
The Virginia Tech *Undergraduate* Historical Review

Volume 1, Number 1 Winter 2012



The Virginia Tech
Undergraduate
Historical Review

volume 1, number 1
spring 2012

The Virginia Tech *Undergraduate* Historical Review

vol. 1, no. 1 spring 2012

Editorial Staff

Editor

Robert P. Stephens

Managing Editors

Stephen O'Hara

Heather Lennon

Associate Editors

Victoria Heath

Alison Hight

Brian Marshall

Rebecca Middour

Gabi Seltzer

Waheed Sheriff

The Virginia Tech Undergraduate Historical Review is published biannually by the Virginia Tech Department of History. The journal is available at <http://www.history.vt.edu/vtuhr>. Bound copies of the journal are available at <http://www.lulu.com>.

ISSN: 2165-9915

All rights reserved. No portion of this journal may be reproduced, by any process or technique, without the formal consent of the publisher.

All email correspondence should be addressed to: vtuhr@vt.edu. All other correspondence should be addressed to: VTUHR Editor, Department of History (0117), 431 Major Williams Hall, Blacksburg, VA, 24061-0117.

CONTENTS

ROBERT P. STEPHENS

Editor's Note / 4

STEPHEN O'HARA & HEATHER LENNON

Introduction / 6

ARTICLES

CHRIS WHITNEY

The Silent Decade: Why it Took Ten Years to Ban
DDT in the United States / 9

RAE KENNEDY

The Cold War Propaganda of Project Apollo / 27

MYLES DAUTERIVE

Going Critical: Three Mile Island and the Federal
Reform of the Nuclear Power Industry / 45

LUKE KALNAJS

The New Life of Latvians in America / 72

EDITOR'S NOTE

The Virginia Tech Undergraduate Historical Review has been a long time in coming. Our department has a rich history of believing in the efficacy of undergraduate research. For many years, my colleagues in the Department of History have gone to great lengths to promote the practice of history by our undergraduates. This broad consensus on the value of research and writing, however, lacked a proper outlet. We knew that our students produced great work, but they needed a forum for publishing it.

This journal, then, is the culmination of the work of a number of people over the course of several years, and I would be remiss if I failed to thank them. Kathleen Jones and Peter Wallenstein have been collecting their students' research for years, and their efforts shaped my approach to undergraduate research. In 2009, Mark Barrow and I collaborated on how to reformulate our own senior seminar courses; this partnership proved to be invigorating and created the momentum that eventually led to this journal.

Building on an effervescence of undergraduate research activity, I began working on the concept for this journal with David Blaha, the founding Managing Editor of the VTUHR. David worked tirelessly and with great enthusiasm on the journal, and this first edition exists in no small part due to his efforts. Stephen O'Hara signed on to the journal upon David's graduation, and he has done an exemplary job of guiding the process from submission to publication. Heather Lennon joined the team more recently and has become an irreplaceable asset. I could not ask for better leadership than these two young scholars.

When we began the process of soliciting submissions, we held it as axiomatic that this was a journal that should not only highlight undergraduate scholarship,

but that undergraduates should run it as well. The six undergraduates who volunteered to act as the founding Associate Editors - Victoria Heath, Alison Hight, Brian Marshall, Rebecca Middour, Gabi Seltzer, and Waheed Sheriff - have done an outstanding job; they have taken their work seriously and made thoughtful and judicious decisions throughout the process. I am deeply indebted to them.

I also want to thank my colleagues who shepherded the research projects to fruition in their courses. Several of my colleagues also agreed to review articles for the journal, and I thank them for their commitment to undergraduate research. Phi Alpha Theta also played an outsized role in promoting the journal as well as gathering enthusiasm and submissions; these efforts are greatly appreciated.

The Virginia Tech Diggs Teaching Scholars Community and the Department of History funded the development of the VTUHR and offered enthusiastic support.

Finally, my thanks goes to all those students who toil away on undergraduate research, to those who submitted their work for public scrutiny, and to those four who were selected for this first volume. Your work inspires me.

*Robert P. Stephens
February 2, 2012
Blacksburg, Virginia*

INTRODUCTION

Welcome to the inaugural issue of the Virginia Tech Undergraduate Historical Review. Created in 2011, the Review is intended to feature outstanding work from undergraduates at Virginia Tech. This publication is the first of many steps toward that goal. As a staff, our hope is that the Review will provide an avenue for undergraduate historical research to flourish beyond the classroom. History is an expansive and evolving field, and we ardently believe that students' research should join this ongoing dialogue. The Review and its staff are committed to creating a public forum for historical research conducted by Virginia Tech undergraduates.

The Review also seeks to extend its influence beyond its biannual publication. Fostering and developing historical research at Virginia Tech involves providing commentary on submissions, conducting workshops on research and writing skills, and giving students the opportunity to develop editorial skills as staff members. We hope that the Review will become a regular source of support for student researchers at Virginia Tech, and we look forward to a sustained partnership with the VT history department, Phi Alpha Theta, and history students throughout the university. For now, we present the Fall 2011 issue of the *Virginia Tech Undergraduate Historical Review* as evidence of this collaboration.

With each edition, the VTUHR will seek out original and well-developed research from highly talented undergraduate students. All Review submissions were vetted by our Board of Editors, consisting of six exceptional undergraduate history majors. Two undergraduate editors reviewed each paper, and the entire Editorial Board selected a few to advance to the next phase of the review process. For these papers, a faculty member familiar with

the topic provided additional commentary. Throughout the student and faculty reviews, a blind review process was used. Editors based their reviews on various criteria, including clarity, structure/organization, grammar, effective use of sources, understanding of relevant historiography, and the argument's originality. Ultimately, the editor and managing editors used the reviews to make the final decisions regarding publication.

