

HISTORY OF THE UNITED STATES MILITARY PARTICIPATION IN  
OPERATION DEEP FREEZE

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by

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## **DEDICATION**

I dedicate my thesis to my wife Mary Beth and daughter Sarah, without whom this would not have been possible. I am forever in your debt for allowing me this opportunity to pursue my dream. I am grateful for my parents, Dale and Mary Wagner, and to my many teachers and professors Benton Cain, Andrew Orr and Jeffrey Littlejohn to name but a few who have pushed me to do my best over the many years of my education. To my friends and church family who have supported me as well, I appreciate all you have done as well.

## **ABSTRACT**

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In 1955, the longest non-combat military operation in United States history began; it continues to this day. Operation Deep Freeze began in support of the then upcoming International Geophysical Year (IGY), but it went beyond when the U.S. government used it to test equipment and procedures in real world conditions with an eye toward the Cold War and the Soviet Union. IGY has been the subject of some historical research; for the most part, that research examined the scientists and the science conducted. In 2006, a study was done on the contributions of the U.S. Air Force, but historians neglected the contributions of the other military branches to the overall mission. Without them, Operation Deep Freeze would have been impossible. By using as much first hand material as possible -- memoirs, original documents and oral histories -- I intent to see how the U.S. military contributed to the exploration of Antarctica in the last 60 plus years to assess how the soldiers, sailors and airmen, many of them combat veterans, viewed the mission, a mission that was not very glamorous and conducted under some of the harshest weather conditions on the planet, but a mission that was essential to the success of an international project.

**KEY WORDS:** Operation Deep Freeze, Antarctica, U.S. Navy, Seabees, U.S. Air Force, U.S. Army, U.S. Marine Corps, U.S. Coast Guard, International Geophysical Year, Rear Admiral George Dufek, South Pole, Paul Siple, Admiral Richard Byrd

## **ACKNOWLEDGEMENTS**

I would like to acknowledge and say thank you to everyone who helped make this possible, without you, this would not have happened. To my friends and colleagues who helped read the early drafts, to the proofreaders who helped find errors, and to Dr. Lara Godbille, Director of U.S. Navy Seabee Museum at Port Hueneme who explained what was and was not available to researchers and who helped to suggest this topic.

To my committee members -- Dr. Nicholas Pappas, Dr. Jeremiah Dancy, and Dr. James Olson – I appreciate your assistance throughout this long process. I am also grateful to Dr. Jeffrey Littlejohn for giving me my first opportunity to write on a graduate level for publication; it was a true learning experience.

## **PREFACE**

The idea for this research grew out of my passion for military history and my desire to give something back to my beloved U.S. Navy and its history. Dr. Lara Godbille explained what materials were available in her archive about Operation Deep Freeze. In my Navy career, I never had the chance to participate in Operation Deep Freeze, in truth; I cannot say that I even knew about it. However, the more that I investigated, the more intrigued I became, and after doing the research, the more I wish I had. While the early days of the operation were hard and dangerous, the knowledge gained about Antarctica and the stories passed on to posterity seemed invaluable.

Previous missions had visited the Antarctic, but never on this scale and never on such a short timeline. The level of planning was immense. In addition, just as NASA had to make sure the men selected as astronauts would be able to perform when needed; the men of Operation Deep Freeze were hand selected for the same reasons.

By studying this Operation and these men, and how they overcame their obstacles, some caused by the mission, some by each other, I hope to show how the U.S. Military not only contributed to its success, but without the military's help, the mission of setting up these bases and maintaining them, would not have been possible at all. Today, we are used to large multinational corporations that can step in and help during a large international event, but in the 1950s, they did not exist. While dozens of countries were involved, most did not contribute anywhere near the amount of men, materials, or money as the United States. In 2017 dollars, the U.S. spent over \$2.2 billion just to build the bases, billions more over the years to maintain them. These bases supported other countries' efforts to build and maintain bases and research stations, insuring that the

International Geophysical Year (IGY) was a success. Moreover, within the backdrop of the Cold War, no one involved wanted the help of the only other nation – the Soviet Union -- that might have had the resources to do the mission, because no one knew if international cooperation was even possible.

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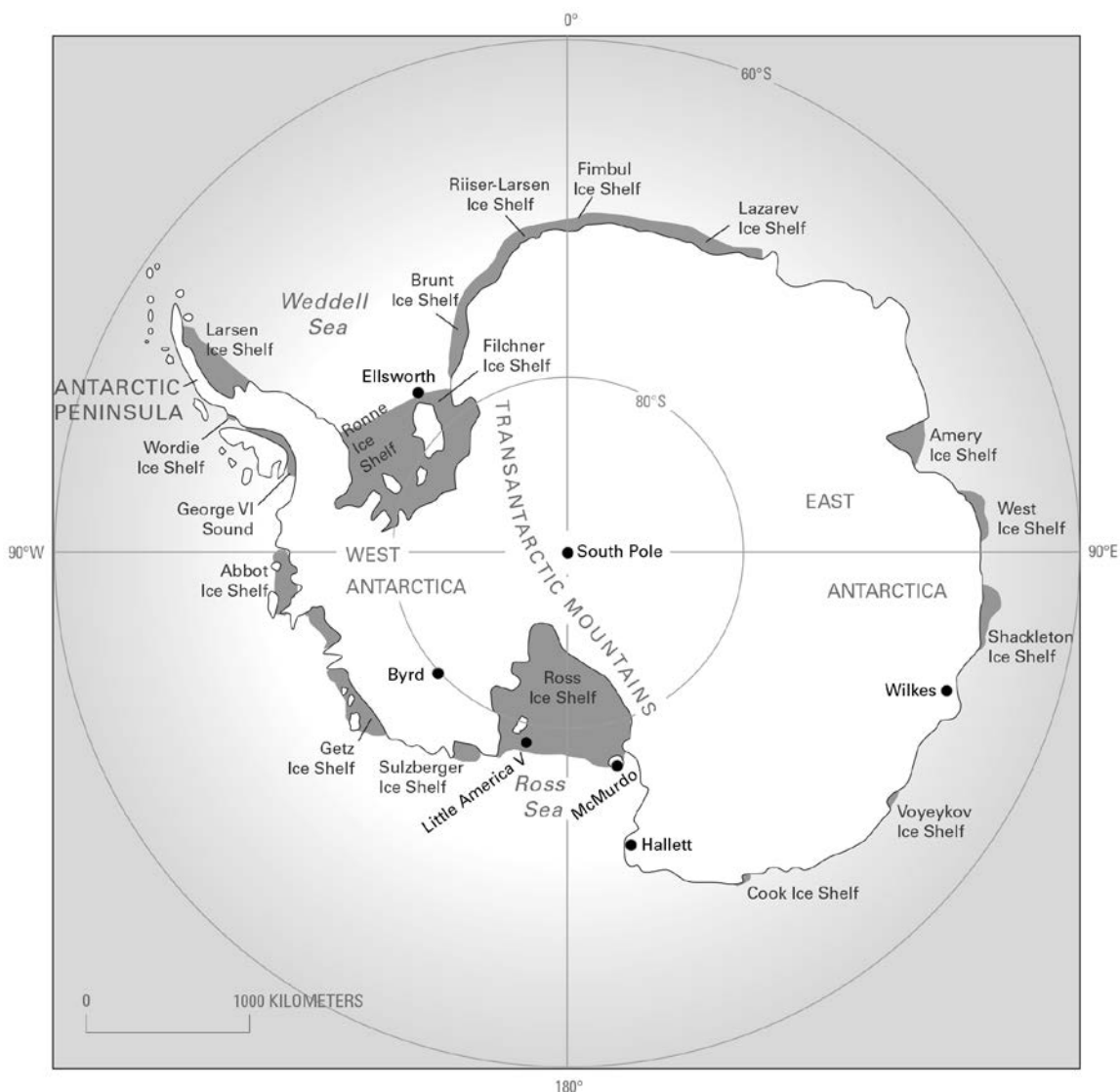
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# **INDEX MAP TO THE PRINCIPAL GEOGRAPHIC FEATURES OF ANTARCTICA AND LOCATION OF FIELD STATIONS<sup>1</sup>**



<sup>1</sup> Extraction from Tony K. Meunier, Richard S. Williams, and Jane G. Ferrigno, *U.S. Geological Survey Scientific Activities in the Exploration of Antarctica, 1946-2006 Record of Personnel in Antarctica and Their Postal Cachets: U.S. Navy (1946-48, 1954-60), International Geophysical Year (1957-58), and USGS (1960-2006)* (Reston, VA: U.S. Geological Survey, 2007).

### **Frequent Acronyms Used in Thesis**

IGY - International Geophysical Year

CO - Commanding Officer

DEW - Distant Early Warning Line

DOD - Department of Defense

GCA - Ground Control Approach system

JATO – Jet Assisted Take Off

LCVP - landing craft, vehicle, personnel

MSTS - Military Sea Transportation Service

NAS - National Academy of Science

NAS - National Academy of Science

OIC - Officer-in-Charge

PSR - Point of Safe Return

TCW - Troop Carrier Wing

TF-43 - Force 43

USCGC - United States Coast Guard Cutter

USNS - United States Naval Ship

VA - Department of Veterans Affairs

VBDR - Veterans' Advisory Board on Dose Reconstruction

VX-6 - Air Development Squadron SIX

YOG - Yard Oiler

## CHAPTER I

### Prelude to Operation Deep Freeze

From 1950 to 1953, various scientists around the world held meetings and planned to place permanent research stations in Antarctica. The United States took on the assignment of building the largest stations based on its capabilities and expertise. The United States assigned the mission to the U.S. Navy because of its history of exploration and knowledge about the Antarctica. The Navy hedged its options and placed its two most experienced people in charge -- Admirals Byrd and Dufek. Despite conflict between their staffs, they started the process of formulating a plan and making it a reality within the timeframe planned. They pulled together men, materials and assets from all over the U.S. military and brought it to one place at the Navy's Headquarters Construction Battalion Center in Davisville, Rhode Island. As they worked through various issues, the plan would change and evolve.

#### I. The International Geophysical Year and Operation Deep Freeze

By April 1950, the Cold War was going into its fourth year, and the Korean War was still more than a month away. However, in that month, a group of scientists were meeting and their discussion birthed a proposal for international cooperation that became the largest "set of coordinated experiments and field expeditions to be undertaken during the cold war," later to be called the International Geophysical Year (IGY), which continues today.<sup>2</sup> It eventually involved over 67 nations and tens of thousands of people, from scientists to military personnel, some paid, some volunteers, but each working to bring about this massive undertaking. The dinner meeting was between James Van Allen

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<sup>2</sup> Korsmo, Fae L., "The Birth of the International Geophysical Year." *THE LEADING EDGE* 26, no. 10 (2007): 1312-316.

of John Hopkins University, who hosted at his home, and Sydney Chapman of Oxford University, who was on his way to a meeting at Caltech. Several other colleagues joined them, including Lloyd Berkner, a veteran of the first Byrd Antarctic expedition. Also present was Wallace Joyce, a member of the National Research Council; Fred Singer, one of Van Allen's assistants at the Applied Physics Lab; and E. H. ("Harry") Vestive of the Carnegie Institution, a former student of Chapman's.<sup>3</sup> Berkner would offhandedly propose a new scientific International Polar Year. Chapman replied that it was a great idea and noted that the twenty-fifth anniversary of the second Polar Year was coming up in 1957 and it would be "a period of maximum solar activity."<sup>4</sup> Van Allen remembered that everyone at the meeting agreed with Chapman and told him that they thought it was a great idea as well and that Chapman then took the lead in pushing the idea to the international community. Chapman had the credentials and the influence to make it happen. "For the next several years, Chapman spent a good part of his time traveling internationally, going to various countries all over the world developing the idea of appointing committees for individual specialties, enlisting the support of influential scientists in all the major countries for this undertaking, and organizing the institutional structure for coordinating the work."<sup>5</sup> Between the 1950 meeting and the first international IGY meeting in spring 1953, the proposed scientific program would include 26 countries and practically the whole of Earth, ocean, and atmospheric sciences."<sup>6</sup> By

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<sup>3</sup> "Interview of James A. Van Allen by Brian Shoemaker," 2008. Accessed August 24, 2015 <http://hdl.handle.net/1811/36727>

<sup>4</sup> Belanger, Dian Olson. *Deep Freeze the United States, the International Geophysical Year, and the Origins of Antarctica's Age of Science*. Boulder, Colo.: University Press of Colorado, 2006. 30.

<sup>5</sup> Van Allen, 23.

<sup>6</sup> Korsmo, 1314

the second meeting in Rome in September 1953, the number of participating nations had grown to thirty-six and eventually to sixty-seven.<sup>7</sup>

Chapman and other scientists conceived of an “apolitical” program that would welcome any nation into the IGY without concern for that nation’s politics. Each nation would set up its own committee and pay for its own operations. In the United States, the National Academy of Science (NAS), a private organization, took the lead and formed the United States National Committee for the IGY. While the NAS could provide the technical knowledge needed, it could not provide the funding. For this, it teamed with a government agency, the National Science Foundation (NSF), to seek funding from Congress. The NAS also formed various technical committees with the goal of reviewing and evaluating “proposals from public and private institutions such as laboratories and universities and formulate their respective programs.”<sup>8</sup> In late 1954, the U.S. Antarctic Committee formed with Laurence Gould as chair. The committee had a mix of personnel, including a meteorologist, a State Department official, and representatives from three branches of the U.S. military. For the Navy, it would be Admiral Richard Byrd, who had been on several expeditions to Antarctica, and Captain George Dufek, who had accompanied Byrd on the 1939 and 1946 expeditions; and had twice been to the Arctic.<sup>9</sup> The Committee would formulate what the U.S. wanted to accomplish in Antarctica, and these two men would play roles in Operation Deep Freeze (known initially as “Deepfreeze”).

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<sup>7</sup> Belanger, 32

<sup>8</sup> Belanger, 33

<sup>9</sup> Belanger, 34

Discussions along these lines had been going on for some time. As Fae Korsmo of the National Science Foundation writes, national and scientific interests played a part in the development of the IGY. “It is difficult to see where one began and the other ended, for World War II, still burning in individual and collective memories, had demonstrated the power of science and technology well before Hiroshima and Nagasaki.”<sup>10</sup> Military planners saw the Arctic as a gateway straight into the heart of the Soviet Union. Using captured German V-2 rockets, both sides had been experimenting with rocketry and in 1949, the Soviet Union exploded its first atomic weapon, giving both sides the deadly weapon. The pairing of the rocket and the nuclear bomb prompted development of the Intermediate Range Ballistic Missile (IRBM) and the Intercontinental Ballistic Missile (ICBM). Military planners were also “interested in very high-frequency scatter technology for reliable low-capacity communication that could avoid the disruptions caused by solar emissions, magnetic storms, and auroras. Polar observations were essential to understanding those space perturbations, which emanate from high latitudes.”<sup>11</sup> To help merge science and the military, the U.S. created the “newly developed Joint Research and Development Board, which was renamed the U.S. Research and Development Board in 1947. The R&D Board consisted of a civilian chair and two representatives from each service: the Army, the Navy, and the newly independent Air Force. The board reported to the Secretary of Defense. Its primary duties were to prepare an integrated military R&D program, coordinate R&D among the services, and allocate responsibilities for programs. The R&D Board conducted its work through committees, which formed panels and working groups. Each committee, panel,

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<sup>10</sup> Korsmo, 1312

<sup>11</sup> Korsmo, 1312



and working group comprised military and civilian members; together they provided hundreds of forums for civilian–military interactions that encompassed all the physical, medical, biological, and geophysical sciences.”<sup>12</sup> The executive secretary for this organization was Lloyd Berkner, the same Berkner at the dinner. The R&D board had previously discussed many of the topics that the IGY brought up in its meetings. The R&D board had concluded that in order to achieve results as quickly as possible, the U.S. needed foreign expertise to work with the military. In fact, the military funded the meeting, about research in the upper atmosphere, which the British scientist, Sydney Chapman, was on his way to in 1950. Chapman and Van Allen shared the same area of research, Van Allen had begun his atmospheric work using V-2s from the military, and Chapman had spent that day with Van Allen discussing this topic.<sup>13</sup>

## **II. Operation Deep Freeze and the United State Navy**

For the logistical problems of transporting and setting up the scientists and their camps, the NAS turned to the Department of Defense, which in turn, tapped the U.S. Navy to get job done. Due to the sheer size of the proposed operations, no civilian group in the U.S. could handle the operation, and the Navy previously had been to Antarctica.<sup>14</sup>

The first Navy expedition to the Antarctic took place between 1838 and 1842 during the United States Exploring Expedition. Also known as the Wilkes Expedition, the U.S. dispatched six ships of various sizes to explore the Pacific Ocean. The expedition “mapped 1,500 miles of Antarctica’s coast south of Australia in 1839-1840, proving

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<sup>12</sup> Korsmo, 1313

<sup>13</sup> Korsmo, 1314

<sup>14</sup> Belanger, 2-3.

Antarctica a continent.”<sup>15</sup> Richard Byrd graduated from the Naval Academy in 1912 and served aboard two ships before being medically retired in 1916 as a Lieutenant (junior grade). He returned to service many times, the first time when the U.S. entered World War I. During this time, he learned to fly, became commander of Naval Air Station Halifax, and promoted to Lieutenant and Lieutenant Commander. After the war, he planned the first trans-Atlantic flights, conducted an expedition to the Arctic, where he claimed to have flown over the North Pole, rose to the rank of Commander, and was awarded the Medal of Honor.<sup>16</sup> He then conducted several expeditions to Antarctica, the first in 1928 to 1930. Having raised the funds from private investors, he used two ships and three planes to explore the Ross Ice Shelf. A special act of Congress promoted him from Commander to Rear Admiral, even though he was on the retirement list. He led a second expedition in 1933 to 1935, this time with U.S. Government backing. He established the first U.S. base called Little America and he spent five winter months alone in a cabin in Antarctica. He nearly died from carbon monoxide poisoning, but Thomas Poulter, the second in command, and a former professor of James Van Allen, rescued him. In 1939 to 1940, Byrd led a third expedition, called the Antarctic Service Expedition, with the intention of setting up two permanent bases. World War II ended that expedition, but Byrd would return in 1946 - 1947, with Operation Highjump, the largest expedition to date -- 4000 plus men and fifteen ships, including an aircraft carrier, along with numerous aircrafts. They mapped an area the size of half of the United

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<sup>15</sup> *United States in Antarctica*, Report of the U. S. Antarctic Program External Panel. Washington, D. C. April 1997. 17.

<sup>16</sup> Neumann, Caryn E. "Richard E. Byrd (1888–1957)." *Encyclopedia Virginia*. Virginia Foundation for the Humanities, June 22, 2014. Accessed August 2, 2015..

States.<sup>17</sup> The Navy drew up plans for Operation Highjump II, which was to occur in 1949, but canceled the mission.<sup>18</sup>

Since Byrd had led the most recent expeditions to the pole, he was an obvious choice to lead the military part of the IGY expedition to Antarctica. He was also somewhat of a celebrity to the general public, having written several popular books about his past trips, as well as articles for newspapers, and had been heard broadcasting from Antarctica. In fact, President Dwight Eisenhower named him as the Officer-in-Charge (OIC), U.S. Antarctic program, essentially in overall command of the expedition, “and senior U.S. representative charged with maintaining effective monitorship over those political, scientific, legislative, and operational activities which comprise the total U.S. Antarctic program.”<sup>19</sup> After this appointment, Byrd then wrote a piece published in newspapers throughout the United States called “Why We’re Going Back to the South Pole.” It ran in July of 1955, in a Sunday supplemental magazine, and outlined the history of U. S. exploration of Antarctica; including the accomplishments of each expedition. Byrd also presented an itinerary of what he hoped to accomplish with the newest expedition, now called Operation Deep Freeze, and how it related to the IGY.<sup>20</sup> Byrd’s description of the plan seemed straightforward. He described how the U.S. would have three or four bases, and would reuse the old Little America Base as the primary base with around forty scientists and at least as many support personnel. A second base would be located in area called Marie Byrd Land, with the biggest prize being a base at the pole

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<sup>17</sup> US 19.

<sup>18</sup> Korsmo, 1312

<sup>19</sup> Dufek, George J. *Operation Deepfreeze*. New York: Harcourt, Brace, 1957.40.

<sup>20</sup> Byrd, Richard. "Why We're Going Back to the South Pole." *The American Weekly*, July 24, 1955, 10-14.

itself, if possible.<sup>21</sup> Byrd also made a prophetic statement when he said, “It is possible that this time when we return to the Antarctic, the return will be permanent.”<sup>22</sup> Since 1955, the U.S. and Operation Deep Freeze have never left Antarctica.

Besides Byrd, the Navy also wanted another veteran of previous expeditions, Paul Siple. Siple had first gone to Antarctica with Byrd in 1928 when he won a contest for a Boy Scout to accompany Byrd. He was nineteen years old and was part of expedition from August 1928 to June 1930. Since then he had become a close friend of Byrd, received degrees in biology and geology, and made two more trips to the Antarctic. He served as a Captain, later Lieutenant Colonel, in the United States Army during World War II as a cold weather expert and later worked for the Defense Department as a science advisor. In this capacity, he completed another trip to the Antarctic, helped to develop the wind chill factor and worked on planning some of the IGY activities. In the spring of 1955, the Navy formally asked the Army to transfer Siple to them. The request asked the Army to supply “some Weasels, helicopters and Dr. Paul A. Siple.” Siple was flattered that the Navy put him in the same class as essential vehicles.<sup>23</sup> For Operation Deep Freeze he would officially be Director of Scientific Projects for Task Force 43, “with the understanding that I would be called upon to help out as consultant on all other phases of this gigantic undertaking.”<sup>24</sup>

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<sup>21</sup> Byrd. 14

<sup>22</sup> Byrd. 14.

<sup>23</sup> Siple, Paul. *90° South: The Story of the American South Pole Conquest*. New York: Putnam, 1959. 100

<sup>24</sup> Siple, 101

### III. Issues of Command

Byrd was not the only one trying to sell the public on what the U.S. was doing. While Byrd was the OIC, the Commander of Task Force 43, the Navy group tasked with the operation would be retired Admiral George Dufek. The Navy, and perhaps the greater U.S. government, relied on Byrd's status and prestige to help sell the project. Nevertheless, he would not be in the decision-making process. He had a staff and office space, but Dufek would make the decisions. Both Admirals and their staffs believed they were the ones in charge, and the ambiguity of the Navy's orders to each would lead to conflict. While both staffs were involved, for an unknown reason, Dufek's staff seemed to take the conflict personally. They went out of their way to avoid Byrd or his staff from being involved from the beginning. The relations became so bad at one point, that in a personnel meeting between both admirals' staffs they agreed that they owed Byrd courtesy due his rank. However, Dufek still had to "speak to junior members of his staff time and again because some of them ignored or ostentatiously sidetracked the work of the Byrd staff."<sup>25</sup>

One historian put a different spin on the situation, stating that Washington wanted Byrd, but recognized that he was old and frail and not in the best of shape, for these reasons the Task Force was not his to command.<sup>26</sup> Dufek had graduated from the Naval Academy in 1925 and served in submarines, aviation, and most classes of surface ships. He commanded aircraft carriers during both World War II and Korea. He made two trips

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<sup>25</sup> Hoyt, Edwin P. *The Last Explorer; the Adventures of Admiral Byrd*. New York: John Day, 1968. 365

<sup>26</sup> Gillespie, Noel. *Courage, Sacrifice, Devotion: The History of the United States Navy Antarctic Air Squadron VXE-Six Squadron 1955-99*. W. Conshohocken, PA.: Infinity Publishing, 2005. 8.

to the Arctic with the Navy and two trips to the Antarctic with Byrd. When his work on the U.S. Antarctic Committee was finished, Dufek retired from the Navy. Moreover, like Byrd, Congress by a Special Act promoted him to Rear Admiral and put him in charge of Task Force 43.<sup>27</sup> In the March 1956 edition of *Proceedings*, an article written by Dufek outlined how Task Force 43 came about and the preparations it took to bring about Operation Deep Freeze. The Task Force formed on February 1, 1955 and came under the overall control of Commander in Chief, U.S. Atlantic Fleet. Dufek joined the Task Force in June and initiated plans on how to train over 1800 men for cold weather operations as well as how to carry out the requirements of the scientists. They located the headquarters for TF 43 in the old Post Office Building in Washington D.C.<sup>28</sup>

Dufek related his first task as the Task Force Commander: finding his deputy and staff. He had been approved a staff of forty-one officers and ninety enlisted men. He wanted the best he could find. In Dufek's mind, the key job was the Deputy Commander, as this person was involved in all of the planning and operations. The person selected ideally would have a varied naval career, be a senior officer with Antarctic experience, and be able to keep cool under pressure.

I telephoned Captain Gerald (Jack) Ketchum in Seattle and asked him if he wanted the job. He was interested, would go anywhere the Navy ordered him, but would like to think it over. So I called the Bureau of Naval Personnel and said that Captain Ketchum had just volunteered for the job, and could I have him ordered to Washington as soon as possible. Jack had made four polar cruises – two to the Arctic and two to the Antarctic. He had commanded destroyers and icebreakers. In addition he

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<sup>27</sup> Dufek, George. "Operation Deepfreeze Fits Out." *Proceedings*, USNI, March 1, 1956, 279

<sup>28</sup> Siple, Paul. *90 Degrees South: The Story of the American South Pole Conquest*. New York: Putnam, 1959. 100

had all the other things that were needed for the job – the qualities that make for effective leadership.<sup>29</sup>

Dufek got his volunteer.

