bottle glass
DfAp-12	328	Clear glass	unit 3									49.52	37.06	2.21	Painted window glass
DfAp-12	329	Clear glass	unit 3									32.53	15.02	2.18	Window glass
DfAp-12	330	Clear glass	unit 3									46.29	39.31	2.18	Painted window glass
DfAp-12	331	Clear glass	unit 3									39.42	36.25	2.2	Window glass
DfAp-12	332	Movie film	East wall									74.04	33.07	0.11	Movie film
DfAp-12	333	Wooden frame	East wall									58.97	22.01	8.95	Wooden frame with blue paint
DfAp-12	334	Foam	East wall									44.3	30.77	8.09	Black foam
DfAp-12	335	Metal ring	East wall								25.17			6.94	Small, metal, ring with fabric
DfAp-12	336	Metal ring	unit 1								110.5			25.8	Round, metal circle with visible join
DfAp-12	337	Green glass	unit 3									27.18	21.92	4.22	Green bottle glass
DfAp-12	338	Pipe	unit 1									194.8	63.47	51.92	Pipe join
DfAp-12	339	Clear glass	unit 3									42.16	33.79	2.01	Window glass
DfAp-12	340	Clear glass	unit 3									50.67	35.82	16.82	Ridged, clear glass. Bottle neck? Pepsi bottle?
DfAp-12	341	Brown glass	unit 3									59.75	28.3	8.17	Brown bottle glass base

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	342	Pipe	unit 1								115.6			63.62	End of a large pipe
DfAp-12	343	Clear glass	unit 3									49.13	28.9	2.23	Window glass
DfAp-12	344	Clear glass	unit 3									41.95	41.24	2.75	Window glass
DfAp-12	345	Clear glass	unit 3									36.51	25.52	2.17	Window glass
DfAp-12	346	Concrete	unit 3									225.9	152.7	21.41	Concrete with iron mesh backing, red stripe.
DfAp-12	347	Metal ring	unit 1								112.5			26.2	Metal ring with visible join
DfAp-12	348	Metal piece	unit 2									56.97	17.49	5.46	Metal piece, like a flattened, hallow nail
DfAp-12	349	spool	unit 3								79.06			27.34	Spool End
DfAp-12	350	spool	unit 3								70.91			18.68	Spool End
DfAp-12	351	Fly wheel	unit 3								73.6			21.49	Fly wheel
DfAp-12	352	Film	unit 2					95	64	76		38.96	34.6	0.18	Projector film
DfAp-12	353	Film	unit 2									59.56	34.56	0.16	Projector film
DfAp-12	354	Film	East Wall									34.17	32.89	0.2	Projector film
DfAp-12	355	Nail	unit 3								11.11	104.2			Nail
DfAp-12	356	Ring	unit 3								71.25			20.13	Metal ring with visible join
DfAp-12	357	Ring	unit 3								122.4			31.6	Metal ring with visible join and debris
DfAp-12	358	Ring	unit 3								73.69			20.18	Metal ring
DfAp-12	359	ring	north wall								75.29			20.43	Metal ring with visible join
DfAp-12	360	Insulated wire	North wall								9.69	96.54			Insulated copper wire, 8 gauge
DfAp-12	361	Jar top	Unit 2					32	99	103		94.74	130.24	59	Syrup jar pour top

Borden	Artifact	Object	Area/Unit	Instrument Position	Elevation (m)	Distance (m)	Direction	Northing (cm)	Easting (cm)	Depth (cm)	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Description
DfAp-12	362	Pencil	East wall								7.2	46.38			Green pencil stub
DfAp-12	363	Nail and wood	East wall									89.06	95.76	47.59	Nail in a piece of wood
DfAp-12	364	Rubber	North Wall									73.47	21.12	5.16	Rectangular length of rubber
DfAp-12	365	Clear glass	North Wall	IP1	1.663	3.52	315					44.59	26.66	7	Melted glass
DfAp-12	366	Clear glass	North Wall									46.12	36.21	6.66	Bottle glass
DfAp-12	367	Clear glass	North Wall									52.33	44.47	2.15	Window glass
DfAp-12	368	Clear glass	North Wall									58.1	29.5	2.15	Window glass
DfAp-12	369	Green glass	North Wall									24.83	17.4	4.3	Green bottle glass
DfAp-12	370	Window frame	West wall									125	35.59	16.37	Painted green window frame and glass