The four articles chosen for publication in this issue exceeded the Board's expectations. In the first article, Chris Whitney focuses on government reform in the use of pesticides during the 1960s and 1970s. He questions the time the federal government spent in banning a threatening insecticide, known as DDT, because its negative effects had become well known through works such as Rachel Carson's *Silent Spring*. He concludes that multiple factors, such as public ignorance and DDT's ability to fight malaria, maintained the harmful insecticide's prominence. The second article remains in the 1960s but moves from the study of pesticides to the study of space. Rae Kennedy explores NASA's Project Apollo during a tumultuous phase of the Cold War. Her article dissects the means by which NASA portrayed Project Apollo to the American public as a civilian endeavor, thus disguising the project's true military goals. Kennedy utilizes a host of government documents, newspaper articles, and speeches to show how public opinion was shaped.

Myles Dauterive's article focuses on the 1979 nuclear catastrophe at the Three Mile Island Power Plant near Harrisburg, Pennsylvania. Exploring the vague safety guidelines prior to the incident, Myles Dauterive highlights the reform efforts made to change the United States' nuclear power industry. Lastly, Luke Kalnajs' submission looks at a completely different type of reform: cultural assimilation. Kalnajs relies heavily on primary sources as he presents the intimate accounts of Latvian immigrants in

the United States following the Second World War. Utilizing exhaustive personal narratives, this article assesses the ways in which communities of Latvian immigrants developed a distinct identity for themselves following their escape of Soviet persecution.

As we launch the *Virginia Tech Undergraduate Historical Review*, we look forward to supporting the work of creative and motivated young historians. While developing the Review in coming years, we have aspirations of it becoming an outlet for undergraduate research throughout the nation. For now, we thank you for your support and hope you enjoy the first issue of the *Virginia Tech Undergraduate Historical Review*.

Stephen O'Hara & Heather Lennon
February 2, 2012
Blacksburg, Virginia

THE SILENT DECADE:

WHY IT TOOK TEN YEARS TO BAN DDT IN THE UNITED STATES

CHRIS WHITNEY

*"It is our alarming misfortune that so primitive a science has armed itself with the most modern and terrible weapons, and that in turning them against the insects it has also turned them against the earth."*¹ – Rachel Carson

A true catalyst in the grassroots environmental movement in the United States, Rachel Carson, American marine biologist and writer, worked tirelessly to reveal the many side effects of the use of pesticides. Her book *Silent Spring*, published in 1962, was arguably the first significant step towards the US ban of the insecticide dichloro-diphenyl-trichloroethane (DDT) in 1972. The "primitive science" that Carson mentions is the desire to eradicate flying insects, a desire which has "armed itself" with the technology that created DDT. With this new weapon, or technology, the goal of protecting humans from disease was met with the recognition of possible side effects upon those the chemical sought to protect. Carson's research helped bring this issue to a greater audience outside of traditional scientific circles via a literary medium. Despite the impact created in the wake of Carson's book and her desire to inform the public, there is one lingering question: In light of the large impact that Carson's book had in 1962, why wasn't DDT banned in the United States until 1972? This article will argue that the ten-year delay in the ban of DDT following the publication

of *Silent Spring* was a result of the insecticide's effectiveness in fighting malaria, public ignorance over the side effects of DDT until scientific research revealed ill effects on wildlife, and the lack of a federal regulating body to ban DDT until the creation of the US Environmental Protection Agency in 1970.

The decision to ban DDT is no stranger to previous historical analysis. Environmental historian Thomas Dunlap, for one, has analyzed the complex relationship between science, politics and public policy, and citizens in the United States. More specifically, Dunlap has researched the rise of environmentalism in response to Rachel Carson's book and the scientific issues raised over DDT by compiling previous secondary sources, such as those that explored the chemical's effects on fish and wildlife.² Dunlap also discusses the role that DDT has played with regard to the scientific community and public policy in the United States, touching on issues surrounding DDT's effects on wildlife as well as the political and public perception of *Silent Spring*.³ Two other scholars who have studied the relationship between DDT and malaria, a disease that DDT was primarily used against, are Richard Tren and Roger Bate. Their research primarily addresses the global eradication campaign against malaria during and following World War II.⁴ Other scholars who have devoted their research to the political decision to ban DDT are Christopher J. Bosso and Charles F. Wurster, who describes the history of DDT before *Silent Spring* and federal litigation after its publication.⁵ These scholars represent but a few of those that have dedicated research to multidisciplinary issues surrounding the history of DDT.

These scholars' research is invaluable to my own work. However, this article will approach the research question using not only previous work conducted by various individuals, such as Dunlap and Wurster, but also information provided by such entities as the US

Environmental Protection Agency (EPA) and the Pan American Sanitary Bureau. In addition, this paper will answer the research question by including political documents and research pertaining to *Silent Spring* itself and the reasons behind the use of DDT to eradicate malaria around the world. For example, the official report by the EPA on the decision to ban DDT offers new insight into the specific role that politics played in the battle over whether to ban DDT in the United States. This paper will also incorporate the personal collection of Daniel E. Wright, who worked for the United Nations Public Health Service during World War II and pioneered using DDT to control malaria in Greece. In this fashion, this paper is not only in agreement with the arguments put forth by many of these authors, but will also bring new primary sources into the discussion to help build on previous research. Additionally, this paper will compile three different primary reasons that contributed to the delay in the ban that may not have been put together in the past: DDT's success in combating malaria, emerging scientific evidence of side effects on wildlife, and the creation of the EPA.

HISTORICAL BACKGROUND

In order to completely understand the issues associated with DDT, one must know how the chemical operates once applied to an organism. In short, DDT attacks the nervous system via the obstruction of natural nerve impulses, which can cause symptoms such as loss of coordination, convulsions, and vomiting in both animals and humans.⁶ However, before scientific research was released during the 1960s and the publication of *Silent Spring*, no one could have understood the full extent to which DDT affected the entire natural environment, including human life. This ignorance persisted until Rachel Carson helped bring these issues into the public eye.