For his chief of staff, Dufek chose U.S. Coast Guard Captain Charles W. (Tommy) Thomas. The position of Supply Officer was also very important to Dufek. He reflected on how logistics played an important role in winning World War II. He also knew that it would play a large part of this endeavor and would interact with all the other departments. Therefore, he chose Lieutenant Commander Donald Kent, with whom he had personally worked with in the past.<sup>30</sup>

The Navy assigned the task of building the bases in Antarctica to the Navy's Construction Force. Formed during World War II, the group known as the Seabees, had previously been to Antarctica during Operation Highjump. Dufek chose Commander Herbert Whitney to be the leader of Mobile Construction Battalion (Special). Whitney had the reputation as an excellent leader. He would deploy for eighteen months and winter over with the construction crews. Dufek allowed Ketchum to complete the staff, with inputs from both of them, of the various officers and enlisted men they had served with in the past whom they believed would go to Antarctic. To Dufek, they were all volunteers who choose to go on this mission.<sup>31</sup>

Lieutenant Lynn Cavendish disputes this. In his interview with author Dian Belanger, he relates how he was working at the White House in 1955, when someone nominated and selected him to be part of Detachment G of the Seabees without a choice. Detachment G would conduct rapid surveys in the Antarctic, such as for bases and

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<sup>29</sup> Dufek, *Operation Deepfreeze*, 46

<sup>30</sup> Dufek, *Operation Deepfreeze*, 46

<sup>31</sup> Dufek, *Operation Deepfreeze*, 47

runways. Cavendish also relates that it worked out well for him and that he made two different trips to Antarctica.<sup>32</sup> On the other hand, Richard Bowers, also assigned as an officer with the Seabees, relates how he heard about the call for volunteers and did just that, partially because Byrd's name was attached to the operation.<sup>33</sup>

Regardless of how they became a part of the Operation, or how they heard about it, all of the men joined because they had something to offer. Most had interviews that included answering questions from a checklist; the more items the interviewees could meet on the checklist, the more likely they were to be chosen. Some had previous experience in Arctic conditions, or experience with certain pieces of equipment, or they had a reputation of being the best at what they did. Once picked, it was up to the officers and men to prove themselves. Very few changed their minds or backed out. Not that this meant everyone got along, they did not. There were personality conflicts, and egos that could not coexist. Veteran explorers with Byrd's earlier Arctic and Antarctic ventures believed that the new explorers did not show them enough respect; the new explorers felt the veterans were too wedded to the ways of the past. The command would settle these issues, either in Davisville or on the ice.

#### **IV. The Planning of Operation Deep Freeze**

The plan, as outlined by Dufek, called for building three bases (later increasing them to seven) over a two-season period. Ships would move everything from the warehouses in Davisville, Rhode Island "via Panama and New Zealand to the

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<sup>32</sup> "Interview of Lynn M. Cavendish by Dian O. Belanger." 2009. Accessed August 24, 2015. <http://hdl.handle.net/1811/36749>.

<sup>33</sup> "Interview of Richard A. Bowers by Dian O. Belanger." 2009. Accessed August 24, 2015. <http://hdl.handle.net/1811/36750>.



Antarctic.”<sup>34</sup> The equipment and supplies would reach the Bay of Whales at the start of the 1955 season. Subsequently, the teams would construct the first base, Little America V, during January and February 1956. The supplies for the other two bases (Byrd and South Pole) would be stored nearby over the winter so that crews could start working on them in October 1956. Also at Little America would be a snow compacted runway that could support the heavy wheeled aircraft.<sup>35</sup> The South Pole base became part of the operation because of the Soviet Union. During the September 1954 conference in Rome, the American delegation had suggested placing a base at the South Pole, but the conference did not make a decision and the U. S. Navy was not certain it was even possible. Then at the July meeting in Paris, the U.S.S.R delegation showed up late and dropped a bombshell: the Soviet Union would put a base at the South Pole. The Chairman of the conference, a French scientist named Laclavere, told them “We have accepted the offer of the United States to erect and man a South Pole station. We don’t think there should be two stations there.”<sup>36</sup> The U.S. was now committed to making it happen. The overall plans for Operation Deep Freeze called for four different phases, over four different years, with building taking place during phase one and two, with only support offered during phase three and four.<sup>37</sup>

Orders began appearing for the materials and equipment that would be required for the operation. Many would need longer than usually timeframe to acquire due to the uniqueness of the Antarctic assignment. Things such as the permanent structures had to be strong enough to withstand 100-knot winds as well as minus 100-degree temperatures.

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<sup>34</sup> Dufek, George. "Operation Deepfreeze Fits Out.", 282

<sup>35</sup> Dufek, *Operation Deepfreeze*, 48

<sup>36</sup> Siple, 99.

<sup>37</sup> *Operation Deep Freeze I--1955-56: Task Force 43*. Official Cruise Book, 17

At the same time, the structures had to breakdown into small enough parts to fit within the cargo areas of multiple means of transportation (ship, plane and/or sled) within which they would be traveling.<sup>38</sup>

Besides placing orders, the Task Force Commander received authorization “to deal directly with the various Navy bureaus in procuring all necessary supplies and equipment.” Additionally, “The Bureau of Yards and Docks was to provide technical assistance for planning the building and maintenance of bases, for preparing base layout plans, for designing, testing, and procuring all structures required.”<sup>39</sup> In other words, the Task Force was to receive all the help it needed to be successful. Richard Bowers offers a different perspective; he arrived in March of 1955 to Davisville, and in his words: “It was a madhouse.”<sup>40</sup> The chaos was caused in his opinion by the timeframe, six months to learn what they were supposed to do, train, order and receive the necessary supplies, and store the supplies on the proper ship, so it would arrive where it was needed. According to Bowers, those who did not have direct experience with the Antarctic read everything they could get their hands on, including previous expeditions’ reports, so they would know what to expect when training, ordering supplies, etc.<sup>41</sup>

## **V. Logistics and Transportation**

Also during this time, the Chief of Naval Operations dispatched an icebreaker, the USS *Atka* to begin scouting out locations and conditions. It returned in April to make its

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<sup>38</sup> Dufek, "Operation Deepfreeze Fits Out", 281

<sup>39</sup> Dufek, "Operation Deepfreeze Fits Out", 285

<sup>40</sup> "Interview of Richard A. Bowers by Dian O. Belanger." 2009. Accessed August 24, 2015. <http://hdl.handle.net/1811/36750>

<sup>41</sup> "Interview of Richard A. Bowers by Dian O. Belanger." 2009. Accessed August 24, 2015. <http://hdl.handle.net/1811/36750>

report and plans were adjusted accordingly.<sup>42</sup> Commander Glen Jacobsen “did an excellent job of getting ready in short order, and the information he gathered caused us to change our plans radically. Without it, Operation Deepfreeze I would have been a failure.”<sup>43</sup> The original plan called for reusing previous sites, as well as leftover aircraft, the *Atka* found that conditions had changed that would make this impossible. *New York Times* Journalist Walter Sullivan accompanied the expedition, having joined it in New Zealand. When they arrived, nothing seemed familiar, the navigator, Lieutenant Commander Frank Woodke, took sightings and believed the ship was ten miles “inland.” The ship continued to sail west looking for signs of the 1947 Little America IV camp. Finally, a lookout spotted a spinning propeller on one of the ice formations. It turned out to be part of an electric generator placed in 1934 at Little America I, a camp that was further west than Little America IV. A helicopter took off to explore further. Little America III from 1940 was located and appeared intact, but the tents of Operation Highjump, and the nine planes left at Little America IV could not be located. “As Siple had predicted, the entire western side had broken off and floated out as one or more icebergs. Woodke’s navigation had been right all along. The ship was, indeed, ten miles ‘inland,’ ... A section at least as large as New York State’s Long Island had “calved” from the Ross Ice Shelf.”<sup>44</sup>

The Discovery Inlet was gone, the Ross Ice Shelf was ten miles closer to the South Pole, and the Bay of Whales had disappeared. “There was no bay ice on which to unload. The *Atka* faced sheer cliffs one hundred and fifty feet in height. Antenna poles

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<sup>42</sup> Dufek, “Operation Deepfreeze Fits Out”, 284

<sup>43</sup> Dufek, *Operation Deepfreeze*, 42

<sup>44</sup> Sullivan, Walter. *Quest for a Continent* New York: McGraw-Hill, 1957. 303

and markers of Little America I, II, III, and part of IV were visible. The seaward part of IV had broken off and drifted northward. The Bay of Whales was reported as unsuitable for a base.”<sup>45</sup> In the time remaining to it, the *Atka* scouted out other possible sites, but was not able to confirm completely if they would work or not. During one such scouting trip, Operation Deep Freeze suffered its first fatality when a helicopter pilot perished during whiteout conditions; he had flown his helicopter into the ice.<sup>46</sup>

The knowledge gained from the *Atka* meant the plan had to change. Originally, it called for setting up Little America V first; instead, the Seabees would construct a support base near Hut Point on the McMurdo Sound first. As Dufek wrote in his memoirs, the report from Captain Jacobsen and the *Atka*, gave the planners a hard choice. The Bay of Whales and Kainan Bay, offered as a possible site by Jacobsen but not confirmed, were the only known locations that might be suitable between McMurdo Sound and Palmer Peninsula. The Bay of Whales was out as a site, and it would mean a snow compacted runway would have to be built at Kainan Bay, a task that was thought not possible to do in the short season and still have it be usable during the first season. This delay in using the runway was unacceptable and instead they decided to change the location of the base to McMurdo Sound. While it was seven hundred and eighty miles from the South Pole, it was a better option for the flights coming from New Zealand than either of the proposed Little America sites because of the bay ice. It took a much shorter amount of time to construct a runway on bay ice and Dufek was optimistic that the bay ice at McMurdo was strong enough to support the landing and take-off of heavy aircraft. However, as Dufek noted, it was not a sure thing. “Few Americans had ever been in this

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<sup>45</sup> Dufek, *Operation Deepfreeze*, 43

<sup>46</sup> Dufek, *Operation Deepfreeze*, 44

area, and practically all our information was gleaned from reports of past foreign expeditions. We felt confident that heavy aircraft could land on the bay ice of McMurdo Sound... It was a gamble, but we were going to take it.”<sup>47</sup>

The scale of the expedition meant that the staff had to rethink how things had been done in past to see if they would still work for this expedition. For example, it was determined that in order to move freight and other goods around, dog sleds would not work. Instead, “we planned to use tractors. Just plain tractors were impractical because they sank into the snow. What we needed for the heavy work was a thirty-ton tractor that could pull a payload of 100 tons over the snow, yet it had to have less ground pressure per square inch than a man on skis.”<sup>48</sup>

In order to move all the supplies to Antarctica, as well as fly observation flights, the command assembled a fleet and a new squadron. The fleet assigned to TF-43 initially consisted of five vessels: two cargo ships, the USS *Arneb* (flagship), and the USS *Wyandot*; two icebreakers, the USS *Edisto*, and the USS *Glacier*; and a tanker, the USS *Nespelen*. A smaller tanker built with a concrete hull, YOG-70, was assigned later, it would be frozen in the ice as a means of storing fuel for the operation.<sup>49</sup>

The new squadron would be Air Development Squadron SIX (VX-6). While only supposed to be temporary, it would carry out the mission of supplying the aviation needs for Antarctica from the beginning until March 31, 1999 when it finally disbanded.<sup>50</sup> A message went out to the entire U.S. Navy asking for volunteers for the new squadron, just as one had gone out for the Task Force. In all some 5,000 men, Officers and Enlisted,

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<sup>47</sup> Dufek, *Operation Deepfreeze*, 48

<sup>48</sup> Dufek, "Operation Deepfreeze Fits Out", 281

<sup>49</sup> Dufek, "Operation Deepfreeze Fits Out", 282

<sup>50</sup> Gillespie, i.

had submitted their names for the 260 positions.<sup>51</sup> Discussions arose as to which aircraft were best suited for the missions, since there was no consensus, planners agreed to try out different aircraft the first year to see what worked and what did not. VX-6 “went into commission at the Naval Air Station, Patuxent River, Maryland. Commander G. K. Ebbe, USN, took command of the squadron, which was originally composed of two ski-rigged R4Ds [known as the C-47, the Skytrain, the Dakota, or in the civilian world, the DC-3], two R5Ds [known as the C-54 Skymaster], two ski-rigged P2Vs [the Neptune], and two ski-rigged UF-1s [known as the HU-16 Albatross]. Three HO4S-3 [known as the H-19 Chickasaw] helicopters and four ski-rigged UC-1s [the Otter] rounded out the squadron. Freight planes were to be provided and flown by the U.S. Air Force for the South Pole air lift.”<sup>52</sup> The planners estimated that in order to carry out the planned first year flights, the squadron would need some 1,200,000 gallons of aviation fuel.<sup>53</sup> In order to simulate the distances that the planes were to fly, practice missions travelled up and down the east coast of the U.S. Ships transported storable aircraft onboard in crates. Those that could not be transported by ship would have to fly a circular route to New Zealand where they would meet up with the rest of the squadron.<sup>54</sup>

The logistics discussed in Dufek’s article made it clear just how much of an undertaking this was. The ships, air and construction units were to be self-sustaining from the time they departed until the time they returned to the U.S. Nothing could be procured from foreign ports with the only exceptions being fuel and provisions, and possible emergency supplies. In addition, the ships would act as the warehouses for the air and

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<sup>51</sup> Gillespie, 12.

<sup>52</sup> Dufek, “Operation Deepfreeze Fits Out”, 282

<sup>53</sup> Dufek, *Operation Deepfreeze*, 52-53

<sup>54</sup> Gillespie., 16-17.

construction units, providing them with the logistical support they needed. The aircraft and other machinery would need parts and the men would need food, a lot of it, not only during construction, but afterwards as well. In case the ships were not able to get back the following year due to ice, an extra year's supply of provisions was to be cached for the wintering-over parties. Everything had to "be delivered to Davisville where they would be inspected, and stacked prior to September 30, 1955 for loading aboard ship during October."<sup>55</sup>

The Seabees had to order all the tools and spare parts needed to maintain the equipment once they got to the Antarctic. Petty Officer William Stroup, in his interview, states that it was the responsibility of the trade supervisors to think of everything needed to do the job. The CO gave them permission to order within reason all tools and equipment needed; nevertheless, the supervisor forgot some items and the Seabees had to improvise.<sup>56</sup>

Besides tools and spare parts, another issue was clothing. Men not leaving the ships would have one issue. Those on the ice received a different issue. Aircrews, wintering-over, and trail parties all had yet other requirements. At least one group, the trail party, ended up wearing six different layers of clothing with the outer parka and trousers also being in different colors, including brilliant scarlet, black, red, blue, and green."<sup>57</sup>

The Supply Officers also had to find such diverse items as gas pressured trail stoves, pemmican, lumber, trail dogs, canvas, etc. Also needed were medical supplies. As

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<sup>55</sup> Dufek, "Operation Deepfreeze Fits Out", 285

<sup>56</sup> "Interview of William E. Stroup by Dian O. Belanger." 2009. Accessed August 24, 2015. <http://hdl.handle.net/1811/36745>.

<sup>57</sup> Dufek, "Operation Deepfreeze Fits Out", 287

Edward Ehrlich recalls, “We had really to establish and then to supply two separate medical facilities: one at Little America and one at McMurdo Sound. We were really starting from scratch.”<sup>58</sup> Also needed were music records and movies to keep up morale. On top of this, the scientific requirements kept changing, to the point that in order to haul all the goods and equipment, more ships became part of the task force, including the MSTS cargo ship USNS *Greenville Victory*, the Coast Guard icebreaker *East Wind*, and an additional YOG to handle the increased fuel needs.

Dufek believed it had become necessary “to order a paring down of expenses and tonnage, which the staff took in stride.”<sup>59</sup> He gave special attention and commendation to how well the aviators, when ordered to pare down their needs, did so extremely well, implying that perhaps others did not. By June, Dufek states they had nearly spent all of their allotted money, so he sat down with his department heads and cut more than a half-million dollars from their expenditures. This was in 1955 dollars; in 2017 dollars, it exceeds 4.5 million. To do so they had to eliminate buildings, equipment, and any other “plush” item they could find. Dufek recalls, “Our decision to do with less fancy equipment wherever possible meant modifying some contracts already in the mill, and it meant “roughing it” to a greater degree by our wintering-over parties, but no objections were raised at the following weekly staff conference.”<sup>60</sup> The Department of Defense had told the Navy that not only was it responsible for making the operation a success, but also the cost had to come from the Navy’s budget. Dufek, Ketchum and Kent sat down and figured out the costs. According to Dufek, the Navy gave him certain instructions to

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<sup>58</sup> "Interview of Edward N. Ehrlich by Dian O. Belanger." 2009. Accessed August 24, 2015. <http://hdl.handle.net/1811/36741>.

<sup>59</sup> Dufek, "Operation Deepfreeze Fits Out", 287

<sup>60</sup> Dufek, "Operation Deepfreeze Fits Out", 287



guide him for computing the costs. “Discount the cost of the ships, their normal fuel consumption, the pay of the crews, the food they eat, and the other expenses incidental to the normal operations of a naval task force in training.”<sup>61</sup> Everything else would be the cost of the operation. Deep Freeze I cost the United States \$9,124,900 above the normal costs in 1955 dollars. In 2017 dollars, this was \$83,300,000.00. The estimate was that if the Navy fulfilled all the originally recommended measures, the cost would be \$58,000,000 or \$530,000,000 in 2017 dollars. The Navy balked at this and went to the President to ask for more money. President Eisenhower told them to spend \$22,000,000 out of their budget. There would be no additional money, so it would have to cover the cost of the operation. Per Dufek, “it was enough to accomplish our primary mission – furnishing logistical support to the U.S. scientific programs in the Antarctic.”<sup>62</sup> This explains his order to reduce costs; they were running out of money and had not yet set foot in Antarctica.

The training that had to take place before the fleet sailed was also monumental. The Navy sent drivers and mechanics to the Caterpillar factory to learn what it would take to maintain and drive the new equipment; equipment such as the D-8 tractor that weighed thirty tons but because of its 54-inch treads had less downward force than a man did on skis. Other Seabees went to Camp Lejeune, N.C., to learn the Marine Corps method of running cold weather fuel farms. Eventually six enlisted Marine fuel experts received orders to join the team. Seabee officers went to Greenland to learn first-hand how the Air Force built snow compacted airstrips. Still others went to Rhode Island to see

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<sup>61</sup> Dufek, *Operation Deepfreeze*, 50

<sup>62</sup> Dufek, *Operation Deepfreeze*, 51

an actual airdrop using the same techniques that they would use at the South Pole.<sup>63</sup> The Caterpillar Tractor Company went so far as to allow Seabees to work on the assembly line so they could not only understand how the machines were constructed, but also how to repair them. Like many of the elements of the mission, they had to be self-sufficient; they could not send the equipment back to the States for repairs.<sup>64</sup> “There were trips to Wisconsin to inspect sledge construction and trips to Peoria to check tractor treads, among others. Air and construction personnel took advantage of every opportunity to observe airdrops of equipment, ice reconnaissance, and other related problems that might arise in the Antarctic... The trail reconnaissance party had practical and classroom training at Davisville.”<sup>65</sup>

As materials arrived in Davisville, they needed inspection and sorting by their destination and time of arrival. There was no extra staff for this job, so the Cargo officer used Seabees and aviators who were not working on something else at the time. Each item was marked with a color indicating the place of its utilization, and a priority code for the time of its deployment. Blue was for all cargo going to Little America; Yellow was for Air Operating Facility; Brown for Byrd Station; Orange for South Pole Station; Green for Beardmore Glacier auxiliary base; Red for tractor-route and reconnaissance party use; and Black was for the Construction Battalion Survey party and by aviation personnel. In order to make sure of using the right material at the right time, they added a priority code marker they besides the destination color. The materials were also going to be loaded in a

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<sup>63</sup> Dufek, "Operation Deepfreeze Fits Out", 286

<sup>64</sup> Dufek, *Operation Deepfreeze*, 59

<sup>65</sup> Dufek, "Operation Deepfreeze Fits Out", 288-9

special order on the ships and planes, “thus, the materials which would be needed *first* would be loaded *last*.”<sup>66</sup>

All of this had to have full consideration, assignment, and implementation before the items arrived in Davisville. Once the ships were loaded, since they used all available space, there was no way of rearranging the material. Any available leftover space was to contain morale items, books, craft supplies, and photographic materials, especially for the men who would be wintering over in complete darkness for up to six months. “The chaplains outlined other monotony-relieving plans. They would have book clubs, discussion groups, card game tournaments, do-it-yourself kits, and would even encourage the men to keep diaries for the day they might want to publish their experiences.”<sup>67</sup>

Another consideration was food and drink. While the food was the same as served on military bases, there had to be more of it. “While in the Antarctic men eat twice as much as normal in caloric intake. The usual Navy ration is around 3,200 calories. We planned for a ration of 5,400 calories for men doing heavy work,” Dufek wrote.<sup>68</sup> He also noted that the men ate more candy and sweets for the quick energy and the caloric warmth. The task force included alcohol in the rations. Men aboard the ships could not consume it at any time, but the men ashore could. However, there were rules for drinking in Antarctica. The commanding officer made them to drink under supervision at an all hands event and for good reason: “To drink indiscriminately in the

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<sup>66</sup> Dufek, “Operation Deepfreeze Fits Out”, 288

<sup>67</sup> Dufek, “Operation Deepfreeze Fits Out”, 289

<sup>68</sup> Dufek, *Operation Deepfreeze*, 62

Antarctic is dangerous. A man under the influence of liquor could wander off by himself over the ice or go to sleep and freeze to death.”<sup>69</sup>

## **VI. Organization and Training of Personnel**

Selecting men to winter over constituted another challenge. As with all the other positions, this was for volunteers. The Seabee Battalion had two hundred and sixty billets, from which came the selection of the winter over group. Four thousand men volunteered. Dufek claimed selection was done with only a review of the volunteer's records and not a psychiatric examination. However, First Class Petty Officer William Stroup remembers differently. In his interview, he states receiving a psychiatric evaluation from a doctor who was from the Harrisburg, Pennsylvania area near Stroup's home.<sup>70</sup> In any case, officers were the first selected, and they would then have the task of recommending chief petty officers and leading petty officers. The officers, in turn, ask the selected officers and petty officers about others they knew. All would receive thorough medical examinations. “Each man had to pass a physical examination equivalent to that of ‘qualified for submarine duty.’ In our nuclear-powered submarines, it is not the fuel or mechanical equipment that limits the time out on patrol, but rather the limits of human endurance. The situation is comparable at our bases in the Antarctic. During the winter night, with total darkness, the temperature plunged to 70° to 80° [F] below zero; these men would live in close quarters. Tempers would grow short; nerves would be strained.”<sup>71</sup> Once selected, the men underwent observation while they trained to see how they interacted with others -- did they get along with others, were they loners.

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<sup>69</sup> Dufek, *Operation Deepfreeze*, 63

<sup>70</sup> "Interview of William E. Stroup by Dian O. Belanger." 2009. Accessed August 24, 2015. <http://hdl.handle.net/1811/36745>.

<sup>71</sup> Dufek, *Operation Deepfreeze*, 64

They would be studied again during the voyage south, as well as when they got to Antarctica. The final selection would not come until just before the ships left Antarctica.

In this Chapter, we saw how certain individuals such as James Van Allen, Admiral Byrd, and others contributed to the planning of International Geophysical Year and Operation Deep Freeze. The Navy places Admirals Byrd and Dufek, the two most experienced people in charge of carrying out the mission of building research stations in Antarctica. At first the mission seems straight forward -- simply reuse bases and aircraft left over from previous missions as staging points -- but the report from an icebreaker sent to scout out the locations changes everything. Byrd and Dufek now must build the support bases before they could carry out the primary mission and all within a short timeline. The logistics of pulling together all the men, equipment and material needed was monumental. On top of this rested the additional tasks of training the men to be able to do the work in subfreezing temperatures and organizing all the materials so they would be in the right place at the right time.

In the next chapter, we will see how the actual mission unfolded. The hardships faced in working and living in Antarctica was as difficult as conducting the mission itself. While most of the men would adapt and overcome the challenges, some would not survive.

## **CHAPTER II**

### **The Big Show**

With the planning done, the mission began. This chapter will follow the ships as they journeyed south to Antarctica, as well as the difficulties encountered by the air group as they made their way first to New Zealand and then to the frozen continent. When the Seabees got on the ice, they discovered that the plans that had looked so good in Washington needed changing, again. The Seabees also had to adapt due to the Antarctica weather. The meticulous organization of supplies while at Davisville did not survive once the Seabees started unloading the ships. Both sites experienced tragedy during the building process; lessons learned from the tragedy however that made it safer for future groups. In addition, some good news, the air group would finally begin its mission. Despite some friction between the old and the new explorers, goals are accomplished and the wintering over process began.