The Globe Theatre (DfAp-12) Feature Catalogue

Note that many of the objects are also artifacts. In this catalogue, Feature designates any object which was measured off of the stadia rod and level and many were collected as artifacts after measured.

Borden	Artifact Number	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Notes
DfAp-12			Datum	Datum		0	-0.1395	.°	Instrument height 139.5cm
DfAp-12	231		Peg 1		1	17.84	1.3525	328.°	
DfAp-12	6		Peg 2		1	17.28	1.4255	323.°	
DfAp-12	173		Peg 3		1	9.46	1.3205	321.°	
DfAp-12	365		Peg 4		1	3.52	1.5235	315.°	
DfAp-12	192		Peg 5		1	10.44	1.2855	324.°	
DfAp-12	262		Peg 6		1	9.86	1.5685	307.°	

Borden	Artifact Number	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Notes
DfAp-12	11		Peg 7		1	28.16	1.2355	359.°	
DfAp-12	234		Peg 8		1	15.97	1.2515	305.°	
DfAp-12	252		Peg 9		1	14.23	1.3905	28.°	
DfAp-12	249		Peg 10		1	30.95	1.4085	1.°	
DfAp-12	69		Peg 11		1	14.94	0.9995	27.°	
DfAp-12		21	Peg 12	Chip bag	1	30.32	0.6075	2.°	
DfAp-12		3	Corner 1		1	1.25	1.1705	323.°	
DfAp-12		4	Corner 2		1	3.83	1.1785	15.°	
DfAp-12		5	Corner 3		1	5.2	0.9935	308.°	
DfAp-12		6	Corner 4		1	13.33	1.4355	320.°	
DfAp-12		7	Corner 5		1	16.93	0.9915	316.°	
DfAp-12		8	Corner 6		1	16.59	1.4735	305.°	
DfAp-12		9	Corner 7		1		1.4115	2.5°	
DfAp-12		10	Corner 8		2	31.45	1.2325	27.°	
DfAp-12		11	Corner 9		4	17.09	1.2334	32.°	
DfAp-12		12	Corner 10		4	26.46	1.0054	34.°	
DfAp-12		13	Corner 11		4	30.95	0.7134	34.°	
DfAp-12		14	Corner 12		4	23.87	1.0154	353.°	
DfAp-12			IP2		1	11.21	0.19	127.°	
DfAp-12			IP3	IP3=Datum					
DfAp-12		1	Iron cover	Iron tank cover			0		
DfAp-12			toilet piece	Porcelain fragment, possibly from a toilet	4	10.56	1.0154	328.°	
DfAp-12		2	Metal Thing		1	4.37	1.3585	2.°	

Borden	Artifact Number	Feature Number	Field Reference	Object Description	Instrument Position	Distance (m)	Elevation (m)	Direction	Notes
DfAp-12			IP4						
DfAp-12	13		Peg 13		4	31.21	0.8084	33.°	
DfAp-12	25		Peg 14		4	30.88	0.8174	30.°	
DfAp-12	247		Peg 15		4	28.73	0.8884	33.°	
DfAp-12		15	Unit 8, N corner		3	11.58	1.1808	321.°	
DfAp-12		16	Unit 8, datum		3	12.87	1.2298	323.°	
DfAp-12		17	Unit 3, N corner		3	29.93	0.9468	21.5°	
DfAp-12		18	Unit 3, datum		3	32.39	0.7758	19.°	
DfAp-12		19	Unit 7, N corner		3	18.12	1.2378	15.°	
DfAp-12		20	Unit 7, datum		3	20.13	1.0008	8.°	