Rachel Carson, born in rural Springdale, Pennsylvania, was an avid lover of nature and possessed a strong sense of duty to protect the natural environment. Upon graduating from Johns Hopkins University in 1928, she joined the U.S. Fish and Wildlife Service as a marine biologist and went on to write about environmental issues associated with aquatic life. In 1958, Carson received a letter from a colleague in Massachusetts who expressed concern over the massive bird kills at Cape Cod due to the spraying of DDT. Since the end of World War II, DDT had been used to control diseases, like malaria, at alarming rates, and this episode proved to be what ultimately drove Carson to write *Silent Spring*. After four years Carson finished the book, which focused mainly on how DDT enters the fatty tissues of animals and humans via bioaccumulation in the food chain, causing cancer and genetic birth defects. Her main argument stated that DDT's long-lasting presence in the natural environment irreversibly affected the health of animals, birds (thinning of egg shells), and mammals while also permanently poisoning the world food supply.⁷ This chemical persistence would in turn create a "silent spring," where no birds sang. Rachel Carson's mission to uncover DDT's detrimental effects was a significant stepping-stone in the eventual decision by the US government to ban the insecticide. However, the fact that DDT was not officially banned in the United States until a decade after publication shows that many still were unconvinced and considered the chemical a valuable as well as significant weapon in the fight against malaria and other insect-borne diseases.

DDT is an insecticide that had not been widely used by the United States as a form of insect control until World War II. More specifically, it is an organochlorine pesticide that was created in Germany in 1874 and was initially used by the US military to help control infectious diseases, such as malaria and typhus, during World War II. The United

States fought the war on two fronts, one being in tropical areas of the Pacific Ocean.

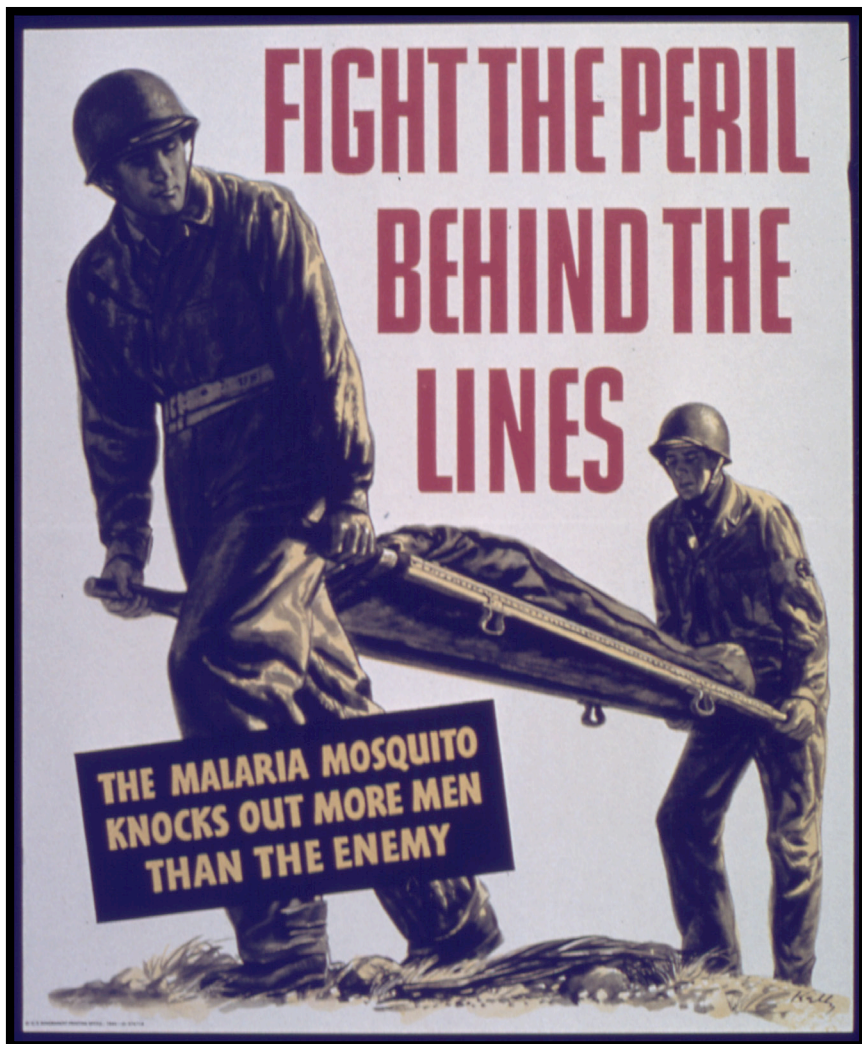


Figure 1: Public Health Poster from World War II, NARA

DDT was no stranger to propaganda; for every one man killed in battle, malaria would kill eight, which gave the United States a stepping-stone from which to push its DDT agenda during the war. DDT was used largely due to

its reasonable cost, demonstrated effectiveness, and persistence in killing insects.⁸ DDT was also used on the commercial and residential levels, by farmers on their crops, and in office buildings to control insect populations. The insecticide also proved to be relatively inexpensive to manufacture and stayed in the environment for a long time, effectively killing any insects that came within a certain range.

Between 1946 and 1950, cases of malaria fell from approximately 400,000 to practically none because of the use of DDT. DDT is still used today in parts of South America, Asia, and Africa with the aim of controlling malaria in places that may not be able to afford more expensive and potentially safer alternatives.⁹ As one can see, the early stages of DDT's development showed much promise and cost-effectiveness when dealing with global diseases. Because of the ban on DDT in the United States in 1972, restrictions have been applied to its use; DDT can legally be produced in the United States but may only be sold to or used by foreign countries. Two of the major reasons behind the ban of DDT were the scientific evidence that exhibited buildup in the fatty tissues of wildlife while persisting in the natural environment and proved the existence of an evolutionary resistance that insects began to develop towards the chemical.¹⁰