#### **I. Embarkation**

With all the supplies in Davisville, the ships were loaded. The personnel checked every item and list many times in hope that they forgot nothing important. The story of Roald Amundsen, the Norwegian polar explorer and the first person to reach both poles, forgetting to take snow shovels, served as a warning and a guide for the supply officers and planners.<sup>72</sup> By the normal Navy standards of how to conduct a ship formation, Task Force 43 sailing formation was abnormal. The ships sailed at different times and dates, with some arriving in New Zealand before others had reached Panama. The unusual schedule was due to both Operational and Logistical considerations. The planners

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<sup>72</sup> Dufek, George J. *Operation Deepfreeze*. New York: Harcourt, Brace, 1957, 56

believed that in order to avoid confusion and mistakes, it was best if all the ships were loaded one at a time from one location, Davisville Seabee Center. Some ships, such as the icebreakers, were loaded with the supplies needed at the start, such as reconnaissance tractors, trail provisions, and airfield equipment. This allowed the icebreakers *Glacier* and *Edisto* to sail first, penetrate the ice, and start exploring the landing sites before the other ships arrived. In the meantime, the rest of the Taskforce waited in the Portsmouth and Boston Navy Yards for their turn. All of this was possible with advance planning, allowing the warehouses to separate the materials by individual ships.<sup>73</sup>

By the end of October, the ships had been loaded, were ready to sail, with the official name of Operation Deep Freeze I. Everyone involved in the operation referred to it as “The Big Show.” Besides the U.S. military personnel, representatives of six countries and fourteen journalists accompanied the ships. A huge sendoff in Norfolk, Virginia, attracted many of the Navy’s top leaders, along with IGY scientists, and congressional members. Admiral Byrd was the first of many speakers. “In all, some twenty flag officers, plus members of Congress and other dignitaries took part in the sendoff.”<sup>74</sup>

The icebreakers were the first ships to leave Davisville, being military ships, they carried deck guns, but both the planners and the crews did not plan to use them. The USS *Glacier* (AGB-4) with ten diesel-electric engines, eight-inch steel plate and 30,000 horsepower total was the country’s newest icebreaker. Constructed in Pascagoula, Mississippi, the Navy commissioned her in May 1955; she was the most powerful icebreaker outside of those used by the Soviet Union. By October 19, 1955, she sailed

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<sup>73</sup> *Operation Deep Freeze I--1955-56: Task Force 43*. Official Cruise Book, 49

<sup>74</sup> *Operation Deep Freeze I--1955-56: Task Force 43*. Official Cruise Book, 51.

for Norfolk Virginia and then continued on southward to the Panama Canal and then to Christchurch, New Zealand. To protect the crew against the polar winds and water, layers of cork and glass insulated the hull. This caused the blow decks to be hot to the point that the sickbay, the ship's hospital, had to be air-conditioned. She carried enough fuel to go around the world without refueling, her stores and freezers carried a years' worth of food for the crew. For water, the ship's desalination plant could produce 1600 gallons of fresh water a day from seawater. On the fantail sits the flight deck and hangers for the two seven-passenger helicopters. Once the ship's cranes lift the removable flight deck away, the cargo holds could be unloaded.<sup>75</sup>

Second ship to leave was the USS *Edisto* (AGB-2), fresh from duty in the Arctic where it worked on the Distant Early Warning (DEW) Line; six engines powered the icebreaker. Two cargo vessels embarked next on November 10, the USS *Arneb* (AKA-56), flagship of the fleet for the voyage, and the *Wyandot* (AKA-92). They too would stop in Norfolk for additional cargo, including philatelic mail. The final group would be the US Coast Guard icebreaker USCGC *Eastwind* (WAGB-279), the cargo ship USNS *Greenville Victory* (TAK-236), and the tanker USS *Nespelen* (AOG-55). The two small yard oilers, YOG 34 and 70 came behind the ships in tow and a team would freeze them into the ice at McMurdo to supply fuel for the construction operations.<sup>76</sup>

Besides their normal crew, the ships also carried over 1800 additional military personnel and civilians. The IGY scientists started work early by taking meteorological

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<sup>75</sup> Dempewolff, Richard F. "Ships That Buck the Polar Seas" *Popular Mechanics*, March 1956, 117.

<sup>76</sup> Belanger, Dian Olson. *Deep Freeze the United States, the International Geophysical Year, and the Origins of Antarctica's Age of Science*. Boulder, Colo.: University Press of Colorado, 2006. 64-65



and oceanographic readings en route to the Antarctic. They were “Providing important navigational and hydrographic information... Oceanographer William Littlewood, a civilian with the Navy's Hydrographic Office on the *Edisto*, for example, made physical, chemical, and biological observations of seawater, ocean bottom, and ice over time, space, and descending depths” Oceanographers on six of the task force ships took depth sounding during the entire 200,000 mile journey to either create or correct the nautical charts. The *Arneb* even had a cosmic ray laboratory on its fantail. All of these tasks were secondary to the ship's primary mission, but they could accomplish them with the Captain of ship's permission. The Captain tried to accommodate the scientists since the knowledge gained was useful to the ship.<sup>77</sup> The ships also carried a combat artist of World War II, Commander Standish Backus, and civilian artist Robert Haun. The artists' job was to supplement the official photographs with pictures and paintings of Antarctica.

The early leaving ships hit storms on the way to Panama, which the later leaving ships missed. “The *Glacier* and the *Edisto* towing YOG's were rolling heavily in high seas. Rolling was so severe that the tableware kept sliding off and breaking on the deck. In place of meals, sandwiches were passed around for a number of days.”<sup>78</sup>

As each ship crossed the equator, the crew took time to induct first timers into the “shellback” community, a time honored tradition in U.S. Navy. For the *Arneb*, the induction took place on Thanksgiving Day. Instead of giving them the usual trimmings, the veterans squirted the first-timers or “Pollywogs” with grease, or forced them to crawl through a slimy mess of various items, all so they could prove to King Neptune they were worthy. On the *Arneb*, Neptune would be Admiral Dufek himself, with a mop for hair

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<sup>77</sup> Belanger, 66.

<sup>78</sup> Dufek , 76

and a broom handle as a trident.<sup>79</sup> Another tradition included beards for many of the crew. Navy regulations permitted the beards while at sea, with the permission of the ship's Captain.

## **II. New Zealand**

The aircraft capable of the long distance flight made their way from Naval Air Station Patuxent River, Maryland to Wigram Air Force Base in Christchurch, New Zealand. They stayed there until the runway was ready at McMurdo Sound in Antarctica. As the ships and aircraft arrived in New Zealand, large and enthusiastic crowds met them; they were some of the first American military men seen in New Zealand since the end of the World War II. Besides the official welcoming ceremony, many of the Americans went to informal welcome parties and excursions to the surrounding countryside. An advance element for the task force, headed by Captain Ketchum, had arranged for docking facilities, fresh supplies and other items.<sup>80</sup>

At Christchurch VX-6 suffered its first loss. The *Greenville Victory* was offloading three Sikorsky HO4S-3 helicopters on to the dock. The team decided to take the one stored on deck for the voyage for a test flight. The pilot was U.S. Navy Reservist Lt Commander Lathrop, who had served in World War II and the Korean War. Also on board was Machinist Mate Frank Hoops. As the helicopter rose, its tail hit an unnoticed overhead wire and broke off. Onlookers saw Lathrop deliberately maneuver towards the bay rather than try to set back down on the wharf. An eyewitness, Captain Duchowski, stated, "That young man acted with great presence of mind. On the fantail were several bottles of acetylene and below decks aviation and diesel. If he had gone into the ship and

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<sup>79</sup> Dufek , 75

<sup>80</sup> Dufek, 77-79

one of those bottles had been cut open – well you know what happens when acetylene gas hits air – poof, and that would sure have been something.”<sup>81</sup> By avoiding loss of life, the helicopter crashed into the bay, where, after a moment floating, it sank 30 feet to the bottom, leaving bubbles and an oil slick for the hundreds of onlookers to see. A sailor from the *Greenville Victory* rescued the two. He dove overboard swimming down and helping to free them from the wreckage. The personnel learned a valuable safety and maintenance lesson; take nothing for granted on this mission. Commanders decided the next day that all operable aircraft would begin flying each day to test out equipment, especially the radios with which the pilots had been having some issues. Personnel conducted repairs in New Zealand before heading for the Antarctic.<sup>82</sup>

### **III. Antarctica and McMurdo Sound**

On December 10, Captain Ketchum with the *Glacier* and *Edisto* left Christchurch for Antarctica. Their job was to cut a path through the ice for the other ships and then head to McMurdo Sound to setup the runway for the taskforce aircraft. The rest of the task force was to head south eight days later. Admiral Byrd and Paul Siple had flown down to New Zealand; they joined the *Glacier* for the trip. On the 16<sup>th</sup>, the icebreakers radioed that they had already gotten through the icepack and believed possible for rest of the task force to as well. Heavy ice stopped them at McMurdo Sound, near Ross Island, which was some forty miles from the ultimate destination of Hut Point. Hut Point included a hut from the 1901 Discovery Expedition of British Captain Robert Scott.<sup>83</sup>

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<sup>81</sup> Gillespie, Noel. *Courage, Sacrifice, Devotion: The History of the United States Navy Antarctic Air Squadron VXE-Six Squadron 1955-99*. W. Conshohocken, PA.: Infinity Publishing, 2005. 21.

<sup>82</sup> Gillespie, 22

<sup>83</sup> Belanger, 74

Admiral Dufek, not wanting to waste any time, moved up the departure schedule, and ordered the fleet to depart at 1400 that day.<sup>84</sup> The departure was so sudden that over twenty US Navy personnel missed the ships leaving and would only join the rest in Antarctica when an icebreaker returned in a few weeks to bring back mail and other things.<sup>85</sup> As the ships headed south, they stopped and waited individually at predetermined waypoints along the meridian 170° east, the path for the VX-6 planes. The ships were to stay on station to “provide weather data, communications, homing beacons, and rescue facilities if needed.”<sup>86</sup> The distance from the airfield in Christchurch (Wigram) to McMurdo was almost 2,400 miles, well within the range of the R5D Skymasters and P2V-2N Neptunes, but outside the range of R4D-1 Skytrains and the HU-16C Albatrosses. To assist them, command ordered the transportation of the airplanes to the city of Dunedin, to Taieri field, which knocked the distance down to about 2,200 miles, but they would still need favorable tailwinds to make it.<sup>87</sup> If necessary, the overloaded Skytrains and Albatrosses could also use JATO (jet-assisted take off) rockets to get into the air and it turned out that it was.<sup>88</sup>

Since the Seabees landed forty miles from Hut Point, they had no choice but to set up tractor trains and move themselves and all the supplies. They would leave behind some men to prepare the ice runway, while the rest would layout the camp around Scott’s hut.<sup>89</sup> On December 19, the ice runway was ready, and the Seabees sent a message to

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<sup>84</sup> Dufek, 80

<sup>85</sup> Gillespie, 24

<sup>86</sup> Dufek, 80

<sup>87</sup> Gillespie, 23

<sup>88</sup> Gillespie, 24

<sup>89</sup> Belanger, 72-73

Squadron VX-6 to ready and launch the aircraft the next day.<sup>90</sup> At 4:00 a.m., with the eight planes readied, the pilots ate breakfast and got their final briefing and then it was to the runway to take off, from both fields. The planes flew low for the first few hundred miles before they climbed to their cruising height. As they passed over each ship, they received weather reports. The first ship was the *Greenville Victory*, 250 miles from New Zealand; the second was the *Wyandot*, at 500 miles. At this point crews rechecked fuel calculations. Instead of the desired favorable tailwinds, the planes were battling 30-knot headwinds. The Albatrosses and the Skytrains had to turn around. At least one aircraft wanted to continue: Lt. Shinn radioed, “Strong headwinds – Don’t think we can make it to McMurdo. Request permission to continue and in emergency crash land on Cape Adare.” While Dufek admired their determination and courage, he refused their request. Dufek knew that not only could the aircraft be lost, so could the crew. The risk was not worth it. The returning aircraft landed on a flare lit runway just as dusk was falling.<sup>91</sup> At Taieri, the returning crews ran into Mr. Browne, the resident New Zealand meteorologist, and acknowledged that he had been right at the briefing before takeoff. Mr. Browne had recommended against taking off, predicting headwinds, the opposite of what the U.S. Navy experts had predicted.<sup>92</sup> After fourteen hours of flight, the two Neptunes and the two Skymasters landed at McMurdo. These were the first planes from outside of the Antarctic to land on the continent.<sup>93</sup> The Neptunes still had plenty of fuel after the flight and received orders to conduct reconnaissance flights along the Royal Society Range and the Ross Sea Ice Shelf. One pilot agreed, while the other refused. Once the planes had

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<sup>90</sup> Dufek, 84

<sup>91</sup> Gillespie, 29

<sup>92</sup> Gillespie, 30

<sup>93</sup> Dufek, 85

arrived at McMurdo, the ships left their stations and sailed to McMurdo. The planes' crews spent the night aboard the *Edisto*, where they enjoyed a steak dinner, before moving into a tent camp at Hut Point, the temperature being minus 38 degrees. A UC-1 Otter and the two remaining HO4S-3's went up to scout the ice and look for a site for the mission's base camp.<sup>94</sup>

However, what was the status of the aircraft that had returned to New Zealand? Operational command soon decided that the Albatrosses would not attempt a second try to get to the Antarctica and instead remained in New Zealand as rescue aircraft, eventually returning to the United States. The R4-D's were still wanted for transportation purposes, and it was believed that they would fly south the second week in January. At Cape Adare, the Seabees constructed an emergency strip and stocked it with fuel, thus giving the R4-Ds a stopping place within their range, with about 400 miles to McMurdo. On January 23, they abandoned this plan and the planes returned to the United States.<sup>95</sup>

While the fliers bedded down in their tent camp, the two icebreakers, *Edisto* and *Glacier*, proceeded to Scott Island to meet the cargo ships. Scott Island marked the northern end of the Ross Sea ice pack. The icebreakers would escort the cargo ships through the pack ice to McMurdo. When the *Edisto* was 478 miles from McMurdo, it received a new set of orders to reverse course and return at best speed to McMurdo. An UC-1 Otter had crashed on takeoff with seven men aboard. *Glacier* continued the mission and escorted the cargo ships by itself. The Otter had been shuttling cargo and people from the off-loading site of the ships and the base at Hut Point, a forty-mile trip. The plane was able to broadcast an SOS that the tent camp picked up and a Neptune, with

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<sup>94</sup> Gillespie, 31

<sup>95</sup> Gillespie, 30-31

less than an hour's worth of fuel, took off to pick up the injured. The camp had only basic medical supplies, so it attempted to summon help with the camp radio; unfortunately, the radio had stopped working. The camp officers then decided to send up a Skymaster, also with only about an hour's worth of fuel onboard, to try contacting the ships with its radio. The effort failed, but Auckland, New Zealand received the message, relaying it to the *Arneb*, which then contacted the *Edisto*. Adding to the misery of the injured and their rescuers, as they awaited the *Edisto*, a blizzard descended onto the camp and made living conditions even worse. Once the *Edisto* arrived, they transferred the injured to its sickbay where it was determined that no one was seriously injured.<sup>96</sup> Squadron VX-6's Commander, G. K. Ebbe, ordered an Aircraft Accident Investigation Board, and Commander Ed Ward served as the senior investigator. That board found that the accident was completely pilot error, and that the pilot, Captain Hawkes, was unqualified to fly the plane but had used rank and position, he was the Senior Air Advisor for Dufek, to take over the flying duties from a junior but qualified pilot, and had incorrectly set the trip tabs, thus causing the accident.<sup>97</sup>

The blizzard also affected the tractor trains. One group, pinned down near the ice edge for sixteen hours, rode out the delay somewhat pleasantly since they had tents, provisions and radio contact with the Hut Point group. Another group was not as lucky. Seabee Commander Whitney had set out with a small group to bridge a crack in the ice that was about half way between the offload site and Hut Point. The four-man group traveled in a M29 Weasel with timbers and tools and soon encountered whiteout conditions. As a precaution, one member skied ahead to lookout for any danger. Despite

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<sup>96</sup> Dufek, 86-88

<sup>97</sup> Belanger, 73

this, the Weasel still fell into a snow-covered crack. Stuck, with water bubbling up into the machine, the Seabees got out of the vehicle and into winds gusting to 70 miles per hour. Knowing that no help would be arriving soon, the Seabees fashioned a makeshift tent from a parachute and waited twenty-six hours before the weather cleared and help arrived. From this point forward, all crews leaving camp carried survival and communication gear.<sup>98</sup>

#### IV. Little America V

While work was progressing on the station and runway at McMurdo, Operational command held a meeting to determine where to set up the other base, Little America V. Paul Siple had to evaluate each potential site in person.<sup>99</sup> The original plan was to put it near the other Little Americas, but the *Atka* had found that this was not feasible. It was decided however to reevaluate the site and confirm that it was unusable. The *Edisto*, the *Wyandot* and the *Nespelen* stayed at McMurdo to complete the unloading of supplies and the construction of facilities. The *Eastwind* along with the YOG 34 would also go to McMurdo when it arrived from New Zealand. Admiral Dufek in the *Glacier*, along with the *Arneb* and the *Greenville Victory*, sailed for the Bay of Whales. Captain Ketchum remained to oversee the work at McMurdo Station. Once they arrived, it took only forty-five minutes in a helicopter to confirm that the site was unsuitable for the off-loading of supplies. Admiral Byrd and several other members of past expeditions flew by helicopter to the old Little America site for a flag raising ceremony to reflect upon and commemorate those expeditions.<sup>100</sup>

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<sup>98</sup> Belanger, 75-76

<sup>99</sup> Siple, 118

<sup>100</sup> Dufek, 90-91



The small fleet then checked out two other possible sites: Kainan Bay, which the *Atka* had suggested using, and the Okuma Bay, which the *Atka* said might have possibilities. Kainan Bay was thirty miles away and upon arriving ships deployed a survey party. “The helicopter returned with the survey party and landed on the flight deck of the *Glacier*. All were unanimous in their enthusiasm for this area as a base site.”<sup>101</sup> Dufek then sailed for Okuma Bay, another sixty miles away. Everyone noticed the wildlife, with flocks of birds in the air, as well as penguins, seals and whales in the waters. Hopes were high that this was the site because it would be a little closer to the Byrd Base, which was important since they would be hauling supplies by tractor train and every mile saved meant less time, fuel and manpower, but it was not to be. All around the bay were sheer ice cliffs that were one hundred and twenty-five feet high. There was also no bay ice. Both of these combined meant there was no easy way to unload the ships.<sup>102</sup>

Kainan Bay was the only choice. The ships headed back and prepared the site for the base. The first task would be creating a safe area for the ships to unload. It was not possible to bring the ships all the way to the land because of the ice. With the bay ice three feet thick, “...it would be necessary for the *Glacier* to break out a slip two miles deep by one mile wide where the cargo ships could be moored, reducing the length of cargo haul and giving protection to the ships from the ocean swell.”<sup>103</sup> The icebreaker did the job by ramming the ice, forcing itself up onto the ice, and then the weight of the ship caused the ice to break and shatter. The job took less than a day. The ships moored in the

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<sup>101</sup> Dufek, 92

<sup>102</sup> Dufek, 93

<sup>103</sup> Dufek, 95

newly created slips by means of deadmen, heavy wooden planks with wire wrapped around, then imbedded and frozen into the ice.<sup>104</sup>

With its work done, the *Glacier* went back to McMurdo Sound. The *Arneb* and the *Greenville Victory* docked into the slip and began unloading all the cargo. Officers and Enlisted worked side by side, twelve on and twelve off, taking advantage of the twenty-four hour sunlight. A galley served four meals a day, along with coffee and snacks. An endless cycle of work, eat and sleep occupied the men until the job was finished.<sup>105</sup>

To move the cargo, the Seabees brought several vehicles. Weasels could pull small loads on wooden sleds, but these would not move the cargo very fast. Moreover, everything had to come off the ships, from helicopters and small planes, to sleeping bags, tents and medical supplies. To move the majority of the cargo, the Seabees had their ten thirty-five ton tractors crawl at a steady pace while pulling two eleven ton steel sleds with V-shaped runners.<sup>106</sup> Emergency camp equipment was also unloaded in case the ships had to leave without all the men, those left behind would be able to survive until rescued.<sup>107</sup> What started out as an orderly unloading soon became anything but. Cmdr. Paul Frazier, task-force ship operations officer, would describe the plan as “foolish and costly,” it had looked good back in Davisville, but as the bay ice started breaking up in the warm summer temperatures, it was any but a good plan. They pressed all hands into service of moving all the unloaded supplies off the ice and up to the campsite. Without

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<sup>104</sup> Dufek, 96

<sup>105</sup> Dufek, 97

<sup>106</sup> Dempewolf, Richard F. "The Seabees Build a Town. Part I" *Popular Mechanics*, April 1956, 268+270.

<sup>107</sup> Dufek, 97

some of it, there would have been no way to over winter at Little America that year. However, in their hurry to move the supplies, organization of the materials was lost. They put supplies of all types onto the sleds and the Seabees drove them to the campsite, upon arrival, if there was no forklift available, they would push the items off the sled to remain where they fell. All of the color-coded plans were for naught. To add insult to injury, as the contents of some of the boxes, crates and barrels were needed, the Seabees would break open the containers and rummage through to find the needed items, often spilling what was not needed onto the ice and snow. There was no hope for an accurate accountability. "Supplies were all over the place in absolutely no system about it at all," said Mehaffey, the Little America Supply Officer during an interview. While they knew where the food was located, it would take several months to sort out the rest of the materials.<sup>108</sup>

Many of the men worked outside their normal rates or jobs. Yeoman Lucier was supposed to work in the Administration Office in Little America, but before he could do that, he had to help unload the ships. He found himself unloading and hauling materials across the ice shelf, working with the carpenters or the electricians. Setting up the camp had priority over everything else.<sup>109</sup> As the work progressed, the permanent buildings slowly arose. The first began on January 5, 1956. When completed, it meant that the men could move out of cold tents and into the warm buildings. Construction began to pick up as this happened, the morale improved, and the men got better food and rest.<sup>110</sup>

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<sup>108</sup> Belanger, 111

<sup>109</sup> "Interview of Richard Lucier by Dian O. Belanger." 2009. Accessed August 24, 2015 <http://hdl.handle.net/1811/36740>

<sup>110</sup> Dufek, 98

## V. Hidden Dangers

Crews found a hidden danger on the snow trails in the form of crevasses--voids in the snow. Sometimes these crevasses were in plain sight, but often they lay hidden under a very thin layer of material. In years past, a party would have someone tied to a rope proceed ahead of them with a fourteen foot long probing stick and that person would stick the rod into the snow or ice and try to determine if it was solid underneath or not. With the weight of the vehicles that the Seabees brought, and the speed necessary to move the material, this method was not going to work. The Army Corps of Engineers at Fort Belvoir developed a detector attached to a Weasel. Army Chief Warrant Officer Silas Bowling helped develop it with his years of experience in Greenland and came along with Deep Freeze to offer advice on its use. The detector consisted of three metal plates, one out front on a non-conducting boom and two dragged behind the Weasel. By sensing the difference in the electrical fields when encountering a void instead of solid material, the unit could tell when there was a hidden crevasse.<sup>111</sup> However, it could not stop all the hidden dangers.

Ice had to be thick enough to support the weight of the machines. To test for this, Dr. Willis Tressler of the U.S. Hydrographic office brought a twenty-foot long motor driven auger. "Hauling it by sledge, Tressler and his crew worked along the trail gouging deep holes at intervals. Ice ran from five to twenty-five feet thick when offloading began."<sup>112</sup> However, bay ice melts from the bottom up because organisms called diatoms that coat the underside of the sea ice. They are brown in color and absorb the heat of the

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<sup>111</sup> Dempewolff, Richard F. "The Seabees Build a Town. Part I" *Popular Mechanics*, April 1956, 274+276.

<sup>112</sup> Dempewolff, Richard F. "The Seabees Build a Town. Part II" *Popular Mechanics*, May 1956, 100.

sun. Thus, ice that had been thick enough when tested could melt and become a danger later on.

## **VI. Conflict between the new and the old**

Dufek chose Lieutenant Commander Bursey, of the United States Coast Guard Reserve and a Byrd veteran of two other expeditions, to map out a safe trail to the Byrd station. His team established a fuel dump about half way there. Bursey's experience clearly shows how the new and old explorers conflicted with each other. In his memoir, Bursey says, "the life and spirit of Antarctic exploration, as I knew it, had vanished." Moreover, why did he feel this way? Because they were not using dogs, and were instead using tractors, planes, and helicopters.<sup>113</sup> He further felt that by using machines, they "added more to the human risk and increased the dangers of the Antarctic."<sup>114</sup> The Seabees felt differently. Chief Warrant Officer Victor Young, who was the Operations Officer at Little America, did not believe Bursey knew anything about using machines or equipment. In his interview, Young goes on to say that because of these convictions, he choose men to go with Bursey who were very knowledgeable about the equipment.<sup>115</sup> George Moss, who was in the trail party, remembers that Bursey wore the same clothing as everyone else, except for his footwear, instead having "his mukluks and not the latest insulated boots – his reindeer mukluks."<sup>116</sup> There was conflict even about what food to bring with them. Bursey believed that the best item to bring along to feed the seven men

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<sup>113</sup> Bursey, Jack. *Antarctic Night; One Man's Story of 28,224 Hours at the Bottom of the World*. New York: Rand McNally, 1957. 203

<sup>114</sup> Bursey, 229

<sup>115</sup> "Interview of Victor Young by Dian O. Belanger." 2009. Accessed August 24, 2015 <http://hdl.handle.net/1811/36736>

<sup>116</sup> "Interview of George Moss by Dian O. Belanger." 2009. Accessed August 24, 2015 <http://hdl.handle.net/1811/36754>

was pemmican, with just a few ‘delicacies’ to supplement it. The men on the other hand told him that the pemmican tasted terrible and refused to eat it. Bursey believed, based on his previous experiences, that if the men were hungry enough they would not only eat it, but also love it. Therefore, he cooked a bunch up and ate it. This only led to the men calling him "Pemmican Jack."

The men then assembled what food they believed was necessary for the expedition. "When I looked over the rations selected, I was astonished. I found steaks, eggs, hams, oatmeal, bacon, beans, ninety loaves of bread, all kinds of fruit juices, peaches, pears, apricots, and other delicacies. And there was cocoa as well as tea and coffee for our hot drinks. This was all real luxury, so far as I was concerned, and unheard of in all the annals of polar traveling. And it was a diet that loaded one sled which could otherwise have taken seven drums of gasoline."<sup>117</sup> Moss, when told of what Bursey wrote, was befuddled. There was no need to take seven drums of gasoline with them because "the airplanes came and dropped it to us."<sup>118</sup>

The conflict seemed more than just a difference in opinion, or old way vs. new ways, but instead had to do with confidence and trust that the man knew what he was doing. Young, believing that Bursey had done a poor job marking the trail and had missed crevasses, leading to the loss of Max Kiel, wrote in his diary "Don't trust trail marked by Bursey" and recommended to Dufek that another way and trail had to be found. Dufek would later say that choosing Bursey had been a mistake.<sup>119</sup>

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<sup>117</sup> Bursey 208-209

<sup>118</sup> "Interview of George Moss by Dian O. Belanger." 2009. Accessed August 24, 2015 <http://hdl.handle.net/1811/36754>

<sup>119</sup> Belanger, 119-120

## VII. Death at McMurdo Station

Rather than journey to McMurdo with the *Glacier*, Dufek flew back in a P2V. It took him two and a half hours to cover the over four hundred miles. He then went aboard the *Edisto*, where he received briefings from Captain Ketchum and others on what had happened since his departure. What he found out shocked him. The site chosen because of all the positives it had, also had a huge negative. It had good things such as a large area for the base, a fresh water lake to supply drinking water, a place for the YOG to frozen into, and an area for the airfield; but it was forty miles from where the cargo was unloaded. Moreover, those forty miles had caused the sailors a lot of hard extra work. The Seabees had to either repair or go around the bad spots on the trail from the ships to the base, so much so that “the actual distance traveled one way by the tractors from ship to base was fifty miles.”<sup>120</sup>

On Friday, January 6, tragedy struck. A 35-ton D-8 tractor driving along the tractor trail that crossed the bay ice became the instrument of the first death at McMurdo Station. A crack had formed in the ice and the crews decided to bridge the gap with a prefabricated Bailey bridge.<sup>121</sup> Bailey bridges were a portable, pre-fabricated, truss bridge developed by the British during World War II for military use that does not require any special tools or heavy equipment to assemble. Driver Third Class Richard T. Williams was driving a newly unloaded tractor across the Bailey bridge when it gave way under the tractor’s weight. Builder First Class Charles Bevilacqua, Williams’ friend, witnessed the accident. Prior to the accident, they put the bridge in place and drove a

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<sup>120</sup> Dufek, 100-101

<sup>121</sup> Dempewolff, Richard F. "The Seabees Build a Town. Part II" *Popular Mechanics*, May 1956, 100+101.

small D-4 tractor across to test it. When the tractor reached the other side, it continued for forty or fifty feet before turning around and coming back. In retrospect, there were signs that something was not right, but those signs had been ignored.

Then Williams got in the bigger, heavier D-8 tractor. We unhooked the sled and Williams started to drive across the open crack, over the bridge. I was walking alongside of the D-8 with Chief Wise. We were watching as things were going along. We were walking right alongside the tractor. I think Chief Wise was on one side and I was on the other. Williams got up on the bridge and that was fine and it held, but more water came up than the smaller tractor. But again, we didn't see the signs. We wanted to just keep going.

Willie went about forty or sixty feet beyond the bridge, and then all of a sudden the tractor just broke through the ice. And I'm yelling at him, "Jump!" And he's yelling at me, "Jump!" Everybody's just yelling "Jump!"...The D-8 toppled over, hit me, dragged me down under the water with Williams. He was leaning out the door when I saw him, heading out the door, because I was looking at him yelling "Jump!"

I went under the ice and now the tractor is gone because the water is very deep, something like 600 fathoms, 3,600 feet deep, but we didn't know that at the time. I ended up under the ice and struggled to get through. Well, my clothes buoyed me up right away, and I was a good swimmer anyway. So I struggled to the surface, and as soon as I struggled to the surface, I said, "Where's Willie?" Immediately up came an empty gas can that was inside the tractor. A red five-gallon metal can—we didn't have plastic in those days. Up came a red metal gas can, and I remember grabbing that and flinging that, just throwing it to get it out of the way because I was pushing ice out of the way to make a hole for Willie and trying to find him under the ice.

Now at this point my clothes are now starting to get wet and I started to sink, so the guys hauled me out. I immediately took my clothes off. This is my buddy. He's right there. My friend is right there. I was right there, he had to be right there. I took my heavy outer clothes off and my boots and I jumped back in again into the water and broken ice. I started pushing ice away. I'm all shook up, I'm all excited, the adrenaline's going like crazy. I'm twenty-five years old, my friend is right here. If I can just make a hole, Willie will pop up and we'll get him out of the water.

Well, up came a seat, and I remember yelling, "Here he is! Here he is!" because I could see... I'm making a hole and here comes this thing. Well, it was the seat from inside the tractor. That was too heavy for me to move, and I couldn't move that, but I was kind of using it as a little bit of buoyancy as I was kicking ice out of the way and I'm yelling, "Willie! Willie! Willie!" But of course Willie didn't come up. And now I feel that



I'm starting to get very cold, so the guys dragged me out. I crawled up onto the ice, sank to my knees and started praying.<sup>122</sup>

The men who witnessed the event and the ones who heard about it later were devastated, but the work continued.<sup>123</sup> The overwintering party would build a memorial to Williams that remains there to this day.

The tragedy did bring a positive outcome: it spurred a decision that in retrospect made a difference in safety and speed. Captain Ketchum ordered the icebreaker *Glacier* to cut a path closer to the station. In thirty hours, the *Glacier* cut through the ice to within seven miles of the station. To use the new path meant handling the cargo three times, but it was quicker. The new routine started when the icebreakers loaded the cargo from vessels in open water and then took it up the path to the sleds. Tractor trains then moved the sleds seven miles to the base where it was off-loaded.<sup>124</sup>

### VIII. Aviation Operations at McMurdo Station

While work progressed on setting up the permanent facilities at McMurdo Station, the aviation operations began as well. Squadron VX-6, with its two R5D and two P2V aircraft, began mapping operations of the continent. The McMurdo airfield was a row of red flags on the ice. The unit slept in tents pitched near the aircraft; they had no galley, but instead ate C rations. Their biggest problem was fuel. They were thirty miles from ships that had it. The squadron leaders discussed and attempted several ideas, including having helicopters ferry fifty-gallon containers from the *Nespelen* to the airfield. They quickly realized this proposal to be completely inadequate since the P2V alone required 3,000 gallons. A second option was to use tractor trains to bring the fuel. However, it

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<sup>122</sup> "Interview of Charles Bevilacqua by Dian O. Belanger."

<sup>123</sup> Dufek, 101

<sup>124</sup> Dufek, 102

was realized that this would stop all other unloading operations. The final plan involved some risk. The aircraft of Squadron VX-6 would take off from the airfield and then land on the ice next to the tanker. "There was always the risk of the ice at the ship breaking under the aircraft, but this outfit seemed to thrive on danger and live under the banner of Dame Fortune."<sup>125</sup> Some of the maintenance issues that the Antarctica sub-freezing weather caused the mechanics and pilots included fuel lines that split because of ice crystals forming, oil solidifying and round tires freezing into square shapes. The intense cold would also freeze grease, not allowing wheels to turn. It also froze skis to the ground, requiring them men to pry them loose.<sup>126</sup>

With the fuel situation solved, VX-6 began to fly its missions. Dufek would call the target areas the planes were to explore "Areas or Poles of Inaccessibility." Many of the planes were equipped with triple lens automatic mapping cameras, while the navigators would take sun fixes and plot them on their maps.<sup>127</sup> On January 3, an R5D flown by Hal Kolp took off to map from the air Wilkes Land. It took its name from Lieutenant Charles Wilkes, USN, who spotted it during an early 1832 expedition. Along the way, Kolp encountered whiteout conditions and had to change direction and fly toward the South Pole. "It was a flat snow surface with no discernible features. He flew around the South Pole for thirty minutes and determined that the pole was at an elevation

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<sup>125</sup> Dufek, 105

<sup>126</sup> Dempewolff, Richard F. "We'll Conquer Antarctica With Wings." *Popular Mechanics*, July 1956, 224+226

<sup>127</sup> Dempewolff, Richard F. "We'll Conquer Antarctica With Wings." *Popular Mechanics*, July 1956, 72.

of 9,700 feet.”<sup>128</sup> This was only the third flight and the second person to fly over the South Pole. Admiral Byrd had flown the two previous times.

January 5 saw the next flight, a 2,200-mile circular journey by Lieutenant Commander Jorda. Some of the flight was over more of the featureless terrain, but Jorda also discovered several large mountain ranges with peaks rising up to between 10,000 and 12,000 feet. Snow only partially covered some of these mountains and Jorda could see brownish rock from the air. The third flight took off with assistance of eight Jet Assisted Take-Off (JATO) pods. The aircraft was heavily loaded with fuel, enough to make a fourteen and half hour round trip across the Antarctica continent, a first, and thus needed the pods to help with the take-off. The plane covered 2,600 miles on January 5 and 6 with pilots Torbert and Hawkes. JATO pods would see regular use in Antarctica in the following years.<sup>129</sup> Flight number four on January 6 and 7 started well, but the P2V experienced engine problems so serious that the crew had to take drastic actions. Again, Kolp was at the controls. The starboard engine began to fail and lose power; the plane dropped to 6,000 feet but needed to clear a 12,000-foot icecap. The crew quickly began to ditch everything they could to reduce the weight, keeping only the radio and the survival kits. “They knew no ground rescue party could travel the 1,000 mile round trip across Antarctica’s hazardous, unexplored interior to reach them. Their forty-five day survival rations and equipment couldn’t see them halfway if they tried to ‘walk out’”<sup>130</sup> The engine completely failed ten minutes before it touched down safely back at

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<sup>128</sup> Dufek, 105

<sup>129</sup> Dufek, 106

<sup>130</sup> Dempewolf, Richard F. “We’ll Conquer Antarctica With Wings.” *Popular Mechanics*, July 1956, 74.

McMurdo.<sup>131</sup> On January 7, Colonel Kolp flew over the South Magnetic Pole while on a 2,700-mile flight. The next day, Admiral Byrd boarded a plane that flew to and circled the South Pole, becoming the first person to do so three times, in 1929, 1947 and 1956.<sup>132</sup>

With the flying season coming to end, and the ice over which they built the runway deteriorating, they needed to reach a decision whether to send the planes to New Zealand and safety or try to make one more flight. The reason for the flight involved exploring more territory from the air. All prior flights had been in the areas closest to Australia, what needed mapping and exploration by all was the area closest to Africa. Dufek believed the risk was worth it, while acknowledging the real danger was not in loss of life, but in the potential loss of the four large aircraft. If he was wrong and the ice the planes were parked on broke off into too small of a piece, the planes may not be able to take off. Dufek would then have to explain to his superiors why two million dollars of aircraft were lost and drifting on the ice out to sea. Dufek decided on three flights designated Able, Baker, and Charlie. Flight Able, commanded by Kolp would go to a point on the map at latitude 82° south and longitude 20° east. Flight Baker, would have pilots Jorda and Ebbe flying to latitude 81° south and longitude 62° east. Flight Charlie saw pilots Torbert and Hawkes do another cross-continent flight to the Weddell Sea. All went according to plan and were successful. Flight Charlie was perhaps had the most success as it discovered four previously unknown mountain ranges on the trip to the Weddell Sea and discovered even more on the trip back.<sup>133</sup>

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<sup>131</sup> Dufek, 107

<sup>132</sup> Dufek, 108

<sup>133</sup> Dufek, 109 - 110

On January 18, after the mechanics had performed all the needed maintenance, the four large aircraft took off from Antarctica and landed uneventfully eleven hours later at Wigram Air Force Base, Christchurch, New Zealand. Unlike the flight to Antarctica, where six ships served as station ships, only the USS *Eastwind* went north to support the flight. Altogether, VX-6 observed in two weeks more of Antarctica than did all of the previous expeditions put together, some 800,000 square miles or one-fifth of the continent, as well as flying over the geographic South Pole four times.<sup>134</sup>

### **IX. Search and Rescue**

With the planes gone, the operational command expected that the mission would settle into a steady and monotonous routine of unloading ships and constructing bases, which was not to be the case. A late storm blew in and forced them to halt all operation. "The open water of the Sound rose in swells six feet high and beat against the northern edge of the bay ice. The ice began to crack and break up. Within the next twenty-four hours seven hundred square miles of ice, four to seven feet thick, started moving out of McMurdo Sound with the tide and current."<sup>135</sup> The ships had to weigh anchor and head to the open ocean. Winds thirty-five to forty-miles an hour accompanied by snow drove through the camp. When it was over, the airfield was gone, but there were improvements caused by the storm. As the ships came back into the sound, they found that the edge of the ice was now only eleven miles from Hut point, instead of forty. The temperature rose

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<sup>134</sup> "Operation Deepfreeze: A Seaborne Invasion of the Antarctic." *Proceedings*, USNI, March 1, 1957, 302

<sup>135</sup> Dufek, 111

to relative balmy 20° Fahrenheit. If the temperature held, they quickly could finish the work.<sup>136</sup>

At the Little America site, work on the fuel storage tanks was finished. In response to this news, the command dispatched the *Edisto* and the *Nespelen* to Kainan Bay to pick up the fuel needed to fill the storage tanks for use during the coming winter and early part of the next spring when the ships would arrive back. Work was also progressing on the trail to the future Byrd Station. Bursey and the Seabees were 380 miles from Little America, “each quarter mile, a bamboo pole topped by a fluttering red pennant was speared in the snow...each fifty miles the caravan stopped...Seabees trundled two fifty gallon drums of fuel from the sleds and planted them in the snow, marking the cache with a twenty foot high flag.”<sup>137</sup> The Seabee leader, Commander Whitney, decided that the trail party should return from there by air because it was late in the season. An UC-1 Otter had been supporting the trail party so it was logical to bring them back to Little America. The Otter was not large enough to take everyone at once, so on February 3 it took the first group and then was to return to get the rest. McMurdo received a message from Little America that the Otter was an hour overdue, and had not received voice communication in over three hours. This violated the established doctrine of a plane reporting its position every thirty minutes. A number of scenarios quickly came to mind, perhaps it was radio failure, or engine failure, or perhaps it had run into a storm and had to land. On the other hand, perhaps the plane had crashed. McMurdo immediately ordered search and rescue operations. Bursey and the men who were with

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<sup>136</sup> Dufek, 112

<sup>137</sup> Dempewolff, Richard F. "The Seabees Build a Town. Part II" *Popular Mechanics*, May 1956, 260.

him at the trailhead received orders to begin retracing their path back to Little America. Command dispatched a tractor train under the command of Warrant Officer Young to meet them. Bad weather proved a problem, as a second Otter from McMurdo was unable to fly to Little America for two days because of it. Operational command finally decided to place an Otter and helicopter onto the *Eastwind* and sail them the four hundred miles to Little America. On February 4, around 9 am they heard the first SOS, each hour after that, either the ships or Little America reported receiving distress signals. Whoever was alive was using the “Gibson Girl” emergency radio. The last signal was received 12 hours later around 9 pm.; what happened to them, had they died?<sup>138</sup> Alternatively, had the radio malfunctioned? The emergency radio known as the “Gibson Girl” was painted a yellow-orange color and was based upon the German emergency radios of World War II. The name came from the hourglass shape of the unit because it supposedly reminded people of the girls drawn by Charles Dana Gibson during the late 19<sup>th</sup> and early 20<sup>th</sup> centuries. It was simple to operate it “by placing it between the knees, setting it to one of the two preset international emergency channels and then by hand cranking the internal generator. If the operators knew Morse code, they could transmit messages. It was a transmitter only; it could not receive any messages. It came with a kite, a balloon, 800 feet of antenna wire, a hydrogen generator to fill the balloon, a signal lamp to communicate with rescuers, and bags to contain all the items plus other accessories. The total weight of everything was thirty-three pounds.<sup>139</sup> While rugged, it was still possible to damage the unit and make it unusable.

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<sup>138</sup> Dufek, 114

<sup>139</sup> "SCR-578 Gibson Girl Transmitter." Olive-Drab.com. Accessed July 20, 2016. [http://olive-drab.com/od\\_electronics\\_scr578.php](http://olive-drab.com/od_electronics_scr578.php).

On the second day the two teams on the trail met just after midnight, they were 250 miles east of Little America. They were ordered to remain there as a support base for the ongoing aerial search. Dufek wished the long-range aircraft were still available and was further frustrated when his crews informed him that it might be impossible to unload the Otter the *Eastwind* was carrying at Little America because the bay ice in Kainan Bay was gone. While heading to Kainan Bay, Dufek had the *Eastwind* check out the Bay of Whales to see if it was useable. It was not. The ship continued on to Kainan Bay where happily it was determined that the Otter could be safely unloaded. Not wanting to get in the way of the rescue operations, Dufek toured Little America to see the changes that had taken place in the three weeks since he had last been there. Many of the building exteriors were complete, but not the interiors. Men staying over the winter would finish them.<sup>140</sup>

Reluctantly, Dufek boarded the *Eastwind* for the journey back to McMurdo Sound. The rest of the Deep Freeze mission had to continue and could not stop while the search and rescue continued. On board the ship was a message from one of the pilots of the long-range aircraft that had left Antarctica and had now made it back home to the United States. The message proposed sending one of the ski-equipped P2V Neptune back to Antarctica to assist in the search and rescue. The R5D's in New Zealand did not have skis and the ice runways were no longer useable. Dufek agreed immediately. He also wanted the third and last remaining Otter to fly to Little America and help with the search. The weather would not cooperate as fog, heavy snow and blizzard conditions swept down on McMurdo. Dufek sent word to the *Glacier* to stop what it was doing, load

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<sup>140</sup> Dufek, 115-116



the Otter, and head to Little America at best speed. It would make the run in twenty-four hours.

Dufek believed things were getting better as the needed resources were coming into place. At noon on February 8, they received the news that the US-dispatched P2V Neptune had crashed in Venezuela.<sup>141</sup> All eight men aboard were unhurt and were rescued by local authorities. The plane was a total loss.

With no other alternatives, the search continued with the resources on hand, two Otters and helicopters by air, while on the ground all known information about the flight was systematically gone over for additional clues. There had even been a report that some radio operators were picking up a faint SOS signal. The work of unloading the ships and setting up the bases continued as well as the window of opportunity to do so was fast closing, since temperatures were lowering as the weather became worse. Finally, on February 9, search crews found the missing Otter and command sent helicopters to pick up the survivors. Word spread quickly amongst the force, raising the spirits and moral of all.<sup>142</sup>

Communication failure had caused the crisis. On February 3rd, the Otter had taken off and sent a departure report. After the 5:15 a.m. report, the weather progressively deteriorated and the plane never received any acknowledgements from Little America even though it continued to broadcast at normal intervals. At around 7:00 a.m. with the wings and propeller icing up, the Otter crashed. Everyone aboard escaped with only minor injuries, but the plane would never fly again. It would, however, provide shelter. The survivors took inventory and found that while they could form a shelter from

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<sup>141</sup> Dufek 119

<sup>142</sup> Dufek, 121

the plane and some tents; and they had the means to stay warm; they only had enough food between the seven men for three days. Since they could not operate the plane's radio when they lost all power, they turned to the emergency radio. "It was hard work...Some messages were heard at Little America...but the major cause of poor reception was the inability of the plane crew to get the kite to stay aloft with the antenna. In addition, the mountain peaks caused interference with the ground waves."<sup>143</sup>

A standing order required that all aircraft carried two weeks of food, which the pilot had overlooked. The men were surviving on a few spoonfuls of oatmeal or pemmican, with a vitamin pill and a candy bar, each day. On the third day after the crash, the survivors determined their location during a break in the weather. They were "one hundred and ten miles northeast of Little America and fifty miles from Okuma Bay. They were off the tractor trail by sixty miles due north."<sup>144</sup> The crew held a meeting to decide whether to stay put or to try to make Okuma Bay. While normally survivors must stay with the aircraft, they moved to the bay. They reasoned that because they were off track by sixty miles from the last known location, a search of the area would be delayed.<sup>145</sup>

They took the sled with two hundred pounds of equipment to survive. To avoid falling down a crevasse, they roped themselves together. The first day they covered seven miles; the second day twelve miles; the third day fourteen. At 6 p.m. on the fourth day of their trek, a search party found them.<sup>146</sup>

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<sup>143</sup> Dufek, 122-123

<sup>144</sup> Dufek, 124

<sup>145</sup> Dufek, 124

<sup>146</sup> Dufek, 125

## X. End of the Season

With the season was fast ending, Little America and McMurdo Sound bases took stock of themselves and prepared for the next season. During February and early March, the ships sailed from Antarctica and did not return until the next season. The *Arneb*, with Admiral Byrd on board, sailed on February 3 to Wellington, New Zealand, where Admiral Byrd disembarked, then to Melbourne, Australia, then back to the United States. *Nespelen* sailed on February 14 for New Zealand, with damage to both propeller screws and a hole in one side. Ice accounted for the damage. She would be repaired well enough to sail safely back to the United States.<sup>147</sup> The other ships took similar journeys, leaving one by one as their missions ended, and then sailing alone back to the U.S. Altogether, the ships had delivered 8,000 tons of cargo between the two sites.<sup>148</sup>

The mooring of the YOGs had to be finished to provide fuel for the planes arriving the next season in October or November. They needed to be placed as close to the Hut Point as possible. Dufek ordered the *Eastwind* to attempt to cut a channel. It turned out to be harder than it looked. Even though this was a task included in the ship's design it shuddered so much each time it hit that nothing could be done onboard while the ramming took place. "It was impossible to sleep, to eat, or to do anything but hold on to something. Captain Rohnke made out a schedule to stop the ship one hour for each meal, and eight hours at night so that most men could get some sleep. The rest of the day he rammed the ice."<sup>149</sup>

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<sup>147</sup> *Operation Deep Freeze I--1955-56: Task Force 43*. Official Cruise Book, 146

<sup>148</sup> "Operation Deepfreeze: A Seaborne Invasion of the Antarctic." *Proceedings*, USNI, March 1, 1957, 302

<sup>149</sup> Dufek, 129

Rohnke estimated a week, however on the second day of the operation; it came to halt. The port propeller shaft had broken. The ice had defeated a second icebreaker in Antarctica. The *Edisto* had lost a propeller to the ice and Dufek released it early to make its way home. Dufek saw only one choice, the third icebreaker was in New Zealand fetching YOG 70; they would have to postpone the mission. With nothing else to do but wait, “Commander Paul Frazier, ship operations officer for the task force, tallied up the ice damage sustained by seven ships of Task Force 43 in the three months of Operation Deepfreeze in Antarctica. *Nespelen*, with her serious hull injury and broken propeller blades, would require \$200,000 to be restored to normalcy. *Edisto* had to enter dry-dock to put her loose screw back in commission. The loss of her LCVP boat in heavy seas would add another \$15,000 in replacement costs. *Eastwind* would require about \$50,000 to replace her broken shaft. *Arneb*, *Wyandot*, *Greenville Victory* and *Glacier* all sustained some superficial damage with an estimated total repair bill of \$35,000.”<sup>150</sup>

In 2017 dollars, it was over \$2.7 million in damages. While waiting for the *Glacier*, a storm with gale force winds blew in, damaging a helicopter parked on the ice, and causing more work and misery for the men on the *Eastwind*. On March 2, the *Glacier* and YOG 70 arrived. Dufek shifted his flag and released the *Eastwind* to return to New Zealand for repairs, then to home. The *Glacier* was the most powerful icebreaker in the U.S. Navy fleet; as such; it took three days to cut through the ice. At one point, *Glacier* drove itself up onto a shoal. After an hour and half of effort, it was able to extricate itself. With the ice near the Hut Point, broken and cleared, crews placed two

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<sup>150</sup> Operation Deep Freeze I--1955-56: Task Force 43. Official Cruise Book, 146

YOGs and moored them to the ice. They would soon freeze in place and were ready for the next season.<sup>151</sup>

The McMurdo personnel held a ceremony before Dufek and the *Glacier* left. Base Chaplin Lieutenant Condit requested naming the airfield after Richard T. Williams the Seabee who had died. Dufek agreed and sent a message to the Navy Department changing the name to “Williams Air Operating Facility, McMurdo Sound, Antarctica.” The *Glacier* then sailed into the Ross Sea where she began picking up messages from Little America. She received bad news: another Seabee had died. Dufek ordered the *Glacier* to sail to Little America, arriving on the next day, March 10. Dufek met with the Commanding Officer of the Seabees, Commander Herbert Whitney, and Chief Warrant Officer Victor Young, the leader of the tractor train where Seabee Max Kiel had died. The mission had been to bury caches of fuel to be used the following October along the trail previously marked by Lieutenant Commander Bursey. “D-8 tractors dragging wannigans (houses on skis) and sleds laden with fuel had little difficulty covering the first one hundred miles. Then heavy crevasses appeared. The light equipment of Bursey’s party had made a round trip over this area with no difficulty. During the search for the lost Otter, D-8 tractors had passed over this area uneventfully.”<sup>152</sup> However, all that changed on 5 March when the lead tractor driver noticed changes in the snow. The Seabees brought up explosives and used them to open up the dangerous areas. Kiel would then use his tractor to fill in the crevasse with snow in order to bridge it. Having finished doing so, he was backing away, when he and his tractor plunged one hundred feet into

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<sup>151</sup> Dufek, 130-131

<sup>152</sup> Dufek, 133

another large crevasse. He died instantly. Trying to recover his body, men descended by ropes to the tractor, but it was not possible to free his body from the machine.

The party immediately held a memorial service for Kiel at the spot, and the tractor train stored its fuel there instead of trying to go further. Dufek met with the men who would be staying; they requested that the airfield's name honor Kiel. Dufek granted permission and officially named it "Max Kiel Airfield, Little America, Antarctica." Dufek and the *Glacier* sailed later that day and spent the next month sailing around Antarctica visiting other nation's IGY stations and outposts, as well as surveying possible sites for Operation Deep Freeze II, before making their way back to the United States.<sup>153</sup>

## **XI. Wintering Over**

Left behind were one hundred and sixty-six men, mostly Seabees but also a few others. Ninety-three wintered at McMurdo Station and seventy-three at Little America. Command had carefully selected those who would remain. They would not see the Sun for almost five months, from April to August, and endure temperatures dropping at times to 78°F below zero. When the weather cleared, they would have a dark sky full of stars and the Aurora Australis. When the weather did not cooperate, they would have to endure blizzard force winds and snow. Both camps depended upon diesel generators for lights, heat, cooking, and water production.<sup>154</sup> The generators were an ongoing headache, working intermittently, and requiring constant monitoring. They set up a round the clock watch to keep the generators running.<sup>155</sup> Not everything at the two camps was the same.