DDT AND MALARIA

Malaria is a mosquito-borne disease that can be found primarily in tropical and impoverished areas of the Earth. It can cause fevers, headaches, and may even lead to death. To understand malaria's importance in the delay of the DDT ban, one must refer to different case studies of its effectiveness in controlling the disease around the world. In 1954, the XIV Pan American Sanitary Conference ordered the Pan American Sanitary Bureau to take

immediate measures to eradicate malaria within the Americas. Malaria had been one of Mexico's biggest health problems, with the infected area covering about 772,000 square miles.¹¹ Following the order to eradicate malaria in the Americas, the Mexican government directed its attention to nation-wide control of the disease, completing the plan in 1955. In 1956, the first stages of spraying were carried out upon nearly 500,000 houses, with the goal of reaching nearly three million households by 1957. DDT was used to spray about 15% of the houses and was carried out by the Department of Epidemiology in Mexico.¹²

In South America, malaria was the leading health problem in Ecuador, with about half of the population infected by the disease. Malaria contributed to the three leading causes of infant mortality in Venezuela, which became the first country to begin a national DDT program in 1945. Eradication of malaria in Venezuela was reported to have covered 117,525 square miles within a population of 2.5 million citizens.¹³ Malaria had also once been considered one of the major causes of health problems in Cuba in the 1950s. After Cuba partnered with the Rockefeller Foundation in using DDT to spray the houses, malaria was no longer a major health problem in some of its rural provinces.¹⁴ The need for world-wide control of malaria is also supported by Paul F. Russell of the Rockefeller Foundation. In his publication, "World-Wide Malaria Distribution, Prevalence, and Control," he emphasizes the need to use stronger doses of anti-malaria therapy and concludes that malaria control must be conducted on a higher level, despite the need for more research of the side effects of DDT. In 1956, Russell wrote that there had been a focused attack on the disease within the past few years and that eradication of malaria "is technically and economically practicable within the next ten years."¹⁵ In Greece, the reduction in anophelism, or malaria vectors, was attributed to the government's anti-

malaria campaign of 1945. However, in 1972, an increase in anophelism was attributed to the end of DDT application a few years earlier. These case studies of the effectiveness of DDT in controlling malaria show how important international governments considered the insecticide in the fight against infant deaths and rapid population decline.

During the 1930s, rice cultivation in Greece was restricted because of malaria but permitted again in 1972 because of the anti-malaria campaign, making rice an export crop for Greece.¹⁶ Lt. Col. Daniel E. Wright was considered the pioneer in the use of DDT to control malaria in Greece and became the Lieutenant Colonel of the Public Health Service in 1942 as a malariologist. In a letter to Dr. T. A. Parran, the surgeon general of the Public Health Service, Crawford F. Sams described Colonel Wright as “of the greatest assistance in carrying out malaria control measures in general throughout the theater.”¹⁷ These documents about Wright all seem to send similar messages, that the anti-malaria campaign should be continued in order to prevent widespread disease and death around the world and to preserve economic viability.

DDT was heavily used in Italy during and after World War II. The first such use came in 1943 by the United States to control a typhus outbreak in Naples. The chemical was sprayed carelessly throughout the slums without regard to possible side effects for about three million people, as the full extent of its toxicology was not known. The typhus outbreak was brought under almost immediate control in only three weeks, as 73,000 people were sprayed per day and 1,300,000 people were treated, demonstrating the awesome power that the new chemical had on infectious diseases.¹⁸ Once again, one can see why many national governments around the world placed such emphasis on the relatively new insecticide based mainly on case studies from other nations.

PUBLIC OBSTACLES AND EMERGING SCIENTIFIC EVIDENCE

Despite eradication of malaria as a major factor in the use of DDT, public ignorance of DDT's side effects was also prevalent. During the 1920s, about twenty years before the introduction of DDT, the Bureau of Chemistry of the Department of Agriculture set standards for residues on food from insecticides. By the time of DDT's introduction, doctors, farmers, and government officials already expressed concern over the issue of residue, but political transparency was lacking at the time. During the 1960s, scientific research, the emergence of other health problems, such as asbestos, and the creation of public interest groups all led to challenges to the use of DDT. The lack of transparency, however, and the fact that the debates over the chemical's use took place behind closed doors prevented the general public from seeking out the truth about side effects.¹⁹ Furthermore, the Public Health Service also devised a set of criteria during the 1940s for determining whether DDT was safe to use.

The Public Health Service concluded that if people exposed to abnormal amounts of residues were healthy, then the general public would be too. They also decided that the burden of proof be laid upon those that would ban a chemical and not those who produced it. Opposition consisted of the Food and Drug Administration (FDA) and some scientists, who stated that safety should be evaluated based on chronic effects and not "classical poisoning," or chemical doses that did not yield effects. This meant that they supported placing the burden of proof upon those who produce the chemicals and therefore expose the public to danger. Unfortunately, the conflict was heavily in favor of the producers, which shows the value of political power and the associated lack of public interest in the issue.²⁰ When DDT became widely used by 1946, the FDA and the Department of Agriculture essentially became agencies that served as interest groups. Their concern was not as much

about the preservation of public health and safety as much as it aimed to help the chemical industry avoid difficulty and therefore receive annual funds.²¹ This led to both positive and negative public opinions of pesticides during the 1960s.

Public support of pesticides can also be seen during the 1960s, even after *Silent Spring's* publication. In 1969, the Department of Agriculture temporarily banned DDT while Congress called for a national embargo on the chemical. Two primary fears that resulted in the stricter regulation of DDT were possible bans on other chemicals and the higher costs of alternatives.²² These concerns all came to the forefront without regard to how DDT might affect human health. There were also many who did not agree with what Carson had to say about DDT in her book. Some considered Carson's book no more than an alarmist literary piece that did nothing but use emotional language to create a stir within the public and practically promoted a return to dark ages riddled with disease.²³ This type of public opinion created yet another obstacle toward banning DDT, despite emerging scientific evidence of the chemicals' side effects. In 1964, the American Public Health Association reported that, although DDT was still a major threat, the use of the insecticide on cotton fields in Central America was contributing to the resistances to DDT that the mosquitoes began to develop.²⁴ This proved to be new scientific evidence that the public had not previously been exposed to when discussing the seemingly infinite wonders of DDT.

On the eve of World War II, the Food and Drug Administration and toxicologists had only just begun to study the issue of cumulative poisoning. Acute poisoning occurs as a result of negligence toward DDT spray residue, while chronic or cumulative poisoning is the result of prolonged consumption of residue and a subsequent buildup of poison that creates serious health problems.²⁵

Another major argument that arose from new scientific research was that with such a strong and effective poison, it was only inevitable that certain beneficial insects and other wildlife would perish. One study conducted near Clifton, Pennsylvania, resulted in the poisoning of fish within two days of spraying DDT along Ash Creek. The study concluded that DDT should only be used in extreme circumstances, and then only after weighing the value of beneficial forms of life that may be affected by its use.²⁶ This study is an example of newfound scientific knowledge when considering the possible effects that spraying DDT has had on beneficial forms of life.

The spraying of DDT also had a strong influence in eradicating elm disease. In 1949, Dutch elm disease began to inflict American elm trees, and DDT was used to kill insect carriers of the disease. Spraying occurred on college campuses in the Midwest in order to preserve their elms, and, after drinking rainwater and eating earthworms, many robins soon died. Scientists examined the robins and found that they contained indirect but lethal doses of DDT within their brains.²⁷ During an interview with ornithologist Joseph J. Hickey, Thomas Dunlap asked him how he became interested in the hazards of DDT. Hickey referred to a collegiate experience involving the spraying of elms. At the University of Wisconsin, DDT was sprayed for elm disease control, and soon robins and yellow warblers began to die all across campus, requiring years for their numbers to replenish.²⁸ In 1960, total robin mortality was estimated to be at about 85% for each spraying, and throughout Wisconsin, three years of consecutive spraying reduced breeding-bird populations by 30% to 90%, marking a substantial decline in the robin population.²⁹

A 1963 study showed the ill effects that the use of "toxic chemicals" had on peregrine falcon populations in Great Britain. These chemicals became the single most important factor in the rapid decline of the falcon

population.³⁰ The falcons in Great Britain were also found to have been victims of bioaccumulation of DDT from their prey and developed no physiological adaptation to the toxins.³¹ Hickey was also involved in a conference of scientists in 1965 that discussed the reproductive issues of peregrine falcons in both North America and Europe. The falcons' eggshells were breaking, and in Britain the scientific evidence had been collected in laboratories, while in the United States it was not. After learning of the results of the British tests on the falcon eggs, American scientists began to conduct similar research; only in 1968 was Hickey fully convinced that DDT was the cause of the thinning of the falcon eggshells.³² Again, these studies became examples of scientific evidence that was brought to the public's attention, but also not present at the time of *Silent Spring's* publication.

THE EPA AS AN AVENUE FOR REGULATION

The third and arguably most significant factor in answering the research question was the US political climate during the 1960s. More notably, the absence of the EPA as an independent agency to administer restrictions on pesticides was the main reason why the original political structure did not allow for a quick ban to DDT despite public outcry and scientific research. Once scientific evidence began to reveal many of the side effects and health risks associated with the widespread use of DDT, the US government also began to take notice. The President's Science Advisory Committee (PSAC), which was created in 1951 by Harry Truman, consisted of a board of scientists that would directly advise the president during the 1960s. One report by the PSAC in 1963, which was ordered by President John F. Kennedy, recognized that pesticide chemicals no longer only affected certain areas and special interest groups. The report admitted that not only did these chemicals travel great distances within the

natural environment, but they also persisted for a long time.³³ The experiments with animals to detect levels of toxicity began to be compared to similar effects in humans, despite the fact that these effects were not initially apparent.

Because of the evidence of the presence of harmful chemicals in major rivers, groundwater, and wildlife in the United States, the PSAC also agreed that further research of side effects was required, and that agencies like the Department of Health, Education, and Welfare; the Food and Drug Administration; and the Department of the Interior should lead campaigns to eliminate the use of persistent pesticides except for those that were necessary to “control disease vectors.” In addition, the PSAC report credited the developing public awareness to *Silent Spring* and Rachel Carson, which led to more transparency concerning the risks of using pesticides, such as DDT.³⁴ The PSAC also began to realize that despite DDT’s seemingly awesome power when used to eradicate malaria, the disease still persisted. Malaria was still the leading cause of death around the world, and the PSAC was beginning to suggest to the US government other methods in eradicating the disease that were both effective and financially feasible. Moreover, they stated that they had essentially crossed the point of no return; the presence of the chemical in the environment would only accumulate further and begin to show effects in plants and wildlife.³⁵

On December 2, 1970, President Richard Nixon created the EPA. This federal agency was created to deal with “research, standard-setting, monitoring, and enforcement with regard to five environmental hazards; air and water pollution, solid waste disposal, radiation, and pesticides.” It would also be responsible for detecting and mitigating environmental problems both locally and nationally, with the intent of turning the 1970s into a decade of environmental recovery.³⁶ The creation of the

EPA would give the United States one independent agency, instead of fifteen units, that had the authority to deal with all national and local environmental problems, including pesticides. This would therefore prove more effective than the PSAC, a committee of scientists who could only “advise” the president.