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<sup>153</sup> Dufek, 135

<sup>154</sup> Dufek, 153

<sup>155</sup> "Interview of William E. Stroup by Dian O. Belanger." 2009. Accessed August 24, 2015 <http://hdl.handle.net/1811/36745>

In fact, due to the camps' locations and their construction, the men at the camps experienced two different worlds.

McMurdo Station had its construction on a hill ninety feet above sea level, on solid black volcanic rock ground. As such, snowfall blew off the buildings and down into the Sound. The other hills protected it and the nearby small ponds providing fresh water during the summer months.<sup>156</sup> The camp consisted of thirty-four prefabricated buildings, a 400,000-gallon fuel farm, and a runway built on the ice.<sup>157</sup> The base commander, Lieutenant Commander David Canham, held weekly all hands meetings to discuss how everything was going and what work remained. A lot of it was the interior finishing work, things like laying the floor tiles, partitioning rooms, hooking up the plumbing. It was also making the spaces usable for their assigned jobs such as the welding shop, the hangers, garages, etc. There were also the safety systems that needed finishing for use, like the public-address and fire alarm systems.<sup>158</sup>

Besides the constant maintaining of the generators, maintenance on the equipment provided another headache. Until the garage was finished, 13 February, this meant the work occurred outside. The five mechanics and the men assisting them had to exert themselves since most the machines suffered from overuse during the summer. Only one tractor was still working, along with three of the eight Weasels at McMurdo. As one person observed it was a "constant struggle by too few men in meager facilities to keep working equipment operational under the most adverse circumstances."<sup>159</sup>

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<sup>156</sup> Dufek, 161

<sup>157</sup> Dempewolf, Richard F. "The Seabees Build a Town. Part I" *Popular Mechanics*, April 1956, 94.

<sup>158</sup> Belanger, 82-83

<sup>159</sup> Belanger 84

When not working on the interiors or maintaining the equipment, the men had the craft items that had been brought for the purpose of occupying free time, as well as just hanging out and talking. They even had a place to worship, thanks to Chaplain Father John Condit; McMurdo had an unplanned chapel built from left over materials, the Chapel of the Snows. It was complete with a bell, taken from a YOG, with Protestant and Catholic murals painted on the walls; the first service was held on May 6, 1956. Father Condit organized many of the social events and building a memorial to Williams,<sup>160</sup> which included a statue known as “Our Lady of the Snows.” It still stands today along with a bronze plaque that was placed forty years later by Charles Bevilacqua “commemorating the young driver and all others who had died in Antarctica.”<sup>161</sup>

Other work included taking care of the rescue dogs. The command recruited Air Force Master Sergeant Dolleman, an experienced dog handler, to advise and to help with the dogs.<sup>162</sup> The dogs could haul sleds or be parachuted with a survival kit for stranded parties. By August 1956, the Seabees at McMurdo Station had finished the interior work on the buildings and with the raising of the Sun could continue to work on readying airfield for the incoming aircraft. To help the aircraft, one of the items the Seabees worked on was approach equipment for ground control.<sup>163</sup> McMurdo had aviation assets of two Otters and one helicopter. After mid-April, however, the helicopter could not fly because its blades delaminated.<sup>164</sup>

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<sup>160</sup> Belanger 86

<sup>161</sup> Belanger 102

<sup>162</sup> “Interview of Thomas T. Montgomery by Dian O. Belanger.” 2009. Accessed August 24, 2015 <http://hdl.handle.net/1811/36727>

<sup>163</sup> Dufek, 161

<sup>164</sup> Belanger, 83



Little America differed from McMurdo in many ways; it was not on solid ground. Instead it was “built on ice six hundred to eight hundred feet thick, resting on the waters of the Pacific Ocean.”<sup>165</sup> As Dufek predicted, this section of ice broke off in 1987 and became an iceberg heading north.<sup>166</sup> Due to extreme weather conditions, above ground buildings were not practical. Instead, Little America was an underground city. They constructed the buildings like refrigerators in reverse, with insulated walls to keep the cold out instead of in. The roofs were flat so that in theory the snow would not accumulate and contained two skylights each. The Seabees dug one main tunnel into the snow, with a ramp at one end and a reinforced roof. This tunnel connected all of the main buildings, the latrines sat at the ends with the quarters, hospital, storage rooms (these were caves and not actual buildings), and labs in between. With this arrangement, the men did not need to go outside when moving from building to building. A tunnel also reached the air facility near the airstrip and held an underground garage and power station. The power station had diesel generators that are capable of providing enough power to service two hundred and fifty homes. The latrines had snow heaters to produce continuous hot water. In all, the Seabees built eighteen 20 by 48 foot buildings from prefabricated kits.

When the Seabees were in Rhode Island they had practiced and found that in normal temperate weather it would take three hours to assemble the shell of a building.

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<sup>165</sup> Dufek, 159

<sup>166</sup> Keys, Harry (J.R.), S.S. Jacobs, and Don Barnett. "The Calving and Drift of Iceberg B-9 in the Ross Sea, Antarctica." *Antarctic Science* 2, no. 03 (1990). doi:10.1017/s0954102090000335.

In Antarctica, it took the Seabees most of a day to put up one building.<sup>167</sup> Off duty, the men here, like the men at McMurdo, could work on various crafts or other forms of entertainment.

The Seabees' other job, especially at McMurdo, was to get the building materials for the South Pole base into useable shape. The expedition had transported damaged materials to the Antarctic. Prior to being loaded at Davisville, the building materials had dropped into the Connecticut River when a freight train carrying them had derailed off flooded track after heavy rains. Initially, planners believed that new materials would arrive from the manufacturer before embarkation. However, due to time constraints, this was not possible. Nevertheless, the planners decided to take the damaged material. Builder Bevilacqua, in his interview, mentioned that the quality of the materials, even those that were supposedly intact, was poor. It didn't matter where the building were destined to be used, all had parts that were of poor quality, so the decision was made to use the best parts for McMurdo since those buildings were going to be built first. Then during the winter months, they began repairs and improvements to the parts left behind. There was no space large enough inside to do the work, so a tent-like structure was set up for the repair tasks. Some of the issues Bevilacqua encountered were due to the train accident but others were caused by the manufacture, perhaps do to the short timeline, Quality Assurance checks were either not done, or were done hastily. "Pieces of plywood were crooked, so we had to shave these off. We had to meticulously go and open up all the bundles, identify the panels. . . . [We had to] go over each panel, make sure they were planed down properly, the spline was in the proper side, put all the splines, say, on the

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<sup>167</sup> Dempewolff, Richard F. "The Seabees Build a Town. Part I" *Popular Mechanics*, April 1956, 91+93.

left side....work each panel over and then pack them up...with the less critical panels on the outside and the more critical panels on the inside.”<sup>168</sup>

While the teams wintered over in Antarctica, back in Washington D.C., coordinators modified Operation Deep Freeze II's plan. Goals had to be set, new personnel needed to be found and trained, equipment ordered, and ships loaded. Operation Deep Freeze II would further test the military to get everything ready on time for the start of International Geophysical Year.

Despite the difficulties encountered, Operation Deep Freeze overcame the obstacles and completed the first years goals. After sailing from Davisville to the Antarctic, the Seabees offloaded onto the ice and hauled the materials to the work sites. The men worked around the clock, outside of their normal jobs to get it done as quickly as possible. The plans changed and changed again. Tragically, two Seabees died. While both deaths led to safer practices, they unfortunately would not be the last deaths the mission would experience. With at least some of the aircraft making it to Antarctica, VX-6 began the long task of mapping the continent. Conflict between the old and new continued, with some of the men growing to distrust the work done by some of the older explorers, even to the point of blaming them for one of the deaths. With the season over, the ships and most of the men headed home to regroup and modify plans. The overwinter party continued to work, completing the interiors of the two bases and readying materials left behind for the next seasons work. With the new season, new men would be coming

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<sup>168</sup> “Interview of Charles Bevilacqua by Dian O. Belanger.” 2009. Accessed August 24, 2015 <http://hdl.handle.net/1811/36730>

to continue the building of bases, with the number of bases increased, resulting in additional problems for the men doing the work.

## CHAPTER III

### Deep Freeze II

Upon the return to the United States, the planning for the second year on the ice began in earnest. Decisions needed to be made about the bases, but first a decision needed to be made about who was in command. Once this problem was settled, then the mission planning could continue. Moreover, that mission was changing; new bases and tasking were added because of the first year's success. The testing of new equipment and techniques continued in the never-ending battle against the deadly crevasses, along with explorations for a better path to Byrd Station. Unfortunately, the two deaths of the first year would not be the last. History was made when the first aircraft lands at the South Pole, taking place in minus 58°F temperatures. In addition, new bases were set up and occupied. For the Seabees in Antarctica, a very busy year awaited them.

#### I. The Byrd Clarification

For many people, Admiral Byrd looked and acted as the larger than life figure that they expected. To Paul Siple, however, who had known and worked closely with Byrd for many years, Byrd did not seem well. "The stout heart that had carried him through so many dangerous adventures was weakened, his hair had turned white and he had lost much weight."<sup>169</sup> Additionally, Siple could see that Byrd becoming upset by his treatment at the hands of the officers in Operation Deep Freeze. It had started in Washington, but continued when Byrd received quarters on the *Glacier* in an unfinished room next to the engines, not the normal accommodation for any Admiral. Besides becoming more frequent, the mistreatment had spread to his staff. "Somehow the feeling

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<sup>169</sup> Siple, Paul. *90 Degrees South: The Story of the American South Pole Conquest*. New York: Putnam, 1959. 107

had now become rampant among the men of Dufek's large staff that Byrd's mere presence threatened the ascendancy of Dufek as "Admiral of the Antarctic." Byrd, who was above such pettiness, ignored the snowballing minor acts of discourtesy both to himself and to all who were veterans of earlier expeditions, but they continued to occur."<sup>170</sup>

In his memoir, Siple, implied that this conflict weighed heavily upon Byrd and led to his decision to leave Antarctica early, insisting that Siple accompany him even though Siple was on Dufek's staff.

As January ebbed, Byrd grew anxious to leave. We had achieved our main goals in Deep Freeze I, he pointed out, and there was little need to linger. His attitude was in sharp contrast with that which he had exhibited on Operation Highjump. I recalled that when departure time came in 1947, a striking sunset had turned the sky into a Kodachrome world. Even as the last call had been shouted, Byrd had kept his eyes fixed on the iridescent sky. "But I don't want to go yet, Paul," he had said, shaking his head.

But times had changed. The small discourtesies exhibited toward Byrd by Task Force officers who felt Byrd represented the past had continued without abatement, and the strain of ignoring them had grown wearing to a man whose temper could be Wagnerian when he was provoked. Time after time I could see the anger creep along the entire length of his body and then subside as his words came out steady, even casual.

The beginning of February, Byrd asked me to arrange for our departure from the Antarctic. I realized that my leaving with him would create a problem, since technically I was on Dufek's staff and subject to his orders. However, I soon learned that the Task Force had no particular desire to have me remain but was almost insultingly willing to have Byrd and me take our leave.

Fortunately, Commander John Cadwalder, a good man and officer, could be entrusted to carry out the co-ordination of scientific work of Deep Freeze I which I was overseeing through to completion.

And so on February 3, Byrd and I pulled out of McMurdo Sound and headed for home.<sup>171</sup>

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<sup>170</sup> Siple 119

<sup>171</sup> Siple 123-4

When he arrived in Washington, Byrd asked Admiral Arleigh Burke, Chief of Naval Operations (CNO) to clarify his position. Siple acknowledged, “. . .it was preposterous that we should have to waste precious time and energy on this matter, especially since so much work had to be accomplished before the fall of 1956.”<sup>172</sup> Siple, and by extension Byrd, believed it was absolutely necessary or there would be a loss of information gained from previous expeditions and because “the Task Force had taken upon itself the authority not only to write plans, but also to approve and carry them out without consulting the Program office.” This was the office controlled by Byrd and fortunately for him, the CNO agreed. Admiral Burke was aware of the treatment Byrd was receiving and he stepped in to put a stop to it. On April 19, 1956 he issued a memorandum for the record, in which he stated that Byrd "was not getting forceful backing in all the matters that are his responsibility, and in some instances he was either bypassed or not kept informed. ...I expressed to Admiral Byrd the Navy's appreciation of his continued valuable effort in assisting the Navy, not only in polar work but in many other things as well. I told him I had just signed the directive covering our Antarctic operations for the coming season, and hoped that it would clarify responsibilities."<sup>173</sup>

The CNO also sent out new Operations Orders that further clarified the responsibilities of the concerned parties. While it was no doubt necessary that this matter get resolved, it probably contributed to Byrd's death early in 1957. Byrd continued to lose energy, strength and weight despite a change to a high calorie diet. His spirits, however, rose.<sup>174</sup>

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<sup>172</sup> Siple, 124

<sup>173</sup> Siple, 124-5

<sup>174</sup> Siple, 125

Dufek, in his memoirs, completely ignored the conflict between his staff and Byrd's, and the treatment of Byrd, instead Dufek concentrated on the preparations for Operation Deep Freeze II. Dufek must have done this consciously, perhaps in an attempt not to diminish the achievements of the mission.

## **II. Changing Plans**

Upon departing the Antarctic, some of the men got leave before returning to continue the work. Others, such as Admiral Dufek, immediately began the process of revising plans and generating new ones as the mission changed. Deep Freeze II required more ships and men. No longer would the Navy be exploring unknown territory and photographing the continent. Instead, its sole responsibility was to support the U.S. National Committee for the International Geophysical Year and the construction of more facilities.

In addition to the bases at McMurdo Sound and Little America, five additional stations were to be constructed during the 1956-57 season - two more than originally planned. I selected one of my best operation officers, Commander Paul Frazier, to lay out the trail from Little America to Byrd Base commencing in October 1956. From the Army he obtained the services of two officers and teams that had operated on the Greenland icecap. Four newly developed crevasse detectors were provided to prevent another accident like Kiel's. Frazier and his team would be flown into the Antarctic with the first aircraft from New Zealand. The officers and men who had blazed the first three-hundred-and-eighty-mile trail and wintered over would provide valuable information.

The Air Force cargo planes would assist in dropping drums of fuel at the selected site. The task of building Byrd Base would be a tough one, but I had complete confidence that Frazier and his team would lay the trail, and Whitney and his Seabees would get the five hundred tons there by tractor-train and air-and build the base.<sup>175</sup>

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<sup>175</sup> Dufek, George J. *Operation Deepfreeze*. New York: Harcourt, Brace, 1957. 162-163



The second base built after the Byrd Base was the South Pole Station. To build it, the plan involved aircraft landing and taking off from the South Pole itself; while it was believed possible, it never been tried. Nine scientists and eight Navy men would spend a year there.<sup>176</sup> The location of the third base was at Wilkes Station in the Windmill Islands, and the fourth base at Cape Hallett. The fifth base planned for construction during Deep Freeze II would be Ellsworth Station on the Filchner Ice Shelf. It would be near the Argentinean and British bases. Ellsworth would be the only base that had a single commander once it was set up. All the others would have a joint command, one civilian and one military.<sup>177</sup> Siple objected, he believed that the military men should answer to a civilian leader.<sup>178</sup> Dufek disagreed, believing the military men deserved a military leader. Originally, the plan had been for the military to turn over the complete base to the scientists and then depart. However, planners realized that the scientists did not have the technical expertise to run the base, and it would distract them from their primary mission. Thus, the Navy agreed to supply personnel to operate the communication equipment and maintain the utilities of the base.<sup>179</sup>

That summer in Washington endless meetings convened on everything from finances, to equipment and materials to bring and why, to what person would head-up what group. Again, as the supplies arrived in Davisville the logistical crews sorted, marked, and stowed them in the warehouses so that they would be ready for loading of the ships.

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<sup>176</sup> Dufek, 167

<sup>177</sup> Dufek, 168

<sup>178</sup> Siple, 128

<sup>179</sup> Dufek, 169

VX-6 would be gaining more aircraft as well as a new commander. Captain Douglas Cordiner took over the unit. The unit consisted of one P2V2 Neptune, two R5D's Skymasters, and four R4D's Skytrains, fitted with extra internal fuel bladders so they would have the range to reach the Antarctic. The contingent would include more Otters and helicopters, some of which arrived inside of Air Force cargo planes. Additionally, the Air Force would supply eight C-124 Globemaster aircraft that belonged to the Eighteenth Air Force's 63d Troop Carrier Wing (TCW), commanded by Colonel E. Wade Hampton.<sup>180</sup> The Air Force took their part seriously. They sent men to New Zealand and Antarctica in January and February 1956 to evaluate the mission and make recommendations. Based on some of the recommendations, the Air Force then made thirteen major modifications to eight C-124s selected to participate in the mission "including a three-phase emergency power unit and special compasses, navigation instruments, propellers, and communications equipment."<sup>181</sup>

In his interview, Air Force Colonel Herbert Levack explained why the Navy needed the Air Force Globemasters. It was all about the size of the aircraft; it was the largest cargo plane in use. It could unload "Paratroopers out of both sides at the same time. And you could drop them that way, you could drop stuff at the same time right out of the well itself—the cargo well."<sup>182</sup>

New to VX-6 would be four P2V7's Neptunes with two jet engines added to the existing engines and propellers. Captain Douglas Cordiner made sure his polar flying

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<sup>180</sup> Ellery D. Wallwork and Kathryn A. Wilcoxson, *Operation Deep Freeze: 50 years of US Air Force airlift in Antarctica, 1956-2006* (Scott Air Force Base, IL: Office of History, Air Mobility Command, 2006). 8

<sup>181</sup> Wallwork, 9

<sup>182</sup> "Interview of Herbert Levack by Dian O. Belanger" 2009. Accessed August 24, 2015 <http://hdl.handle.net/1811/36726>

veterans worked with the new pilots to make sure they received the same training in polar flying, survival and navigation. As part of the training and testing that took place, Cordiner flew a R4D to Greenland and practiced landing and taking off on the Greenland icecap. He did it at the same elevation as the South Pole, 10,400 feet.<sup>183</sup>

The plan, as envisioned, called for a Navy ski-equipped R4D to land at the South Pole while overhead would be Air Force C-124 Globemaster with trained crews. If something happened to the R4D and it could not take off, the Globemaster would drop survival gear along with a Weasel, fuel and sleds. The aviation crews did not want to use dogs. The Weasel would allow the men to find a place where an aircraft could land to pick them up. If this proved impossible, then they would head to Beardmore with aircraft overhead watching and supplying with needed supplies. A new location as close to the pole would be necessary for the science station. They hoped that this backup plan would not be necessary and a station could relocate to the Pole. The plan called for the ski-equipped aircraft to land the initial Seabees who would prepare a landing field. The Globemasters would then land supplies or if necessary, parachute drop loads of twelve to fifteen tons of cargo. Once the initial group was safe and had begun assembling the base, more Seabees would land and the work would accelerate.<sup>184</sup>

A command change would take place with the Seabees. Commander Whitney and his men were still down on Antarctica, so a second group assembled -- Mobile Construction Battalion (Special) Detachment Bravo -- commanded by Commander William Flynn. It again consisted of volunteers; however, this time, in addition to the earlier screening procedures, every man would undergo a psychiatric examination. All

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<sup>183</sup> Dufek, 165

<sup>184</sup> Dufek, 166 - 167

tests results reached Flynn, who could replace anyone he did not believe suitable to the mission ahead.<sup>185</sup>

With the changes in the mission, plus the additional materials that would be needed to build five new bases, the Deep Freeze II task force grew to twelve ships from seven and over thirty-four hundred men, up from eighteen hundred.

The twelve ships included some of the previous year's vessels. There would be four icebreakers, the USS *Glacier* (AGB-4), the USS *Atka* (AGB-3), USCGC *Staten Island* (WAGB-278) and USCGC *Northwind* (WAGB-282), followed by five cargo ships, USS *Arneb* (AKA-56), USS *Wyandot* (AKA-92), USNS *Private John R. Towle* (T-AK-240), USNS *Greenville Victory* (TAK-236) and USNS *Private Joseph F. Merrell* (T-AK-275). Moreover, the expedition included one tanker, USS *Nespelen* (AOG-55), one seaplane tender to house the scientists, USS *Curtiss* (AV-4) and a destroyer escort, the USS *Brough* (DE-148), that would be assigned as weather ship, stationed between New Zealand and the ice whenever there were flight operations.

Like the previous year, the ships did not all depart at the same time. Unlike the previous year Dufek would not be accompanying the ships south, he would instead fly down. While underway, the fleet would be under the command of Dufek's second in command, Captain Jack Ketchum.

### **III. Crevasses**

Dufek did not forget his commitment to Young to find a better path to Byrd Station and choose Commander Paul Frazier to find it. Frazier realized early on that everything Bursey had done was useless and asked for help from the Army to provide

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<sup>185</sup> Dufek, 170-171

new equipment and men. The Army had been having luck with a new detector in Greenland. Frazier and his team flew together to the Antarctic on the first flights from New Zealand.<sup>186</sup>

Majors Merle R. “Skip” Dawson and Palle Mogensen came from the U.S. Army Transportation Corps to help Frazier. Both were experienced veterans of Arctic icecap service and held Master Mariners licenses. In other words, they could command a ship, but neither was an expert about crevasses. They met with Frazier over the summer in Washington D.C. A third person, Lieutenant Phillip Smith, also assumed duties, but was in the Arctic during the meetings. Smith, holding a Master’s Degree in geology from Ohio State University, was a mountaineer and spelunker, and had “specialized in working through crevasse systems.”<sup>187</sup> Frazier recalled the meetings:

I described my plan to the majors, and asked for their comments:

“There will be three task elements. The air element will be under Lieutenant Commander Bob Graham, now at Little America. He will have Otter airplanes, a helicopter and one or more of the R4D transports that will arrive in October, to provide support for the trail Party and the tractor trains. We will thoroughly reconnoiter the area from aircraft before the first vehicle leaves Little America.

You, Skip, will command the trail party of six Army and five Navy personnel. The Navy radioman and electronic technician are now in Greenland being instructed in the use of crevasse detection equipment. A demolition man, a mechanic and a driver will be provided from the wintering-over group at Little America. These men will complement the three sergeants who have been promised by the Army.

The third element, the tractor tram, will be commanded by Chief Warrant Officer Victor Young, also in the wintering-over party. He will have eighteen men to run the train of six tractors, each towing two twenty-ton sleds.

You’re charged with sweeping a safe trail across more than six hundred miles of unexplored territory; nearly twice the distance any heavy

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<sup>186</sup> Dufek, 162

<sup>187</sup> Belanger, Dian Olson. *Deep Freeze the United States, the International Geophysical Year, and the Origins of Antarctica's Age of Science*. Boulder, Colo.: University Press of Colorado, 2006. 132

equipment has ever traveled in the Antarctic. We will have utmost air support at all times."

I told them to prepare their basic plans and inform me what vehicles and supplies they would need.<sup>188</sup>

The Majors had questions, the first being about the efficiency of the crevasse detector. Frazier could only reply what he had heard others tell him, namely that it was better than the one used the previous year in Antarctica. Major Mogensen then suggested that the third member of the group, Lieutenant Smith, should learn how to use the detector before he left Greenland. Frazier agreed and sent a message to Smith.

The entire mission depended upon these detectors working correctly. Each coastal station that would deal with crevasses would get two of them. The manufacturer -- Southwest Research Institute in San Antonio Texas -- had agreed to modify them to meet any requirement that the IGY or the Seabees expressed. The Seabees needed them to work. They had learned that light vehicles, under two or three-tons, could cross a crevassed region, only to have heavier tractors which followed crash through the snow bridges with potentially fatal results.

Frazier was worried. If they could not overcome the crevasse problem, it jeopardized the Byrd Station plan. Frazier believed there were two possible routes, one through Prestrud Inlet, the route previously tried. It was also the route tried by every other expedition, and each had reported crevasses. The other route was southeast and unexplored. Frazier planned to reconnoiter both by air before making a decision.<sup>189</sup> His comfort came in the qualifications of the Army Majors. He was amazed on how much

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<sup>188</sup> Frazier, Paul Wilson. *Antarctic Assault*. New York: DODd, Mead, 1958. 150-154

<sup>189</sup> Frazier, 155

knowledge and experience they brought to the problem and the solutions they devised to solve them.<sup>190</sup>

#### IV. Departures

In order to be at their respective locations for the start of the season, the ships started departing in September. The *Brough* left on September 4, heading from Rhode Island to the Panama Canal and arriving on station after a month. The icebreaker *Glacier* departed on September 10, earlier than originally planned due to the additional explosives which Frazier and his team needed. Frazier and his team calculated how much explosives they needed to do the job. Then they examined the amount of explosives being taken and compared it to their calculations. They determined the amount to be insufficient. Frazier ordered an additional eight thousand pounds of special explosives and two hundred boxes of blasting caps. Due to the timeline in the plan, the *Glacier* would have to penetrate the Ross Sea ice pack earlier, by several months, than a ship had ever done. If something prevented the ship from arriving by the time of the deployment of the needed explosives, it would affect the whole plan.<sup>191</sup>

Frazier and his group flew out early in October. At each plane change, they made sure all of the six tons of cargo made it on the next plane. Frazier's team reached Christchurch on October 3. They had hoped to leave for Antarctica in five days, but it was not until October 17 that they took off. Admiral Dufek would leave Christchurch on October 15.<sup>192</sup> The *Wyandot* sailed on November 9 and the *Arneb*, with Captain Ketchum

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<sup>190</sup> Frazier, 154

<sup>191</sup> Frazier, 158

<sup>192</sup> Frazier, 160

aboard the flagship, sail on November 12, both from Davisville.<sup>193</sup> Most of the fleet would be rendezvousing in the Ross Sea by mid-December.<sup>194</sup> The *Curtiss*, with the scientists onboard, would sail from San Diego in December.<sup>195</sup>

Dufek left Rhode Island for New Zealand on September 14. He made it a point to visit Byrd at Byrd's home in Boston. They spoke for hours, during which Byrd expressed that he hoped to visit Antarctica later in the season. Once in New Zealand, Dufek began making the rounds of official visits starting with the U.S. Ambassador. He also met with IGY officials and Sir Edmund Hillary. He was waiting when Siple arrived.<sup>196</sup>

Paul Siple did not intend to return to Antarctica. He wanted to return to his job with the Army. In June, he went to Germany to advise some people on research he had done. When he got back in July, he felt the pressure to go back to Antarctica. Members of the IGY had apparently assumed that he would be the "scientific leader at the South Pole Station." He was prepared to ignore the pressure, for family and career reasons, and he still did not agree with the split command structure. What he could not ignore was the Department of Defense (DOD) or Admiral Byrd. The DOD insisted that only someone like him, with his years of experience, could succeed at the South Pole and implied that men could die if he did not lead the effort. Byrd applied direct and personal pressure based on their long friendship. Siple finally agreed and began making his personal preparations. He met with Byrd for lunch the day before he flew out. He arrived in

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<sup>193</sup> Ronne, Finn. *Antarctic Command*. Indianapolis: Bobbs-Merrill, 1961. 27

<sup>194</sup> Belanger, 190

<sup>195</sup> Dufek, 171

<sup>196</sup> Dufek, 181-182



Auckland, New Zealand, on October 9.<sup>197</sup> He would wait a few days before receiving a schedule to fly south.