The creation of the EPA also represented a shift in pesticide regulatory authority away from the Agriculture Department and toward the newfound EPA. In 1971, The National Academy of Sciences, a panel of scientists, convened and decided after a seven-month hearing that the elimination of DDT was necessary. William Ruckelshaus, the first administrator of the EPA, issued an order with a similar sentiment that would shape the history of public interest in the environment and environmental law. He concluded that the costs (wildlife and ecosystem degradation) of the use of the pesticide outweighed its benefits.³⁷ This statement also coincided with the 1963 report by the PSAC that called for the elimination of persistent pesticides.³⁸ In the spring of 1972, Ruckelshaus banned DDT for pest control in the United States because of its persistence in the environment and carcinogenic properties. During the same year, Nixon also disbanded the PSAC. This decision would set a precedent for regulation that ruled in favor of protecting human health over economic concerns, a movement that was assisted by Rachel Carson’s efforts, which began with the news of the Cape Cod bird kills in 1958.³⁹

CONCLUSION

Rachel Carson, despite being a catalyst within early environmental movements and a synthesizer of scientific research into a public medium, also had to overcome the political interests of some within the scientific community. Some saw *Silent Spring* as a danger to their reputations, but

Carson criticized these scientists for placing themselves above scientific truth in order to appease the chemical industry. In addition, some members of the National Academy of Sciences-National Research Council panel were, in fact, employed by chemical companies, and Carson's message would challenge them to "weigh their scientific integrity."⁴⁰ One important facet of Carson's book that should be noted is that her message was not to completely overhaul the chemical industry and ultimately cease all uses of DDT in the United States. Rather, Carson simply wished to make people more aware of DDT's side effects and argued for the public's right to know how they might be affected by its continued use. The resistance faced by the environmental movement of the 1960s may have been encouraged by that very sentiment, but that is a different issue entirely.

Another clear and significant obstacle during the process of establishing a federal ban on DDT that deserves separate research was the resistance by the agro-chemical industry. As an insecticide that was widely used in the agricultural sector to ensure high yields, DDT was something the chemical industry wanted strongly to preserve. In particular, the industry was primarily afraid that the ban on DDT would lead to similar bans on other chemicals in use. This fear also led to reckless blame of environmental organizations, such as the Environmental Defense Fund, as contributors to a sort of "dark conspiracy" to eliminate all pesticides, thereby severely damaging the industry.⁴¹ This paranoia and response displays the clear conflict of interest between regulatory efforts and the stance that this industry had on the value of DDT. Efforts by the agro-chemical industry clearly played a role in the delayed ban of DDT over this time period, a role which must be examined at great length. However, this paper focuses on three separate and equally important points pertaining to the delayed ban of DDT.

While many reasons exist as to why it took ten years to ban DDT after the publication of *Silent Spring*, the insecticide's effectiveness in fighting malaria, public ignorance over the side effects of DDT before scientific research revealed the ill effects of DDT on wildlife, and the creation of the US Environmental Protection Agency in 1970 proved especially significant. Beginning with the publication of Carson's book, the public concern over DDT and scientific research of the 1960s finally culminated with the 1972 ban. However, understanding when the ban was imposed can only be achieved through the study of these three major obstacles: DDT was proven to be effective in eradicating malaria during and after World War II, scientific research did not exist that would reveal things like insect resistance and effects on wildlife, and a single agency did not exist to handle multiple environmental issues. Upon examining these reasons behind the time lapse between *Silent Spring* and the ban of DDT, one can begin to grasp the importance of Carson's message: Humans can utilize technology with good intentions, but can also use the same technology to harm not only the earth, but their own well-being.

¹ Rachel Carson, *Silent Spring* (Boston: Mariner Books, 2002), 297.

² Thomas R. Dunlap, *DDT, Silent Spring, and the Rise of Environmentalism* (Seattle: University of Washington Press, 2008), 58.

³ Thomas R. Dunlap, *DDT: Scientists, Citizens, and Public Policy* (Princeton: Princeton University Press, 1981), 98.

⁴ Richard Tren and Roger Bate, *Malaria and the DDT Story* (London: The Institute of Economic Affairs, 2001): 35, <http://www.iea.org.uk/files/upld-publication26pdf?.pdf>.

⁵ Charles F. Wurster, *A Case Study: The Decision to Ban DDT* (National Research Council, 1975), 7-9.

⁶ National Pesticide Information Center, *DDT General Fact Sheet*, 3.

⁷ Natural Resources Defense Council, *The Story of Silent Spring*, <http://www.nrdc.org/health/pesticides/hcarson.asp>.

-
- ⁸ U.S. Environmental Protection Agency, *DDT: A Review of the Decision to Ban its Use as a Pesticide* (Springfield: National Technical Information Service, 1975), 251.
- ⁹ National Pesticide Information Center, *DDT General Fact Sheet*, <http://npic.orst.edu/factsheets/ddtgen.pdf>, 2.
- ¹⁰ *Ibid.*, 2-3.
- ¹¹ Pan American Sanitary Bureau, "Communicable Diseases," in *Annual Report of the Director of the Pan American Sanitary Bureau, 1956* (Washington, DC: 1957), 26.
- ¹² *Ibid.*, 27.
- ¹³ *Ibid.*, 31.
- ¹⁴ Pan American Sanitary Bureau, "Communicable Diseases," 32.
- ¹⁵ Paul F. Russell, "World-Wide Malaria Distribution, Prevalence, and Control," *American Journal of Tropical Medicine and Hygiene* 5, no.6 (1956): 964.
- ¹⁶ M.C. Balfour, "Observations on Greece in 1972," in *Daniel E. Wright Papers*, 2-3.
- ¹⁷ Crawford F. Sams to Dr. T. A. Parran, 1943, in *Daniel E. Wright Papers*.
- ¹⁸ Frank M. Snowden, *The Conquest of Malaria: Italy, 1900-1962* (New Haven: Yale University Press, 2006), 199.
- ¹⁹ Dunlap, *DDT: Scientists, Citizens, and Public Policy*, 39.
- ²⁰ *Ibid.*, 54-55.
- ²¹ *Ibid.*, 55.
- ²² Neil A. Martin, "Stamp Out DDT?" *Barron's National Business and Financial Weekly*, September 15, 1969, www.proquest.com.
- ²³ Edwin Diamond, "The Myth of the 'Pesticide Menace,'" in *DDT, Silent Spring, and the Rise of Environmentalism*, 115-120.
- ²⁴ Association of Schools of Public Health, "Summaries of Selected Papers from the 92nd Annual Meeting of the American Public Health Association and Related Organizations Held at New York City," *Public Health Reports* 80, no. 2 (1965): 118, www.jstor.org.
- ²⁵ Paul B. Dunbar, "The Food and Drug Administration Looks at Insecticides," in *DDT, Silent Spring, and the Rise of Environmentalism*, ed. Thomas R. Dunlap (Seattle: University of Washington Press, 2008), 53.