Dufek would take a Navy R5D Skymaster to Williams Air Operating Facility at McMurdo Sound on October 18. The men, who had wintered over, were working twelve-hour shifts to build a new runway on the fifteen feet thick bay ice. To prevent accidents due to poor visibility, they were installing a Ground Control Approach system (GCA) to help guide the aircraft. After Dufek's flight, then the P2V Neptune's and R4D Skytrains would take off from New Zealand to head to Antarctica. Siple would come with the C-124 Globemasters of the 18th Air Force.<sup>198</sup>

Taking advantage of his time in New Zealand, Siple also met with various IGY officials, as well as Hillary. The day before he was to fly out, he gave a series of lectures about Antarctica to U.S. Air Force personnel stationed in New Zealand.

## **V. Death in Antarctica**

Admiral Dufek left two days early on October 16. He decided to fly in the first plane. The VX-6 Skymaster took thirteen and a half hours to make it to Antarctica from New Zealand. They experienced some icing initially, but for the most part, it was as routine a flight as could be expected in this part of the world. As soon as he had landed, Dufek sent word back to begin the other flights. He was surprised and impressed with the amount of work completed over the winter. The Seabee Officers and men greeted him warmly, perhaps it was because they were excited to see him or perhaps it was because

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<sup>197</sup> Siple, 129-132

<sup>198</sup> Siple, 134

he had brought five hundred pounds of mail. He toured McMurdo and reviewed some of the accomplishments at not only McMurdo, but at Little America as well.<sup>199</sup>

At the same time, the VX-6 squadron took off from New Zealand. At first, they encountered no problems, but right after passing the point of no return, the weather began to deteriorate at McMurdo. On the morning of October 17, the visibility was poor and the pilots had to rely on the GCA operators for guidance. The Neptune, ground control decided, would land first. As the plane came in for a landing, the pilot believed he could see well enough to land on his own and stopped listening to the GCA operator. Unfortunately, at landing, the right wing struck and the plane cartwheeled on to the ice. The pilot and two crewmembers perished instantly, a fourth man suffered critical injuries and die within days. The four were Captain Rayburn Hudman, USMC; Lieutenant David W. Carey, USNR; Aviation Electronics Technician 1 Charles S. Miller, USN; and Aviation Machinist's Mate 1 Marian O. Marze, USN.<sup>200</sup> Four others received serious injuries.

While the emergency crash crew dealt with the wreckage, there was still the matter of the remaining planes. A Skymaster came in to land next, using GCA, it landed

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<sup>199</sup> Dufek (183-184) stated "They had spent 100,000 man-hours building the ice runway, working on rotating twelve-hour shifts seven days a week except for a few holiday celebrations...The men at Little America had dug out the stores hidden in drifts of snow sometimes double or quadruple their own height, locating them from photographs taken before the snows came. They had worked under searchlights in the dark cold night to prepare for the trail expedition to Marie Byrd Land. Here at McMurdo . . . barracks and mess halls had been expanded. The chapel even had a new white picket fence. The spirits of the men had been good throughout the winter."

<sup>200</sup> "Casualties: USN and USMC Personnel Killed and Injured in Selected Accidents and Other Incidents Not Directly the Result of Enemy Action, 1946-1989," Naval History Blog, 2010, , accessed January 04, 2017, <https://www.navalhistory.org/2010/04/28/casualties-usn-and-usmc-personnel-killed-and-injured-in-selected-accidents-and-other-incidents-not-directly-the-result-of-enemy-action-1946-1989>.

safely. The next three airships, all R4Ds, landed without the help of the GCA, the visibility had improved enough for the pilots to land on their own. That left one R4D, and visibility went to zero. With the help of the CGA operator, the plane was able to land safely.<sup>201</sup>

All flights halted until the weather improved. When it cleared, the first of the Air Force's Globemasters arrived; it had taken twelve hours and twenty-three minutes to complete the flight with 46,500 pounds of cargo. The plane returned to New Zealand with the injured Neptune crew as a second Globemaster with Siple arrived. The other Globemaster flights took place as the weather permitted.<sup>202</sup> On October 21, a Globemaster had an accident upon landing, it went up on its nose, but no one was injured. It was not the last, Globemasters crashed on November 28 and 29. There had been no deaths in these two crashes either; the most serious injury had been a broken leg. Parts from the November 29 Globemaster crash contributed to the repair the other two and help return them to airworthiness. The carcass of the cannibalized plane would become a storage shed.<sup>203</sup>

## **VI. Flight Operations in Antarctica**

Some of the Task Force 43 pilots expressed concern about the ice runway; specifically they were concerned that it would break up. On October 25, Dufek asked Siple to check out the ice runway and make a determination. Going aloft in a helicopter with two pilots and a photographer, Siple flew all over the Sound. After checking and photographing everything they could, Siple landed and went to see Dufek. "The bay ice is

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<sup>201</sup> Dufek, 185-186

<sup>202</sup> Dufek, 187

<sup>203</sup> "1952 USAF Serial Numbers." 1952 USAF Serial Numbers. Accessed August 12, 2016. [http://www.joebaugher.com/usaf\\_serials/1952.html](http://www.joebaugher.com/usaf_serials/1952.html).

still safe. You can send the planes up," I informed Dufek. "There is no ice breakup across the entire Sound north of Cape Royds to the mouth of the Ferrar Glacier."<sup>204</sup>

Siple estimated that the runway would be good for at least one if not two months. Upon hearing this, Dufek ordered the air operations to begin. That afternoon the first flight took off. It was a R4D Skytrain and its mission was to look for a suitable site for the support base for air operations. Two more R4Ds flew Frazier and his group, along with some of their equipment for detecting crevasses to Little America V. The last flight that day was an Air Force Globemaster to overfly the South Pole. Major General Chester McCarty, who had flown over the North Pole just six weeks earlier, piloted the plane. The aircraft did not land at the South Pole, but airdropped eighteen drums of fuel and equipment, some 10,000 pounds altogether. Amongst the equipment dropped was a "Grasshopper" automatic weather station. It would broadcast weather reports every six hours for about six weeks.<sup>205</sup> Siple believed it was a "token" salute to the future station.<sup>206</sup> However, the Air Force needed to prove, that its techniques and personnel could perform the mission of supporting the South Pole base.<sup>207</sup>

Other aircraft made flights to get men and equipment to the Beardmore Glacier support base. This base was to be used to support the flights to and from the pole. The pole, sitting 10,000 feet above sea level, made it hard for some of the planes to operate. The planes would potentially use more fuel than normal, as well as JATO rockets to take off after landing at the pole, and thus would need a place to set down and refuel before making it back to McMurdo. Beardmore had an eight-man crew, six thousand gallons of

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<sup>204</sup> Siple, 141-142

<sup>205</sup> Dufek, 188

<sup>206</sup> Siple, 142

<sup>207</sup> Belanger, 159

aviation gasoline, as well as the equipment necessary to relay radio messages and give weather reports.<sup>208</sup> Due to illness of intended personnel, Canham assigned Michael Baronick to run Beardmore with just three men. While they had no issues putting the small camp together, the main radio was another story. It did not work and they were forced to use a hand-cranked AN/GRC-9 “Angry-9” radio for communication.<sup>209</sup> It was determined that the location would work for this year’s operations, but might need moving the following year. This was not a problem since the station was seasonal and not manned over the winter. The command then came to try for the pole the next day.<sup>210</sup>

On October 31, a ski-equipped R4D would take seven passengers, made up of Admiral Dufek and an all-Navy crew, to make the first ever landing at the South Pole. Siple, bitter about his own exclusion, believed that Dufek deliberately did it in haste to exclude him and ignore Byrd’s wishes, painting the incident in the most derogatory terms in his memoir. Siple saw Dufek as being less than ready for the experience, and decided that the first trip did no scientific good, but was instead an opportunity for Dufek to grandstand, plant an American flag and take pictures. Further, Siple believed that had others been on the trip, they would have prepared for the minus 58°F temperatures. Siple would make the claim that “had they been able to do no more than dig a hole in the ice and take the temperature, it would have been highly useful to those of us who were to live at the Pole.”<sup>211</sup> Belanger, in her book, points out that it took Siple hours to do just this

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<sup>208</sup> Dufek, 188

<sup>209</sup> Belanger, 157

<sup>210</sup> Dufek, 191

<sup>211</sup> Siple, 144

when he did get to the pole.<sup>212</sup> Since Siple wrote his book after returning from overwintering, he had to know that his criticism was unfounded.

Dufek, of course, saw things differently. There would be two other aircraft flying with Dufek's plane. A Navy Skymaster would act as a pathfinder and drop extra survival gear if necessary. An Air Force Globemaster carried news representatives to cover the story, and had the ability to drop even more survival gear.

I felt that as expedition leader I should make the first test landing at the South Pole. Accordingly, I picked the crew of the *Que Sera Sera* (the name of the aircraft, meaning "What will be, will be") for this historic flight. The pilot was Lieutenant Commander Conrad Shinn. Copilot was Captain Bill "Trigger" Hawkes. They were both excellent pilots and experienced in Antarctic flying. Lieutenant John R. Swadiner was selected for navigation. Other crew members picked were Aviation Machinist's Mate Second Class John P. Strider for plane captain and mechanic, and Aviation Electronics Technician Second Class William A. Cumbie for radioman.

The Squadron Commander, Captain Douglas Cordiner, and I would ride as passengers. We believed we should observe at firsthand what conditions our men would be working under in building this base. We also believed that we should share the greatest risks with our men.<sup>213</sup>

Along the way, Dufek and his crew took observations that they plotted on a map, their intent was to set up locations to photograph and to plot in order to help future mapmakers. The R5D and the Globemaster took off after the R4D. They flew faster and were supposed to catch and pass the R4D as they flew over the Beardmore Glacier. As it was, the R5D developed engine trouble and turned back. Then, over the pole, Hawkes asked Dufek if they should land or try dropping gear to mark the surface. Dufek told Hawkes to use his own judgment. Shinn reported that his instrument panel was showing

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<sup>212</sup> Belanger, 159

<sup>213</sup> Dufek, George J. *Through the Frozen Frontier: The Exploration of Antarctica*. New York: Harcourt, Brace, 1959. 100

red warning lights due to the cold and air pressure affecting the aircraft. Air Force Captain C.J. Ellen in the Globemaster then gave a reassuring reply: "Don't worry, Gus, if you can't get off I'll belly land this baby and give you a warm house to live in." With that reassurance, the plane started toward the ground and landed smoothly at 8:34 p.m., October 31.<sup>214</sup>

The plane kept the engines turning, but even then, Strider was concerned about the oil leaks and the skis freezing to the surface in such low temperatures. Within minutes, all of them were showing signs of developing frostbite. As quickly as they could, they erected the flag and put up the radar reflectors to help future aircraft navigate to the pole. Cumbie found that his hands had frozen to the shovel he was using, that they had to force it from his hands. Movie and still cameras failed to operate. Dufek felt he had no choice but to call it quits after forty-five minutes.

Once everyone was aboard, Shinn revved the engines for takeoff, but the aircraft did not move even with full power. As feared, the skis had frozen to the ground. The pilots could not even see out the windscreen and would have to take off by instruments alone. Shinn fired four of the fifteen JATO bottles. The plane still did not move. He fired four more JATO bottles and there was a slight movement, so four more and then the final three. The aircraft took off at sixty knots, below the usual take off speed, close to the stall speed of fifty-eight knots. Once airborne, they jettisoned the empty JATO bottles, lightening the aircraft by 2,500 pounds and helping gain speed and altitude.<sup>215</sup> Shinn, years later, believed it had been foolhardy to make the landing when it was so cold, and

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<sup>214</sup> Dufek, *Operation*, 199

<sup>215</sup> Dufek, *Operation*, 202

believed that had the JATO bottles not worked, they would not have survived for rescue. In retrospect, he says they should have parachuted in acclimatized men and equipment.<sup>216</sup>

After flying three hours to the Beardmore station, the aircraft made a normal landing, refueled, and then flew four more hours to reach McMurdo. By which time Dufek had made a decision to postpone sending the building crews. It was his opinion that it would be reckless and dangerous. “The weather at the Pole was still too harsh – men can work at those temperatures at sea level but not at 10,000 feet.”<sup>217</sup> Not everyone agreed with the Admiral. Besides Siple, others who thought Dufek had made a wrong decision included Navy Lieutenant Richard Bowers who believed it was not the men, but the equipment that failed, and he took it personally for the mission’s delay. He and his men spent the weeks waiting by reviewing all their equipment, plans, etc. Their morale would go up and down several times.<sup>218</sup> Also concerned about the delay was Harry Wexler, director of Meteorological Services at the U.S. Weather Bureau and vice chair of the Antarctic Committee.<sup>219</sup>

On November 19, an Air Force Globemaster deployed to the Pole to examine the weather. It found the weather fair, so just after midnight, on November 20, two Navy R4Ds landed on skies and unloaded eight men and eleven sled dogs. The planes stayed on the ground for one hour before taking off with the assistance of JATO. The temperature was relatively balmy at 29° below zero, 29°F warmer than it had been when Dufek had landed. The Globemaster did a parachute drop of a Weasel, sleds and other supplies.

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<sup>216</sup> “Interview of Conrad Shinn by Dian O. Belanger.” 2009. Accessed August 24, 2015 <http://hdl.handle.net/1811/36748>

<sup>217</sup> Dufek, , *Operation*, 206

<sup>218</sup> “Interview of Richard A. Bowers by Dian O. Belanger” 2009. Accessed August 24, 2015 <http://hdl.handle.net/1811/36750>

<sup>219</sup> Belanger, 161



After that day, three flights a day deployed to the South Pole to drop by parachute ten tons of supplies. Ten more men arrived in on the 26<sup>th</sup>. “That same day more Antarctic history was made when Sergeant Richard J. Patton, an experienced and tough parachutist, made the first parachute landing at the Pole.”<sup>220</sup> He helped sort out issues the Air Force was having with parachutes that did not open and other issues with cargo drops. The expedition named Patton Glacier in the Sentinel Range of the Ellsworth Mountains after him. Dufek would appoint Lieutenant John Tuck as the military commander for the station during the wintering over. Paul Siple would be the scientific leader.

## **VII. Tractor Trains to Byrd Station**

The original plan had Frazier and his tractor trains leaving for Byrd Station in October. The team arrived October 25 by air, after many stopovers, to the South Pole. On November 6, an advance party lead by Dawson headed out. They had one Weasel equipped with the new detector; it had four disc-shaped electrodes attached by a framework to its front. The second vehicle was another Weasel with communication gear in it. A Sno-Cat towing sleeping huts mounted on sleds followed. The last two vehicles were D-8 tractors, each towing two sleds loaded with fuel and supplies. The team outfitted one sled as the cookhouse. Because of these D8's, the fastest the train could move was three miles per hour.<sup>221</sup>

The failure of last year's group to find a path through the crevasses caused part of the delay for the tractor trains. Due to this, the original timetable was probably unrealistic from the beginning; however, equipment modification and personnel training

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<sup>220</sup> Dufek, *Operation*, 207

<sup>221</sup> Dufek, *Through*, 92-93

caused the other part of the delay. The command should have considered both of these issues during the creation of the timetable.

Once the rest of Frazier's team had arrived, they conducted an inventory to make sure that nothing was lost on the trip. They confirmed the inventory and then Frazier met with the Seabees about modifying vehicles. They added hatches to the roofs of the Weasels along with running boards. Supplies then could be loaded into the respective vehicle. The team held a meeting where the newly arrived members of the team met the Seabees who would be going along on the expedition. Frazier gave each man's qualifications and stated bluntly that the mission came first over personal feelings. He then gave the Seabees the option of leaving the team. No one did. Tex Gardiner, one of the Seabees, told Frazier that the blunt and honest talk had won them over and made them stay. The meeting then transitioned into a briefing on how to accomplish the mission.<sup>222</sup>

Right after that, Frazier and others began scouting out a route.

They began a systematic air reconnaissance to locate the best breakthrough corridor to West Antarctica's Rockefeller Plateau. First, a VX-6 pilot would fly one or more of the Army officers out in an R4D to scan the entire margin of the ice shelf, sitting and photographing telltale depressions in the snow that warned of bridged crevasses. They followed these sorties with shorter-range, lower-altitude flights by Otter and then close-in work by helicopter, all put at their disposal by Dufek. The Army experts decided on a route somewhat west and south of Bursey's where, Smith recalled, there was a "very tough but comparatively short set of crevasse problems to deal with." Anywhere was a gamble, but here there were no mountains to interfere with air support, and beyond "this one horrendous spot" there appeared to be "clear sailing" all the way to Byrd. But the crevasse belt was fearsome. They were estimating thirty-two crevasses in a seven-mile stretch. In fact, there were more than that, and still more were discovered as the crossings proceeded.<sup>223</sup>

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<sup>222</sup> Frazier, 171-173

<sup>223</sup> Belanger, 133

They flew over each area at least three times, morning, noon and late afternoon, to take into account the fact that different lighting conditions revealed different things, “Areas that appeared safe in the morning often revealed ugly crevasses in the afternoon.”<sup>224</sup> Frazier shared the planes with those planning the pole landing, so he could not get all the flights he wanted or felt he needed. Once they settled on the route, Frazier wanted to do one more flight before giving permission for Dawson’s group to depart. He delayed the departure by one more day hoping to get that flight, but at noon on the sixth, he gave permission for them to start. They would not reach the destination for several days, so Frazier reasoned he could still do it before they arrived and could radio the men on the ground. Four hours after Dawson left, the *Glacier* arrived with reporters anxious to fly out to the party and travel with it. Frazier assured them that they would have access as much as possible, unlike most military operations this mission considered the press, and their stories, an integral part of this operation. More important to Frazier were the four tons of high explosives that the *Glacier* brought with it, which were vital to destroying crevasses. The explosives remained at Little America and flown out to the party as needed.

Dufek released a damaged R4D to Frazier for his exclusive use. The damage to the wing took place during a landing at Beardmore Glacier and was clearly visible to the occupants of the plane from the inside as it flew. Nevertheless, he considered it safe enough for what Frazier needed to do with it. As Frazier gathered the missing information about the route, he landed when possible and the party updated their charts. As the first crevasse area got closer, Frazier stopped using the R4D in favor of an Otter.

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<sup>224</sup> Frazier, 175

Frazier, the team also received visits from Dufek, as well as reporters and photographers accompanying the ships to cover Deep Freeze II.<sup>225</sup>

As the party moved away from Little America, it received supplies by air, such as fuel, lubricating oil, anti-freeze and food. Every twenty miles they built a twelve-foot tall mound in the snow and topped it with spent fuel drums. Marking the trail for those following, the drums could even be detected on the radar carried by aircraft. A helicopter piloted by Marine Lieutenant Leroy Kenney joined the team and even the Air Force got involved by airdropping fuel drums from a C-124. They spent more than a week searching for a safe passage between miles 171 and 194. At mile 183, they found what they believed to be an area that they could produce a safety zone to get past the area with large number of crevasses. It would take a lot of hard work and the use of a large amount of explosives. "Between 19 November and 3 December, after the detected fissures were marked (using the helicopter's shadow to pinpoint the spot to flag), demolition and dozing teams - using one Weasel and one bladed D-8 - probed, blasted, filled, leveled, marked, and tested the trail, the latter by rein-controlled tractor. They used some 800 pounds of dynamite per mile and pushed enormous quantities of snow into the blown-out maws (in one seven-hour period 105,000 cubic yards), constantly worrying about the D-8's position lest it unwittingly slide into a hole." The finished product was seven miles of trail, thirty-five feet wide at its narrowest, dubbed "Crevasse Junction" but renamed to "Fashion Lane," a name that was later made official. On 3 December, the trail party and all their equipment reached safety on the plateau.<sup>226</sup>

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<sup>225</sup> Frazier, 178

<sup>226</sup> Belanger, 134-135

There had been trouble along the way. At one point, the crevasse detector had stopped detecting them, but they recalibrated the detector and they solved the issue, just as they solved all other troubles. As the men developed dry and cracked skin due to the sun and wind, Little America sent out cartons of Noxzema. They men wore dark sunglasses to avoid snow blindness, “but wind had burned their eyelids to the point that the pain was more severe than snow blindness.”<sup>227</sup> The doctor at Little America solved this problem by mixing up a solution and having it flown out to the party.<sup>228</sup>

With the plateau reached, the party sent word back to Little America. They conducted a flag raising ceremony, filmed by an NBC cameraman, and declared a success. Commander Young and the main body of builders began the trip out to the Byrd Station building site. Their journey’s progress was as slow as the trail party’s progress, so to help make up the time, Young divided his men into two teams. Each team was on duty and driving the equipment for twelve hours. When off duty, team members could sleep and eat. Bunking would be by hot-bunking (shared bunking), no one but the cook got his own bunk since he was preparing all the meals for both groups.<sup>229</sup>

On December 8, the main body approached the crevasse area known as “Fashion Lane.” The trail party ordered Smith to return to the area and guide the men over the seven miles of snow winding through the crevasses.

To abandon his mission, now within reach, was "heart-breaking," although it later opened other doors, Smith said, and "of course it was the right thing to do in terms of the enterprise." He knew like no one else the terrain of those seven miles while also knowing that "knew" was "something of an overstatement," given that already "the effects of glacial motion had begun to make minor changes." He also realized that appearances would

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<sup>227</sup> Frazier, 185

<sup>228</sup> Frazier, 185

<sup>229</sup> Belanger, 135-6

not inspire courage among Navy men who were "still absolutely spooked" about crevasses. After all the dynamiting and snow moving, the area was blackened, churned into chaos; it "literally looked like a war zone." Deadly chasms still flanked the twisting trail. Dr. Ehrlich, who had heard the fears, noted that when it came time, everyone went without objection, which he attributed to good leadership. Young saw "not even the slightest bit of reluctance about doing anything." His men were "just outstanding," the "kind of people that you like to have with you." Likely, the picture was painted more vividly for Smith, to spur his willingness. Likely, the bravado among the Seabees masked considerable internal anxiety.<sup>230</sup>

The tractor train arrived at the crevasse zone on 9 December; soon an R4D landed with Frazier and Smith. After briefings and reconnaissance by Weasel, Smith and Young started the first tractor and one sled over at 0645, followed by the Weasel. Smith, who sat with the driver, guided him along: "Okay, now when we go another twenty-five feet, you have to make a hard turn here, so we've got to go a little bit this way over to the edge, but this is exactly as far as you can move. You cannot go any further to the right because we don't know about whether that's safe over there or not." They safely gained the plateau two and a half hours later and returned with the tractor, to start another sled over after an interval of eight hours to allow the "nervous snow a chance to settle." Gradually, they shortened the wait to four hours without mishap, although Bill Stroup remembered getting out three or four times to walk behind the rein-driven tractor when he crossed. On the 11th, when only the wanigan sleds were left on the ice-shelf side, "we opened a crevasse in the trail we had been running over." The next day they decided to proceed anyway, "passing the crevasse on the side. The sleeping wanigan opened another crack further up the trail, however [we] brought the messing wanigan over anyway and it made it safely." By 0830 the train was all on the plateau. "I don't believe another sled would

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<sup>230</sup> Belanger, 136

have made it," the exhausted, relieved train leader wrote.<sup>231</sup> Once all the equipment was safely across, the caravan made the long trip to the building site. Periodically the Navy would land ski-equipped planes to off-load fuel for the trip. On three other occasions, the Air Force airdropped thirty tones to the Seabees. Finally, on 23 December, Young radioed that they had made the site at 2 p.m., and had begun construction at 4 p.m. Total distance traveled had been 645 miles; but the men had a mission to accomplish and rest came later. Within nine hours, the first building was completed. Young had enough materials for three more and then the group returned to Little America.<sup>232</sup> Using lessons learned during Deep Freeze I, material was loaded on the sleds in its order of need at the worksite. They also had learned to leave the building site undisturbed so it would not need grading before the building could begin.<sup>233</sup>

On December 29, the last building went up. The men then turned to the task of erecting antennas, outfitting the interiors of the buildings and building the snow runway. Young declared the base operational on New Year's Day. Soon thereafter, the fifteen tons of food and equipment, along with the dozen scientists and eleven Navy support personnel who would winter over began to arrive. Young was among the last of the non-winter over personnel to leave. He left on January 23.<sup>234</sup>

Young may have declared the base operational, but those wintering over believed differently. Its ability to keep them alive and safe was marginal and its ability to conduct scientific research questionable. There was little margin for error in its food and fuel supplies, and some feared that they might have to abandon the station. Air Force support

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<sup>231</sup> Belanger, 136

<sup>232</sup> Frazier, 206

<sup>233</sup> Belanger, 139

<sup>234</sup> Belanger, 139-140

had vanished because the runway at McMurdo had deteriorated to point it was unusable and the planes had flown back to New Zealand. VX-6 could only offer two flights of R4D's because of the weather. More than one person was relieved that Dufek decided to try to get one more tractor train of supplies in before the window of summer closed. The tractor train of seven D-8 tractors pulling fourteen sleds loaded with about 220 tons of material left on January 29. Smith again led them through Fashion Lane and the train arrived at Byrd on February 12.<sup>235</sup>

### **VIII. The South Pole**

With the Seabees at the South Pole and supplies being flown in each day, construction began. During the winter, the Seabees at McMurdo repaired the damaged materials. They had also palletized the materials and placed them into the Air Force A-22 containers, which could be attached to parachutes and airdropped by the Globemasters.<sup>236</sup> One item that they could not be palletize were the twenty-foot-long metal beams to support the roofs and floors of the South Pole buildings. The Globemasters could not drop anything of that length. The Seabees had to cut the beams in half, and then drill them for the splice plates to rejoin them. Unfortunately, it did not go as well as it should have. The men assigned to cutting the trusses in half did not mark which one went together. The Seabees assigned to bolting them back together wasted much time trying to match up the pieces at the building site. "They were steel trusses. We made out because

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<sup>235</sup> Belanger, 140-141

<sup>236</sup> Siple, 146



we just worked them. So it took us twice as long to get a truss bolted together and there were a jillion bolts.”<sup>237</sup>

Preparing the building materials were not the only thing done over the winter to prepare for the South Pole, they conducted survival training for the building crew. Lieutenant Richard Bowers had known since Davisville that he would be in charge of the building of the station. He had worked on the McMurdo Station, to learn lessons in building under the South Pole conditions, but also to get to know his handpicked men. By the time the actual project arrived, he had reduced the number of men down to thirty-five men including alternates.<sup>238</sup> In his oral interview, Bowers spoke about the planning. He consulted with Siple about his needs at the Pole; this in turn influenced his team choices. After he had picked out the men he wanted, he spoke to them to see if they were interested. Most were, but a few were not. They then went about gathering all the tools and equipment they needed to do the job. Finally, they then assembled all the scientific gear. He had to organize and prioritize everything.<sup>239</sup>

Each was a volunteer who had attended weekly lectures at McMurdo on surviving every possible emergency. They had also spent several trips to practice various techniques for moving and surviving in the extreme temperatures. They underwent rigorous physical, navigational and medical training, even practicing putting up one of the huts.<sup>240</sup>

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<sup>237</sup> “Interview of Charles Bevilacqua by Dian O. Belanger.” 2009. Accessed August 24, 2015 <http://hdl.handle.net/1811/36730>

<sup>238</sup> Siple, 147-148

<sup>239</sup> “Interview of Richard A. Bowers by Dian O. Belanger.” 2009. Accessed August 24, 2015. <http://hdl.handle.net/1811/36750>.