-
- ²⁶ Clarence Cottam and Elmer Higgins, "DDT and its Effect on Fish and Wildlife," in *DDT, Silent Spring, and the Rise of Environmentalism*, 60-62.
- ²⁷ Roy J. Barker, "Notes on Some Ecological Effects of DDT Sprayed on Elms," in *DDT, Silent Spring, and the Rise of Environmentalism*, 66.
- ²⁸ Thomas R. Dunlap, "Interview with Joseph J. Hickey," in *DDT, Silent Spring, and the Rise of Environmentalism*, 81.
- ²⁹ Robert Rudd, "Pesticides and the Living Landscape," in *DDT, Silent Spring, and the Rise of Environmentalism*, 78.
- ³⁰ "Editorial from *Bird Study*," in *DDT, Silent Spring, and the Rise of Environmentalism*, 68.
- ³¹ Derek A. Ratcliffe, "The Status of the Peregrine in Great Britain," in *DDT, Silent Spring, and the Rise of Environmentalism*, 74.
- ³² Dunlap, "Interview with Joseph J. Hickey," 81-84.
- ³³ President's Science Advisory Committee, "Use of Pesticides," in *DDT, Silent Spring, and the Rise of Environmentalism*, 104-105.
- ³⁴ President's Science Advisory Committee, "Use of Pesticides," 107.
- ³⁵ Society for Science and the Public, "More Pesticide Research," *The Science News-Letter* 83, no. 22 (1963): 341, www.jstor.org.
- ³⁶ William D. Ruckelshaus, "First Administrator on Establishment of EPA," *History*, US Environmental Protection Agency, <http://www.epa.gov/history/org/origins/first.htm>.
- ³⁷ Charles F. Wurster, "A Case Study: The Decision to Ban DDT," 1975, 7.
- ³⁸ Robert Gillette, "DDT: Its Days are Numbered, Except Perhaps in Pepper Fields," in *DDT, Silent Spring, and the Rise of Environmentalism*, 122.
- ³⁹ U.S. Environmental Protection Agency, "Pesticides and Public Health," *History*, <http://www.epa.gov/history/publications/formative6.htm>.
- ⁴⁰ Christopher J. Bosso, *Pesticides and Politics* (Pittsburgh: University of Pittsburgh Press, 1987), 116.
- ⁴¹ Robert van Den Bosch and Howard W. Hintz, "DDT," *BioScience* 23, no. 4 (1973): 211, www.jstor.org.

THE COLD WAR PROPAGANDA OF PROJECT APOLLO

RAE KENNEDY

“That’s one small step for man; one giant leap for mankind.”¹ These famous words, spoken by Neil Armstrong upon first walking on the moon, marked the achievement of Project Apollo, NASA’s manned lunar excursion program. Beginning in 1961, Americans rallied together around Project Apollo, turning it into a point of national unity during a time of major domestic conflict. Apollo appeared to serve another purpose as well. The federal government widely represented the space race and, more specifically, Project Apollo, as a way to elevate the United States’ scientific and technological prestige, and thus surpass the Soviet Union, its Cold War rival. However, this emphasis on idealistic reasons for racing to the moon overshadowed other equally significant motivations.

In the 1950s, national media outlets suggested that the Soviets’ lead in the Space Race could translate into military superiority.² By the 1960s, however, public discourse all but eliminated the military and defense as goals for outer space. Instead, the public viewed space exploration as a great scientific endeavor, with motivations based on exploration, curiosity, and the challenge of technological development. This transition in emphasis indicates a significant and ironic shift because the military objectives had not really disappeared; they had just ceased to be presented in public dialogue on the Space Race.

Although historians have done research in the past to prove that the Space Race had an intimate connection to the Arms Race, questions still remain.³ Who benefitted

from the connection? How were the billions of budgeted dollars spent? Why was national defense within NASA not out in the open? Public media emphasized the expansion of scientific knowledge during a time of highly charged tensions between the United States and the Soviet Union. The 1960s also represented a time of domestic conflict over widespread issues such as civil rights, women's rights, and the Vietnam War. However, Project Apollo united US citizens during this period of disunity, making it an anomaly.⁴

Public rhetoric by the federal government portrayed Project Apollo as an idealistic civilian effort to increase national unity and prestige. However, this discourse obscured an important defense dimension to the project and its ties to the Arms Race. President John F. Kennedy hailed Project Apollo as "the most hazardous and dangerous and greatest adventure on which man has ever embarked."⁵ Government use of military contractors and tensions with the USSR show that the Space Race contained military aspects; it was not simply an idealistic scientific adventure. This article will demonstrate how NASA quietly utilized its resources for military objectives throughout the development of Project Apollo.

The Cold War began shortly after WWII as a result of suspicion between two major superpowers of the world, the United States and the USSR.⁶ The two WWII allies faced cooperation problems as distrust mounted from ideological differences and mutual fears of global domination.⁷ The USSR developed its first atomic weapons by 1950, which heightened tensions and increased hostility.⁸ This tension quickly burst into a nuclear race. The United States did not have the upper hand at the bargaining table and the two countries competed to obtain the most nuclear weapons.⁹ Negotiation and diplomacy failed to stop the two nations from developing large numbers of nuclear weapons, and

both countries continued to create newer and more destructive weapons.¹⁰

The race for nuclear supremacy manifested itself in several ways, including the race for superiority in space. In 1958 Congress passed the Space Act, which created the National Aeronautics and Space Administration (NASA).¹¹ The Saturn Program, the predecessor of Apollo, created a launch vehicle that would make launching a manned lunar mission possible.¹² Project Apollo, also known as the Apollo Program, was a NASA program that had the basic objective of landing two men on the surface of the moon.¹³ The program succeeded. On 16 July 1969, Apollo Mission 11 was launched; on July 20, the first man walked on the surface of the moon, and on July 24, he returned safely to Earth.¹⁴

From Apollo's introduction to the public by President Kennedy in 1961 on through Apollo 11 in 1969, the media showed uncontrolled excitement. Professionals, businessmen, and government officials excitedly discussed the project at length. Extensive public discussion on the subject took every form imaginable, from scholarly essays to editorials to poetry. The government seemed to put as much emphasis on its space programs as possible in order to stress that the program united the nation.