<sup>240</sup> Siple, 147-148

Siple also used his time at McMurdo to prepare for the South Pole. Upon arrival, he took inventory of all the gear and equipment for the wintering over. He then compared his list to those made the previous year. “It was disquieting to discover that fifteen closely typed pages of equipment had either been left out or were in short supply. If we had acquired nothing further and merely accepted what had been packaged, life at the Pole could certainly have turned out to be a grim affair.”<sup>241</sup> Siple prepared three lists of items. List A, included items he considered absolutely essential, things like raw stock to build instruments and gadgets in an emergency, a sewing machine, and shop equipment. List B, were provided items but in too small of a quantity, such as aluminum foil, sandpaper, spare drills, and safety pins. List C were items that would be useful if provided, such as napkins, paper cups, and disinfectant. Siple had permission to requisition anything he could find as long as it was already available at the McMurdo base. He and a team of Seabees looked all over the base, including the pile of equipment that surrounded the base. They were able to find most of the items on the lists, what they could not find; they requested IGY headquarters’ help in locating. “I remember that we were particularly elated when we acquired a set of the *Encyclopedia Britannica*, for I knew that during the winter night men would argue about various factual questions and it was important that they have source books to settle their disputes.”<sup>242</sup>

On November 20, Bowers and his men found themselves near the South Pole, or more specifically, eight miles from it. The transmission and batteries on the Weasel were broken when it landed hard from the parachute drop. “Bowers and his men began to suffer from the altitude and cold almost immediately. All the men felt dizzy and were

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<sup>241</sup> Siple, 146

<sup>242</sup> Siple, 146

seized with a strange feeling of exhaustion, some were frostbitten, and one almost passed out due to anoxia, or lack of oxygen.”<sup>243</sup>

Bowers disagreed. In his interview, he described how the Supply Chief at McMurdo would make sure everything was color-coded and could even send replacements for items lost. Instead, he placed the blame on the deterioration of the runway at McMurdo and the problems that the Air Force was having with the parachute drops. The schedule at the South Pole worked around the flights. If the weather was good, the Air Force flew everything they could as often as they could. Work at the Pole would stop so that all hands could help recover the air dropped items. When the planes could not fly, the Seabees spent their time building the station, sometimes they could get a full twenty-four hours of construction done before the next flight. The biggest problem they had was with the airdrops. Due to the winds, the Air Force used a disconnect device that was supposed to automatically separate the pallet from the parachute once it was on the ground. Instead, the device would operate while the pallet was still in the air, causing the contents to be scattered all over the area. Some of it was salvageable; some of it was not and needed replacement.

The faulty disconnect slowed us down at first because we'd have to dig the streamed material out of the snow—sometimes five or six feet in depth—drag it to camp, find out what was damaged, then radio back and say that pallet such-and-such and the number, give Chief Hess the description and he'd have to go out and dig it up and send us a replacement. And he did that. He did a marvelous job.

The Air Force wanted to investigate this problem further so they parachuted an AF sergeant by the name of Dick Patten in to us. He confirmed what we were telling them, and the AF stopped using the device. He stayed with us to serve as a ground patroller for subsequent

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<sup>243</sup> Siple, 152

drops. He also helped with construction, [and] didn't return to McMurdo until late December.<sup>244</sup>

The cause of McMurdo runway problem was a January 1957 Antarctic heat wave. High temperatures were in the 30's and sometimes reached 40 degrees Fahrenheit. Besides the runway deteriorating, the heat wave deteriorated the trail from the ships to shore that the cargo-caring tractors traveled. The tractors had to navigate a path filled with watery potholes. Sometimes the pothole went all the way through the ice, and seals would poke their heads up through holes in the ice, at other times it was Penguins. After a group in a Weasel had ventured out to one of the YOG's and the vehicle broke through the ice, one man, Seabee Ollie B. Bartley<sup>245</sup>, drowned; a group formed to try to fix the holes. Bartley was the eighth man killed during Operation Deep Freeze.<sup>246</sup> Cold weather was not expected until late February, until then, the potholes had to be filled. Dr. Andrew Assur of the Snow, Ice and Permafrost Research Institute came on assignment to solve the problems. "Daily he worked, caring for each pothole much like a dentist treating a tooth. First he would clear all the slush from the melt-water hole and fill it with crushed ice and fresh water."<sup>247</sup> This continued each day until the holes were filled and the runway declared safe for aircraft to operate.

One day after Bowers' group had landed; an Air Force Globemaster brought a new transmission and batteries for the Weasel. Unfortunately, the "parts fell from the plane prematurely and landed two and half miles from the tents. And though the

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<sup>244</sup> "Interview of Richard A. Bowers by Dian O. Belanger." 2009. Accessed August 24, 2015. <http://hdl.handle.net/1811/36750>.

<sup>245</sup> "Casualties: USN and USMC Personnel Killed and Injured in Selected Accidents"

<sup>246</sup> Frazier, 226

<sup>247</sup> Frazier, 227

transmission landed safely, the batteries were all broken.”<sup>248</sup> The Air Force, assuming the Weasel was now operational, began dropping building materials eight miles away at the South Pole. Bowers decided to split his group, leave one party behind to repair the Weasel, and take three men with him to the South Pole by dog sled. Bowers found the materials scattered around the area; some were several miles away. Some were buried or damaged, but salvageable. Others though, were destroyed or lost and never recovered. On November 25, Patton parachuted into the original landing site. He brought with him new batteries for the Weasel and once he reached the actual South Pole site, got the airdrops in order. The next day more men arrived and the construction camp was started. On the 27<sup>th</sup>, a D-2 Caterpillar tractor arrived and construction picked up speed.<sup>249</sup>

Paul Siple and the last of the construction crew arrived on November 30. Before leaving McMurdo, Siple reminded Dufek that in addition to the construction materials that still needed to be sent to the South Pole, there was also approximately “a hundred tons of food, medical gear and operational equipment for the South Pole Station” that still had not arrived at McMurdo and was inbound on ships.<sup>250</sup> Siple says that Dufek was unaware of this fact and was “appalled” by the revelation.

What Siple found at the Pole was a chaotic but organized construction camp. Every material, building, vehicle and person had been brought by the air 850 miles from McMurdo. Where once there was nothing, now there were warm accommodations until the base was ready. He shared the room with Bowers, while at the same time it served “as the galley, radio shack, weather station, office, first aid station and a host of other

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<sup>248</sup> Siple, 153

<sup>249</sup> Siple, 154-157

<sup>250</sup> Siple, 159

odds and ends activities.”<sup>251</sup> While the Seabees worked on the camp, Siple began digging a hole. It would take him four days to dig down eighteen feet with an access ramp. His purpose for doing this was to determine two things, what the winter temperature at the pole would be, and to find out if the snow would support the weight of a Globemaster landing on it. At the bottom of the hole, the temperature was a minus 62°F, which meant they could look forward to a winter temperature around minus 120°F, colder than found anywhere else on Earth. His tests on the snow showed that it would not support a heavy Globemaster with being compacted down significantly, something there was no time to do.

While the camp layout had already been planned in Washington and agreed upon by both the Navy and IGY, Siple had recommendations to make based on his experience in the Antarctic. Bowers for his part was under orders not to make any changes without prior approval. The changes involved all the buildings being at the same height so that the building would not be buried under the snow. Another was that tunnels connect the buildings so a person could go from one building to another without going outside in the extreme weather. Finally, an emergency camp was built and stocked with supplies so that if a fire destroyed the camp during the winter, the men would have a chance of surviving.<sup>252</sup>

Bowers was unable to change the height of the buildings, so with the roofs at the same level, the foundations had to be at different levels. This meant the Seabees had to dig down deeper for some buildings than for others. Siple also proposed that half of all

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<sup>251</sup> Siple, 161

<sup>252</sup> "Interview of Richard A. Bowers by Dian O. Belanger." 2009. Accessed August 24, 2015. <http://hdl.handle.net/1811/36750>.

the supplies be placed on different sides of the camp, so that if one side burned, they would have the other side. If both sides burned, then they had the emergency camp. Finally, there was the issue of the fuel dump. Siple explained, "As at the other IGY stations, the Navy had planned to put our fuel barrels out in the open. I, however, could not picture leaving the Station in the dark at minus one hundred degrees to wrestle in a 400-pound barrel of fuel. It would have to be done by hand, for no vehicle we had could operate at such low temperatures."<sup>253</sup> Instead, the fuel would be stored underground between the buildings, easily accessible to the winter over party.

On December 24, the first eight Seabees left the South Pole. On the 29th, eight more Seabees left, but the eight replacements that would be wintering over and supporting the scientists took their places. Of the construction crew, all that remained were the men who would do the turnover to the replacements. On January 4, 1957, Bowers and the remaining six Seabees left. It had been hoped that the planes would bring the rest of the men who would be wintering over; instead, they brought more supplies. Dufek was concerned that there was not enough food to survive the winter with what was currently on hand. He ordered that no more personnel would be brought in until there were enough supplies. The last of the supplies and personnel arrived on February 12.<sup>254</sup> With that, the eighteen men, nine civilians and nine Navy men would be alone at the Pole for the winter. They would finish building the base, mostly the interiors, and would conduct the scientific experiments. The Navy men would support the scientists in these efforts.

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<sup>253</sup> Siple, 166

<sup>254</sup> Siple, 188-227

## IX. Cape Hallett and Wilkes Stations

The three remaining stations to be built all were close to the coast and could be built, supplied and supported by ships. The previous year, sites had been mapped and partially explored, but none extensively. All of the camps were modest in size.

In February 1956, the *Edisto* had attempted to find a suitable landing site at Cape Adare. After four hours, the attempt was called off and the ship moved down the coast sixty miles to Cape Hallett. When the survey party, made up of representatives from the Navy, Air Force, the Smithsonian, IGY, Hydrographic Office and the press, landed it was a fair weather. There were a few penguins about, but before they had time for an actual survey of the area, a snowstorm came up and caused them to go back to the ship. Despite the lack of a thorough survey, they still selected the area for a base. When a team arrived the next season, it was discovered that the area was actually a penguin rookery that had to be dealt with.<sup>255</sup> William H. Littlewood, a civilian oceanographer who worked for the Navy during Operation Deep Freeze explained the rational during an interview. Based on historical data, Deep Freeze planners knew Cape Adare was a place that could be used. When the Navy arrived to look over the area, there were katabatic winds coming down off the mountains. A landing attempt was made using a WWII landing craft (LCVP); the heavy surf caused it to turn over and the people aboard needed rescue. The conditions made the location unacceptable for a base, so the Navy went up and down the coast looking for another site. Finally, near Cape Adare a site was found. Littlewood, in his interview states:

We're now late in the season and we had to do this rather quickly. I went ashore in the landing craft in this case. I wasn't the first one to step

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<sup>255</sup> Belanger, 189



off but was in the first landing craft in there. The spit of land was covered by snow, but not deep snow at that time.

There were a few penguins on it, perhaps about fifteen molting Adelie penguins that looked like they were waiting to finish their molts to go to sea and such. I guess we didn't realize that that was the only site for the penguins around there, too. So really the snow covered the guano that would've marked it as a penguin colony. So we went back and decided that was the site. It was called Cape Hallett where we found this spit of land. That was the base that became the joint U.S.-New Zealand base for later years.<sup>256</sup>

In December 1956, the ships of Deep Freeze II gathered at the edge of the Ross Sea. The *Northwind* was scheduled to escort the *Arneb* to the Cape Hallett location when word came to divert to McMurdo because McMurdo needed the two D-8 tractors to help rebuild the runway. This delayed the *Arneb* from reaching Cape Hallett until the 29<sup>th</sup>. Instead of the few penguins seen during the last trip, the *Arneb* found thousands of birds. As few as 200,000 and perhaps as many as 500,000 birds occupied the pebble beach.<sup>257</sup> In order to clear a work site, the Seabees put up a fence around several acres; the scientists then removed some 7,500 birds. Unfortunately, the fence was blown down in a storm and the area refilled with birds. The Seabees' only choice was to do it all over again.<sup>258</sup> They solved the problem by building a barrier made from oil drums. As William Littlewood recounted, "You may have seen pictures of Cape Hallett with a ring of fifty-five-gallon oil drums as a barrier to the penguins because they had a hard time hopping up on the fifty-five-gallon drums from the flat ground."<sup>259</sup>

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<sup>256</sup> "Interview of William H. Littlewood by Dian O. Belanger." 2009 Accessed August 24, 2015. <http://hdl.handle.net/1811/36755>

<sup>257</sup> Belanger, 190

<sup>258</sup> David Boyer, "Year of Discovery Opens in Antarctica," *The National Geographic Magazine*, September 1957. 355

<sup>259</sup> "Interview of William H. Littlewood by Dian O. Belanger." 2009 Accessed August 24, 2015. <http://hdl.handle.net/1811/36755>

On New Year's Eve, a storm trapped the *Arneb* between the ice and the shore. Photographer's Mate Paul Noonan explained, "The pack ice, which extended out for several hundred miles I'm told, was being blown by hurricane-force winds down on the ship, and it was just popping the hull—squeezing the ship."<sup>260</sup> There was talk of having to abandon the ship, something no one wanted to do, but the wind finally stopped and ship was freed from the ice shelf.

With the storm over, the *Arneb* unloaded its cargo and construction of a supply dump began. With help from all hands, including the ship's crew, the unloading took about a week. By January 9, the supplies were organized and some basic shelters erected for the construction crew. Communication was working, and because the base was being built on rock and not snow, the future buildings would have windows, unlike other IGY bases that were covered in snow. On January 10, the *Arneb* sailed away to deliver the rest of its cargo. Left behind were about thirty Seabees to finish the base.

By the time the *Atka* picked them up on 12 February, they had completed four main buildings to provide for berthing and medical care, cooking and messing, meteorology and communications, power generation, vehicle maintenance, and science. Assorted smaller units housed the latrine, spare generator, hydrogen generator, balloon-inflation shelter, darkroom, radio homer, and refrigerator. In addition, there were a seismometer hut, two non-ferrous huts for geomagnetic measurements, a rawin dome, and an aurora tower - all familiar IGY structures.<sup>261</sup>

The *Arneb* and the *Northwind* were ordered to stop in McMurdo before going to the location of the Wilkes Station. It was 800 miles out of the way, but Dufek was concerned about the damage the ships had suffered, the *Arneb* was leaking.<sup>262</sup> "So we

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<sup>260</sup> "Interview of Paul F. Noonan by Dian O. Belanger" 2009. Accessed August 24, 2015 <http://hdl.handle.net/1811/36752>

<sup>261</sup> Belanger, 193

<sup>262</sup> Belanger, 196

went to McMurdo Sound, and at McMurdo Sound they heeled the ship over by swinging the tractors and the landing craft out on the port side to bring the starboard side up above the water line so they could weld and repair the cracks. There was a good deal of cargo that was damaged with the water and wasn't usable, but it wasn't that bad that we couldn't go ahead.”<sup>263</sup> It was determined that the icebreaker was too badly damaged to continue and it was sent back to Christchurch was a new propeller. The *Glacier* was assigned as a substitute; the *Greenville Victory* was also assigned to go with the ships to help unload the cargo. The three ships, upon entering Vincennes Bay encountered the thickest pack ice anyone had seen. The *Glacier* was the most powerful icebreaker that the U.S. possessed, and it had to try four times to get through the ice to make the coast. During this process, the *Arneb* suffered more damage, but the builders had finally arrived at the site of the station.<sup>264</sup> It was the most northern of the stations, just outside the Antarctic Circle, and as Paul Noonan remembers, the base was built in less than three weeks. By using all available personnel from the ship working eighteen-hour shifts to assist the Seabees the ship was unloaded using landing craft to bring the materials to the beach, and the tractors. “Well, they got the ship all unloaded, and they built the structures of all the buildings—the two barracks buildings, the chow hall, the garage, and the one other building that were sort of a recreation building—they got those structures all up and they got the powerhouse going, and then they departed.”<sup>265</sup>

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<sup>263</sup> “Interview of Paul F. Noonan by Dian O. Belanger” 2009. Accessed August 24, 2015 <http://hdl.handle.net/1811/36752>

<sup>264</sup> Belanger, 197-199

<sup>265</sup> “Interview of Paul F. Noonan by Dian O. Belanger” 2009. Accessed August 24, 2015 <http://hdl.handle.net/1811/36752>

As in all the other stations, once the building team left, it was up to the men staying behind to finish the stations and get them into working order to conduct the IGY research. Wilkes was the only IGY station never to have an airfield. As such, visitors never disturbed them; other than the radio, they were alone.<sup>266</sup>

#### X. Ellsworth Station

The last station built was the Ellsworth Station, it was also the only station whose builders and occupants did not go through New Zealand or any of the other Antarctica stations. Due to its location, the Ellsworth station was closer to South America than to New Zealand and Christchurch. On November 9, 1956, the men sailed from Davisville in the attack cargo ship U.S.S. *Wyandot* (AKA 92); a veteran of World War II, the ship was damaged by Japanese bombs during the Okinawa landings. They sailed down to Panama, crossed the canal and were joined the USS *Staten Island*, a Wind-class icebreaker based in Seattle, Washington. The two ships then sailed to Antarctica, stopping in Valparaiso, Chile to pick up Captain Finn Ronne, head of the military overwintering party, as well as the overall commander of the station. The ships headed to the Filchner Ice Shelf.<sup>267</sup>

We sailed out of Punta Arenas after dark on that evening of 7 December and proceeded through the Straits of Magellan into the Southern Ocean. We set our course to the southeast towards the Weddell Sea. The plan was to avoid as much of the ice pack as possible and eventually head due south about 15°W We didn't see civilization again until 31 January 1958.<sup>268</sup>

Once the ships entered the pack ice, progress slowed as they were dealing with ten to fifteen foot thick ice. At some point, the ice caused *Wyandot* to rupture a seam and spill out 9000 gallons of fuel oil. On Christmas Eve, the *Wyandot*'s captain reported

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<sup>266</sup> Belanger, 202

<sup>267</sup> John C. Behrendt, *Innocents on the Ice: A Memoir of Antarctic Exploration, 1957* (Niwot, Colo: University Press of Colorado, 1998). 9

<sup>268</sup> Behrendt, 18

more damage; this time the blade tips of the propellers had been shortened by contact with the ice.<sup>269</sup> Along the way, the ships visited several of the IGY bases belonging to other nations. “Our welcome at these bases was overwhelming, and our gifts of fresh fruit and news magazines were more precious to them than diamonds. On take-off to Shackleton base on December 30, one of our helicopters was damaged when it failed to develop full power. It crashed on the deck of the *Staten Island* and was a total wreck, but fortunately, no one was hurt. After being stripped of all its usable parts it was dumped overboard when we became stuck in the ice on New Year's Day.<sup>270</sup>

On January 1, the ships became locked in the ice; they remained there for eleven days. On January 11, the ships became free of the ice, but the *Wyandot* was taking water in the number two hold. Just like the *Arneb*, the *Wyandot* was heeled over by suspending the D-4 Caterpillar tractor and several landing craft over the port side. It allowed the welders to reach the crack and conduct repairs. On January 15, it was determined the propeller had been damaged further, additionally there was now a five-foot split on the port side. The dewatering pumps handled the flooding, but only when the ship was not moving. Dufek became concerned about the ship sinking and urged the ship's Captain to find a spot soon for the base. By the next day, when repairs were attempted, the split had become a seven-foot crescent shaped gash. To make matters worse, the *Staten Island* lost a propeller that same day.<sup>271</sup>

On January 23, Dufek's patience was up, and he ordered the base to be built at a nearby location. The scientists wanted a different location, but the *Wyandot's* Captain

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<sup>269</sup> Behrendt, 26-27

<sup>270</sup> Finn Ronne, *Antarctic Command* (Indianapolis: Bobbs-Merrill, 1961), 31-32.

<sup>271</sup> Behrendt, 34-38

agreed with Dufek and had become increasingly concerned about the damage to the ship. On January 26, the first group landed at the site of the base -- thirty-five miles west of an Argentine base and fifty miles from a British base. Rather than being on the edge of the bay of the Filchner Ice Shelf, the actual site was two miles inland.<sup>272</sup> The Navy had originally expected construction to take forty days, instead, the Seabees and the ship's crew had two weeks to unload the cargo and build the base. However, it took eleven days of the fourteen to unload 11.2 million pounds of cargo, including 5000 drums of fuel. The base was built in the remaining three days. Depending on who was doing the estimating, it was between seventy and ninety percent finished. On February 10, the ships sailed back to the U.S. Left behind were thirty-nine men who would complete the base and winter over.<sup>273</sup> The station was operational by April, in time to start the IGY.<sup>274</sup> Along with the station itself, Ellsworth Station also had three Otters and a Sikorsky HO4S-3 helicopter to help with the work.<sup>275</sup>

Unfortunately, the plan of having only one commander, a military one, instead of two, a civilian and a military one, did not work as anticipated. Ellsworth Station was plagued with the most conflict of any of the wintering over groups. Moreover, while science was accomplished, perhaps more could have been done with a calmer atmosphere. While a definitive reason as why there so much conflict may never be determined, it seems that having only one commander was not it. Instead, most of the conflict seems to come about because of a conflict of personalities, between the commander, Finn Ronne, and the scientists and the military men.

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<sup>272</sup> Behrendt, 45-47

<sup>273</sup> Behrendt, 49

<sup>274</sup> Belanger, 213

<sup>275</sup> Belanger, 212

At the end of Operation Deep Freeze I, Admiral Byrd sought clarification as to what his and Admiral Dufek's roles exactly were in this endeavor. It was a battle that needed to be fought, but may have cost the Admiral his life, as he started losing weight soon thereafter, and passed in early 1957, never seeing the Antarctic again. With this clarification in place, the planning for Operation Deep Freeze II truly got under way. Those plans soon began changing with more ships, men and mission being added, even VX-6 gained more aircraft. The problem of the crevasses and the route to Byrd Station got attention from Paul Frazier and three Army Officers who were experts in dealing with the ones found in the Arctic. Unfortunately, just like last year, Antarctica saw several men lose their lives, and there was the potential of others dying as well. However, because they were true professionals, the prospect of death did not deter the men involved from doing their jobs and completing their missions of landing at the South Pole, building a Polar Station, completing Byrd Station, building and completing the Beardmore, Cape Hallet, Wilkes, and Ellsworth Stations.

The following chapter will look at Deep Freeze III and beyond. The mission will shift from building to sustainment. The Antarctic mission will also see new technology being tried out for suitability, some of it continues to be used, but other pieces of technology will be abandoned. Finally, the mission will see another military branch take over as primary provider.

## **CHAPTER IV**

### **Deep Freeze III and Beyond**

In Operation Deep Freeze III, the mission changed from building to sustainment, and the science of the International Geophysical Year took center stage. The Navy would be part of that science, carrying out experiments themselves and assisting the civilian scientists in their experiments. Operation Deep Freeze IV should have been the final year, however, it turned out to be so successful, that they kept going. With an ongoing mission, new equipment came into use that outperformed the old surplus equipment. The Army will increase its presence in Antarctica with a helicopter that is famously known for its use elsewhere in the world. Antarctica also flirted with the Atomic Age, before settling into the Jet Age. Finally, the Navy stopped supporting the Antarctic mission as another service takes over.

#### **I. Changing Mission – Deep Freeze III**

With Deep Freeze II wintering over taking place, Deep Freeze III planning began. Unlike previous years, most of the planning had to do with resupplying the already constructed bases. No new construction was planned. This would be the pattern for most years to come; resupply and support missions with an occasional building or repair project.

Two projects excited Dufek. The first project involved scouting out a possible permanent airfield on land to replace the ice runway at McMurdo Sound. There was concern that the bay ice might crack or give way at the wrong time and strand the men in the Antarctica. An ice-free area was found fifty miles west of McMurdo, at Cape Bernacchi. During Deep Freeze III, a two-year study began to test the feasibility of



building an airfield there. If it was possible, Dufek believed that commercial flights could use it, flying from Africa, New Zealand, Australia and South America.<sup>276</sup>

The second project to be undertaken involved determining the depth of the ice under the United States base at the South Pole. It was not certain if there was land or ocean below the South Pole. To find out, seismologist Father Daniel Linehan from Boston College accompanied the Navy survey team to the area.<sup>277</sup>

Offshore, the Navy continued its research on the Southern Ocean. During Deep Freeze III, the Glacier completed:

35 oceanographic stations; 1,036 bathygrams using hourly drops of a bathythermograph, a device for recording temperature versus depth (actually pressure); and 1,025 surface salinity measurements. The team recorded continuous bottom profiles (by precision depth recorder), measured tidal movements, logged ice conditions and characteristics, and dredged and preserved marine fauna. They plotted current systems and refined the Convergence, calculated the water budget of the oceans, and, using radioactive isotopes from many depths, dated water masse.<sup>278</sup>

While no major projects were planned, some buildings at a few of the locations, needed to be repaired. At the Byrd Station, this was due to the severe winters they had experienced and the poor quality of the initial structures.<sup>279</sup> In addition, unlike previous years, only one aircraft, a HUL-1 helicopter assigned to the *USS Atka*, was destroyed. It crashed on takeoff, no one was killed, but several were injured.<sup>280</sup> Chaplain Paul Reigner was burned so severely that he had to receive evacuation back to the United States for treatment. He insisted before leaving that he be able to preach at least one sermon. A

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<sup>276</sup> Dufek, *Through the Frozen Frontier*, 114

<sup>277</sup> Dufek, 115

<sup>278</sup> Belanger, 364

<sup>279</sup> Belanger, 149

<sup>280</sup> Peter J. Anderson, "United States Aircraft Losses in Antarctica," *Antarctic Journal* IX, no. I (Jan. & Feb. 1974): 8.

special service was held, where the Chaplain preached while lying on a stretcher, with his body covered in bandages and only his face visible. Immediately after, a Globemaster took him out of the Antarctic.<sup>281</sup> A few other aircraft had accidents, but all were repaired and returned to service.

## II. Deep Freeze IV

Operation Deep Freeze IV also had no new construction planned; in fact, it was supposed to be the last year of the program. However, a decision was made to keep the program going, and after this year, the Operation would be named for the fiscal year. Thus, Operation Deep Freeze 60 followed Operation Deep Freeze IV. The main efforts for Deep Freeze IV were resupply and consolidation. Two stations were transferred to other nations, Wilkes and Ellsworth. Little America V was closed. Five aircraft were lost in accidents that took the lives of eight men.<sup>282</sup> In October 1959, Dufek wrote an article titled “What We've Accomplished in Antarctica” for *National Geographic*. What is perhaps more interesting than the title of the article was the lead-in: “After four years and \$250,000,000 of Operation Deep Freeze, the naval officer in charge sums up.” In today’s money, this is nearly \$2.1 billion. Nowhere in the article does Dufek explain the figure; it is probably just what was budgeted for the IGY, not including the cost of the military support. Dufek does mention the cost for diesel. At 14 cents per gallon originally, by the time the Air Force dropped it onto the ice, the price rose to \$3.60 or \$30.00 per gallon today. Dufek spent most the article describing his last visit to Antarctica, and what had changed in the four years of Operation Deep Freeze. He remarks that he was retiring and turning the project over to Admiral Tyree, regretting that eighteen men died during the

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<sup>281</sup> Dufek, 135

<sup>282</sup> Anderson, 9

four years. He also mentioned that the Army was trying to develop nuclear power plants for use in the Antarctic. At a cost of \$3 million each, it would take twenty years to pay for themselves. The truth would be a little different.<sup>283</sup>

### **III. New Aircraft**

Operation Deep Freeze 60 was a year of resupply, but it also involved surveying the existing buildings and structures to see what was usable, with repairs, and what would need rebuilding, now that the decision had been made to continue beyond the original timeline. Introduced in Antarctica was a new aircraft and it would be so successful that it continues in use today: the Lockheed LC-130 Hercules.<sup>284</sup> The Air Force began testing ski equipped C-130's in late 1956. They took a C-130A off the assembly line and added skis to it. In January 1957, it successfully landed in a series of tests in Minnesota and in Greenland. Lockheed then modified twelve C-130A aircraft while they were still in production. They were known as C-130D. The Air Force tested these in the Arctic in January 1959.<sup>285</sup> One year later, the Air Force flew seven to Antarctica. While not as large, nor carrying as much cargo as the C-124 Globemaster, the Turbo-prop equipped Hercules could fly higher and faster, and with skis, land at the various stations instead of having to air drop the cargo, an innovation that saved millions of dollars a year in the cost of having to buy parachutes or replace lost air dropped equipment. Between January 25 and February 5, 1960, the seven aircraft made "128 ski landings, average flight per day 7, total flight days 1104, cargo carried 407 tons with 131 crew members, 10 flight crews

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<sup>283</sup> George Dufek, "What We've Accomplished in Antarctica," *National Geographic Magazine*, October 1959, 526-557.

<sup>284</sup> Anderson, 10-11.

<sup>285</sup> Gillespie, 159.

and an average of 7.3 missions per flight crew.”<sup>286</sup> The Navy was so impressed with the aircraft that they ordered their own to be used in Deep Freeze 61.

Pressure from Admiral Tyree had the first four new ski-equipped C-130BL Hercules diverted from the original USAF contract to the Navy's VX-6 Squadron in August 1960. They were similar in appearance to the C-130A apart from their four bladed propellers, and Lockheed incorporated major improvements giving them greater performance. The 'B' also had more powerful engines, greater fuel capacity and greater structural strength, allowing them to operate at higher gross weights, which resulted in the squadrons improving their Antarctic operation's payload range. The ski assembly was the same as the C-130D's, allowing the plane to land on either skis or wheels.

The first C-130B BuNu 14831 arrived in the Antarctic on October 29 1960, commencing polar operation the next day. This aircraft was later buried in the ice for sixteen years before it was recovered and returned to Antarctic service with the New York Air National Guard.<sup>287</sup>

One of the first bases rebuilt would be Byrd station, as it was in poor shape. The Army had recently built a new science station in Greenland by digging a ditch and placing a curved roof over it. The snow then blew over the structure. The Navy wanted to use this design and determined that the trenches would have to be nine to twelve meters wide and at least six feet deep. The Navy also wanted to move the station six miles from its original site. To accomplish the trenching, the Navy needed snow-milling machines delivered to the site, and the machines came from France. To bring the machines to New Zealand, where they would then be ferried to Antarctica, the Air Force used another new plane, the Douglas C-133 Cargomaster. It was the largest cargo-carrying aircraft in the fleet until the Lockheed C-5 Galaxy replaced it in the 1970s. Each of the C-133 carried thirty tons of equipment to Christchurch.<sup>288</sup>

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<sup>286</sup> Gillespie, 163

<sup>287</sup> Gillespie, 164

<sup>288</sup> Gillespie, 165

#### **IV. U.S. Army Helicopters in Antarctica**

During the 1960s, the U.S. Army increased its participation in Operation Deep Freeze by supplying helicopters and personnel to fly and maintain them. Starting with Deep Freeze 62, and continuing until Deep Freeze 69, the Army flew the UH series of helicopters in the Antarctica to support field work to remote sites; in all some 3000 hours of support.

In 1961, the Navy asked the Army to support a U.S. Geological Survey of the Victoria Land coast and the Army detachment arrived on October 21, 1961. The Army brought with it two UH-1B Iroquois and nine men. In March 1962, this helicopter arrived for the first time in a place it will be forever linked with, Vietnam. The “Huey” as it was known, was chosen because it had turbine-powered engine that could lift 2000 pounds, fly as high as 13,000 feet, did not need to be preheated to start in the cold temperatures of the Antarctic, and could be transported inside of the LC-130. The Navy’s helicopters could do none of this. By January 12, the survey work was completed, a full month ahead of the schedule. The Army also found time to support the McMurdo and Hallett Stations, one time transporting 30,000 pounds of cargo using external slings from the *Eastwind* to the Hallett station in only ninety minutes. The Navy was so impressed that they asked the Army back to conduct a new survey the following year. When the Army returned, they brought three UH-1B copters fitted with higher performance engines. Upon the completion of the survey, the helicopters were used to support a geology team working near Mount Weaver. The geologists reported that the help the Army gave them in three days allowed them to accomplish the amount of work that would have been done in three months using only ground transportation.

With the work done, the helicopters flew to the pole and waited for a LC-130 to pick them up. On February 4, 1963 the three helicopters became the first rotary wing aircraft to land at the South Pole. With these successes, the Army agreed to continue the support Deep Freeze in the coming years.

For Deep Freeze 64, the Army supported the fieldwork being done in the Hallett Station area and in the Ellsworth Mountains. However, on the day the helicopters arrived at the Hallett Station, a storm destroyed two of them. These two were sent back to the U.S., but the Army did not give up and instead sent two new helicopters to complete the tasks.

Deep Freeze 65 would see the Army again doing the same tasks, but it would also see the Army experience its first flight accident. A UH-1B crashed just below the summit of a mountain, being damaged beyond repair. No one was hurt, and the investigation that followed placed the blame on insufficient power for landing at that location at that altitude. The landing site was at 13,800 feet. Despite this crash, the abilities of the turbine-powered helicopter were becoming known and accepted. More and more projects were designed to take advantage of these helicopters, projects that would not have been possible, or would not have been as easy to carry out without them.

For Deep Freeze 67, the Army upgraded the Antarctica detachment with new UH-1Ds. These helicopters had greater capabilities than the UH-1B, including greater range and carrying capacity. They would be used with more and more projects over the next

several years until the end of the Deep Freeze 69. At that time, the Army disbanded the detachment and transferred the helicopters to the Navy for use in the Antarctica.<sup>289</sup>

## V. Nuclear Power Comes to Antarctica

Antarctica was not the first place that the U. S. attempted to utilize nuclear power. In fact, the Army had installed a small reactor in Greenland. The Army was trying nuclear power in order to reduce the cost of providing power to remote areas. The Army had done a cost benefit analyst and believed that nuclear power could generate electric power for around 0.564 cents per kilowatt-hour. The Navy, using the Army's analysis applied it McMurdo Station. A gallon of diesel cost the Navy 12 cents a gallon. By the time it was shipped to McMurdo, the cost had risen to 40 cents. When this fuel was then used to generate electricity, the cost per kilowatt-hour became 0.975 cents. The Navy concluded that nuclear power would be a more economical way of generating power. The Navy also believed that if this worked, then both Byrd and the South Pole Stations would also receive them. When the Navy went to Congress for approval, they found Congress to be very receptive and gave the Navy approval.<sup>290</sup>

Martin Marietta Corporation won the contract to build the reactor called the PM-3A. It had the capacity to produce 1.8 megawatts, was small enough to fit inside a LC-130 and was expected to last 20 years. The reactor arrived on December 12, 1961, became operational on July 10, 1962, and decommissioned in September 1972. Over the 10 years that the reactor was in operation, it produced 78 million kilowatts, and when it was running, it supplied all the power that McMurdo needed. However, due to various

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<sup>289</sup> Thomas L. Orr, "Army Helicopter Operations In Antarctica: Eight Years of Support," *Antarctic Journal of the United States*, Nov. & Dec. 1969.

<sup>290</sup> Richard P. Muldoon, ed., "McMurdo Station Reactor Site Released for Unrestricted Use," *Antarctic Journal of the United States* XV, no. 1 (March 1980): 1-4.

scheduled shutdowns for maintenance, as well as an accident that did not release any radioactivity, but which caused the reactor to be off line for several weeks; the need for diesel backup generators never went away. Added to this were the additional costs of maintaining the reactor, as well as a new report commissioned in 1972 by the National Science Foundation that found that the operation of the unit was not cost effective.

During the 1973-74 season the Navy dismantled all of the reactor's secondary systems and most of the reactor vessel itself. Those components and all of the fuel was shipped to the Department of Energy's Savannah River Plant near Barnwell, South Carolina, for disposal. In 1974-75 the rest of the reactor components were shipped. In 1975-76 the buildings that surrounded the reactor were shipped along with their foundations. All of the backfill from the site which contained more than 2000 picocuries per gram of radioactivity was boxed and shipped as low specific activity waste. All of this material ended up at the Savannah River Plant.

What remained after the 1975-76 season was rock which contained less than 2000 picocuries per gram. Since International Atomic Energy Agency regulations consider material containing less than 2000 picocuries per gram nonradioactive for shipping purposes, the rock was marked for bulk loading on the annual departing cargo ship. From 1976-77 to 1978-79, about 11,800 cubic yards of this low-level contaminated rock were collected and shipped to Port Hueneme, California.<sup>291</sup>

The former site was tested and found to be safe for unrestricted use. In 1979-80, McMurdo received new more fuel-efficient diesel generators to meet its power needs. In January 2013, after veterans who served at McMurdo during the period that reactor was operating or while it was being decommissioned expressed their concern, a technical report was released that detailed a study that had been conducted as to how much radiation exposure any one of them could have received. Working together, the Department of Defense (DOD), the Department of Veterans Affairs (VA), and the Veterans' Advisory Board on Dose Reconstruction (VBDR) put together a group of military, civilian, and contract radiation experts from the Defense Threat Reduction

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<sup>291</sup> Muldoon, 1-4



Agency, the Naval Dosimetry Center, and McMurdo Station veteran volunteers to assess these risks. “This team calculated veteran radiation doses and assessed the probability that these radiation doses may have caused subsequent disease. During this assessment process, VA and VBDR subject matter experts provided critical peer-review.”<sup>292</sup>

The study concluded that the probability that anyone received dangerous levels of radiation to be low, and that the probability that any disease could be caused by the amount of radiation to also be low. It also outlined how a veteran or if deceased, the veteran’s family could file a claim if they believed otherwise. In July of 2013, hearings were held to discuss these findings. The VA still stands by the study, but it has awarded benefits for radiation exposure in McMurdo for the last several years.<sup>293</sup>

## **VI. Jet Planes and the Air Force Takes Over**

In 1963, the U.S. Air Force accepted the first of a new heavy lift jet powered transport aircraft, the C-141 Starlifter. The jet transport was designed to replace the propeller cargo planes such as the C-124 Globemaster. It could fly twice as fast, twice as high, and with an unlimited range because of the ability to be refueled in the air. So in 1966 it was decided to test the new plane in the harsh conditions of Antarctica. On November 11, 1966 a C-141 took off from Christchurch and flew over McMurdo, it could not land because of crosswinds, so it turned around and flew back to Christchurch. Total time aloft was 10 hours and 20 minutes. The C-124 Globemasters had taken over

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<sup>292</sup> "Upper-Bound Radiation Dose Assessment for Military Personnel at McMurdo Station, Antarctica, between 1962 and 1979," U.S. Defense Threat Reduction Agency, DTRA-TR-12-003, June 2013.

<sup>293</sup> Ron Regan, "Cancer linked to exposure at Antarctica Navy base after NewsChannel 5 Investigation," Newsnet5, December 23, 2015, accessed June 28, 2017, <http://www.news5cleveland.com/news/local-news/investigations/cancer-linked-to-exposure-at-antarctica-navy-base-after-newschannel-5-investigation>

12 hours just to go in one direction. On the 14th, they tried again and were successful. In October 1967, one last C-124 was used, but after that, for all heavy loads it would be the C-141 or other jet-powered aircraft.<sup>294</sup> With its capacity to land on snow, the choice for lighter loads remained the LC-130.

In October 1968, the record set in 1966 by the C-141 was broken; a C-141 had flown from Christchurch to McMurdo in less than five hours. It carried some 40,000 pounds of cargo. Using the formula to determine where the Point of Safe Return (PSR) was for the aircraft on the missions, the Air Force put the PSR at 20 minutes beyond McMurdo.<sup>295</sup> In 1984, another first took place with the C-141: Air Refueling. Due to a large-scale military exercise by U.S., New Zealand and Australian forces, there was a shortage of aircraft. In order to carry out all of the planned missions, fewer aircraft carrying more cargo would be needed. In order to do so safely, the mission planners decided to use a KC-10 Extender aerial refueling tanker aircraft to top off the C-141 before it goes to McMurdo. This allowed the C-141 to carry an additional 20,000 pounds of cargo without worrying about the PSR. It proved so successful, that planners continued to request air refueling in the following years.<sup>296</sup> Other feats accomplished by the C-141 including helping resurrect old aircraft. In December 1971, a Navy LC-130 crashed on take-off, from about 125 miles from Dumont d'Urville, when a JATO bottle detached, damaging the number two engine. Sixteen years later, an Air Force C-171 brought two replacement engines and propellers to Antarctica. Navy engineers, using the new parts,

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<sup>294</sup> Ellery D. Wallwork and Kathryn A. Wilcoxson, *Operation Deep Freeze: 50 years of US Air Force airlift in Antarctica, 1956-2006* (Scott Air Force Base, IL: Office of History, Air Mobility Command, 2006), 59.

<sup>295</sup> Wallwork, 77

<sup>296</sup> Wallwork, 113

not only pulled the aircraft from the snow and ice, but flew it in January 1988 to McMurdo Station and then to New Zealand for a complete overhaul.<sup>297</sup>

In 1989, while planning for Deep Freeze 90, the Air Force decided to use the largest aircraft in its inventory to complete a mission. Four UH-1N helicopters needed to be moved to Antarctica. The C-141 could handle one helicopter disassembled at a time, so four flights would be needed, plus the time to reassemble the aircraft and to make sure it was ready to fly. The Air Force decided to use the mammoth C-5 Galaxy. It could handle two helicopters fully assembled at a time plus additional cargo. On October 4, 1989, a C-5 landed at McMurdo with 167,000 pounds of cargo, it included the two helicopters. The C-5 flight from Christchurch was slower, it took 5 hours 22 minutes, but the plane carried three times the amount of cargo the C-141 could carry.<sup>298</sup>

In the early 1990s, the Cold War ended and the funding for Deep Freeze began shrinking. Additionally, the military began downsizing and this meant the consolidation of missions. The Department of Defense decided only one branch needed to fly the LC-130 and the missions to Antarctica. Since the Air Force was already flying the heavy loads to McMurdo, it would take over the lighter loads as well. The Navy would turn over its planes to an Air National Guard unit from New York that had been using the LC-130 routinely in Greenland and occasionally in the Antarctic. The Navy squadron VX-6 or VXE-6 as it was known after 1968 would be inactivated by 1999. Civilian contracting firms would replace the military ground personnel that supported the science missions by maintaining the buildings and infrastructure. “Over the course of its existence, VXE-6 logged more than 200,000 flight hours in direct support of United States interests

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<sup>297</sup> Wallwork, 120

<sup>298</sup> Wallwork, 125-126

(primarily scientific research) in the Antarctic. The squadron transported more than 195,000 passengers, delivered over 240 million pounds of dry cargo and nearly 10 million gallons of fuel to numerous sites throughout Antarctica.”<sup>299</sup>

The military downsizing would mean that the National Science Foundation would have to shoulder more of the costs to supply and maintain the stations in Antarctica. In the past, some of the costs had been absorbed by the military “Training” budgets. As part of the downsizing, the Air Force would be retiring the C-141. Anticipating that its role would still need to be filled in Antarctica, the Air Force sent a C-17 Globemaster III instead of a C-141 to McMurdo on October 15, 1999 to evaluate its ability to fill the mission. A second C-17 was sent on November 11. The Air Force decided that the C-17 could perform the mission successfully and it and the C-5 continue to be used today.<sup>300</sup> “Between October 1956 and February 2006, US Air Force airlifters would fly over 5,800 missions, moving more than 78,900 tons of supplies and equipment and 94,500 passengers between New Zealand and Antarctica and around the Antarctic continent itself.”<sup>301</sup>

In the years since, the military has continued to support the science operations in Antarctica, but in a much diminished capacity compared to the early days of Operation Deep Freeze. The Navy still does occasionally find itself lending a hand; but not to the extent it once did. Beyond the knowledge gained, why does the military still lend a supporting hand? It does so because Antarctica remains one of the harshest climates on the planet to test equipment and men, and if it works there, it will work anywhere.

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<sup>299</sup> Joe Hollern, "History of Antarctic Development Squadron Six," VXE6history, accessed June 29, 2017, <http://www.vaq34.com/vxe6/vxe6hist.htm>

<sup>300</sup> Wallwork, 161

<sup>301</sup> Wallwork, iii

## **CHAPTER V**

### **Conclusion**

When it was first proposed, the International Geophysical Year was a short-term project that had lofty goals. It was modeled on the International Polar Years of 1882 – 1883 and 1932 – 1933, and by the time the science actually started, some 67 countries, including the United States, were participating. In order to carry out the proposed research tasked to the U.S., the support of the U.S. military was not only needed, it was essential. The U.S. Navy in particular was necessary because it had previous experience in the Antarctic starting in 1839, as well as the men and equipment needed for the project. Called Operation Deep Freeze, it began in 1955 when Admiral Byrd took charge of the newly formed Task Force 43 and it continues today. Over the intervening years that the U.S. military played a supporting role in Antarctica, it has lost over forty members there, numerous aircraft and other equipment and spent millions of dollars out of its own budget, but it has also done some of the most extreme construction projects in some of the most difficult conditions on the Earth. This is the longest non-combat mission undertaken by the U.S. military. The Soldiers, Sailors, Marines and Airmen, many combat veterans, most volunteers, looked at the mission as an important one, something to be proud of, a highlight in their careers.

The Navy, not wanting to place the mission in only one person's hands, added Admiral Dufek to the Operation. Between the two Admirals, the Navy had its two most experienced Arctic and Antarctic people. At first the mission seems straight forward, simply reuse bases and aircraft left over from previous missions as staging points, but the

report from an icebreaker sent to scout out the locations changes this. Byrd and Dufek must now build the support bases from scratch before they can carry out the primary mission and all within a short timeline. The logistics of pulling together the men, equipment and material needed, as well as the additional tasks of training the men to be able to do the work in subfreezing temperatures and organizing all the materials so they would be in the right place at the right time, is monumental.

Despite the many difficulties encountered, the men of Operation Deep Freeze overcame the obstacles and completed the goals set for the first year, dubbed Operation Deep Freeze I. After sailing the ships from Davisville, R.I. through the Panama Canal to the Antarctic, the Seabees offloaded straight onto the ice and hauled the materials to the work sites. The men worked around the clock, outside of their normal jobs to get it done as quickly as possible. The plans that they had worked so long on to make sure everything was perfect, changed and changed again. Tragically, two Seabees die in two different instances. The first one plummets through the ice on his tractor to the bottom of the ocean, the second dies when his tractor goes into a crevasse. While both deaths lead to safer practices, they unfortunately would not be the last deaths the mission would experience. VX-6, the squadron set up to support the mission is unable to get all of their aircraft to Antarctica. With only some of the aircraft making it, VX-6 began the long task of mapping the continent, the pilots being the first people to see much of the continent. The pilots and crews flying long twelve-hour missions to such remote areas that if there was a problem, help was not immediate. Conflict between the old and new explorers happened as the groups of men worked, with some of the men growing to distrust the work done by some of the older explorers, even to the point of blaming them for one of

the deaths. When the first season ends, the ships and the bulk of the men head home, to regroup and modify plans. A contingent of men stay, this group, the overwinter party, continued to work alone, completing the interiors of the two bases, McMurdo Station and Little America, and readying materials left behind for the next season's work.

At the end of the first season, Admiral Byrd sought clarification as to what his and Admiral Dufek's roles exactly were in this endeavor. It was a battle that was needed in order to mitigate some of the conflict that was going on, but it shortened the Admiral's life, as he passed in early 1957, never seeing the Antarctic again. With this clarification in place, the planning for second season, called Operation Deep Freeze II truly got under way. Those plans soon began changing with more ships, men and mission requirements added, even VX-6 gained more aircraft. The problem of the crevasses and the route to Byrd Station got attention from Paul Frazier and three Army officers, who were experts in dealing with the ones found in the Arctic. Unfortunately, just like the previous year, Antarctica saw several men lose their lives, and there was the potential of others dying as well. However, these men did their jobs and completed their missions despite all of this. By the end of season, they will have made a landing at the South Pole, built a Polar Station, completed Byrd Station, built and completed the Beardmore, Cape Hallet, Wilkes, and Ellsworth Stations.

In Operation Deep Freeze III, the mission changed from building to sustainment, and the science of the International Geophysical Year took center stage. The Navy would be part of that science, carrying out experiments themselves and assisting the civilian scientists in their experiments. Operation Deep Freeze IV should have been the final year, however it turned out to be so successful, they kept going. With an ongoing mission,

new equipment came into use that outperformed the old surplus equipment. The Army increased its presence in Antarctica with a helicopter that is more famously known for its use elsewhere in the world. Antarctica will flirt with the Atomic Age, before settling into the jet age, and finally the Navy will stop supporting the Antarctic mission as another service takes over.

All of this is possible, because of the support of the military, both in material and in personnel. The men involved saw this mission in many different ways, some as a great adventure, some as a highlight of their careers, some as just another day, but no one, not even the combat veterans seems to have seen it as a waste of time. All of the men involved volunteered to participate; additionally they were screened several times to make sure they would be a good fit. If they had not wanted to be a part of it, they could have easily have gotten out of doing so. Instead, most of the men seemed to take pride in the job they were doing, even if it was not something that was going to be permanent, they still wanted to do it the best they could. Some even took it personally if others were not giving it their all.



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