President Dwight D. Eisenhower set the initial tone of the public conversation by tying the space race directly to the Cold War. In 1954, the Eisenhower Administration created the Technological Capabilities Panel to assess the Soviet threat to US national security.¹⁵ Historian Von Hardesty explains that this panel feared that the USSR would use satellites for military purposes in order to gain intelligence.¹⁶ Eisenhower clearly viewed the USSR as a military threat. As he outspokenly stated in his farewell address, "we face a hostile ideology - global in scope, atheistic in character, ruthless in purpose, and insidious in method... Our arms must be mighty, ready for instant

action, so that no potential aggressor may be tempted to risk his own destruction.”¹⁷ Eisenhower believed that the USSR posed a military threat to the United States – a threat that had spread to space.

John F. Kennedy, in contrast, turned the Apollo program into a symbol of idealism. He inspired audiences through his rhetoric, using words that made the Apollo Project seem like the most glorious and pressing issue of the time: “These are extraordinary times. And we face an extraordinary challenge. Our strength as well as our convictions have imposed upon this nation the role of leader in freedom's cause.”¹⁸ His use of words such as “freedom,” “extraordinary,” and “leader” in this speech exemplify how he rallied Americans using words that made them feel prestigious as a world power.

Kennedy publicly emphasized that the Apollo Program would bring the United States national and international prestige. “I am delighted,” he exclaimed in a 1962 speech at Rice University, “that this university is playing a part in putting a man on the moon as part of a great national effort of the United States of America.”¹⁹ This national effort was not just for domestic consumption; the Cold War meant that it was also being played out on a global stage. Kennedy used Apollo to demonstrate US superiority in technology and science against the Soviets, highlighting the fact that winning against them would symbolize a major morale blow. An interview between Kennedy and James Webb, the Administrator of NASA, illustrates just how central the sense of competition was:

PRESIDENT KENNEDY: Everything that we do ought to really be tied in to getting onto the moon ahead of the Russians.

WEBB: Why can't it be tied to preeminence in space, which are your own words...

*PRESIDENT KENNEDY: Because, by God, we've been telling everyone we're preeminent in space for five years and nobody believes it because they have the booster and the satellite.*²⁰

As this exchange shows, Kennedy strongly felt that a lunar landing would assure the country's national standing over the Soviet Union.

Extensive newspaper and popular magazine coverage of Project Apollo in the 1960s reinforced Kennedy's message that space technology would enhance national prestige. *Time* magazine, for example, gave widespread coverage to the space race and Project Apollo. The articles usually presented a positive view of the program, celebrating the possibility of manned exploration of space and the moon, and predicting many future benefits. The *New York Times*, one of the most widely read newspapers, also supported Project Apollo. James Webb, in one of the paper's articles, explained, "For the sake of this country's prestige, it is essential that other nations believe that we have the capability and determination to carry out whatever we declare seriously that we intend to do. Space achievements have become today's symbols of tomorrow's scientific and technical supremacy in the minds of millions of the world's people."²¹ This positive outlook venerated scientists as national heroes who pursued their work with creativity and resourcefulness. Webb's statement not only reinforced the prestige that space exploration would bring, but reminded the reader that the nation's reputation rested upon finishing what had begun. The United States could not give up.

NASA's biannual reports regarding Project Apollo similarly underscored technological advancement rather than the Cold War military goals. The Apollo Objectives, as stated in the Eleventh Semiannual Report to Congress in

1964, were “to achieve U.S. preeminence in space during this decade through the creation of the broad range of capabilities required to accomplish manned lunar exploration....All [the objectives] will open the door to further exploration and exploitation of space as required by the national interest.”²² Here again, the message of US prestige as a major goal of Project Apollo stood front and center.

Subsequent annual reports continued the trend of emphasizing technological progress. In the Twelfth Semiannual Report to Congress, NASA identified significant progress in the development of the spacecraft and other services needed for the launch of the craft.²³ This report stated in its “Objectives” section that “once developed, these new capabilities can be employed for scientific investigations, for space exploration, and for new technological applications.”²⁴ Progress in technology, and technology only, was the focus of the reports.

The NASA budget demonstrated Project Apollo’s significance in the mind of the government. The Space Act created NASA as a government agency in 1958.²⁵ Its budget, as appropriated by Congress, stood alone from any other agency’s budget; no other agency was affiliated with or directed NASA. In 1962, the outlay to NASA was \$1.257 billion.²⁶ This is a significant amount of money for a new agency and demonstrated its importance to the Kennedy administration. NASA then separated its budget into different research areas. That same year, \$234 million went to Project Apollo. Just two years later, that amount had increased to almost \$3 billion.²⁷ As NASA realized the potential for lunar exploration, it allotted more money to that segment of the department to speed up progress. Apollo had become one of NASA’s, and the nation’s, most important projects.

Criticism of Apollo did at times appear, primarily based on economic concerns. Opponents feared that the

cost and the rapid pace of the project's development was financially reckless. The *Wall Street Journal*, the newspaper of the financial and business sector, published many of these critiques. In one issue, a professor from Stanford University exclaimed, "I'm in favor of putting a man on the moon. But I think it's dubious whether we should cram the program into this decade and spend 20 or 40 billion [dollars] on it."²⁸ Another analyst similarly wrote, "What is unarguable is the cost of the rapid pace of the space program....What Washington needs in a great hurry are some clear priorities."²⁹ Both writers criticized the "race" aspect of the Apollo Program, which seemed to many a waste of taxpayer money. Reporters described it as a "crash" program - pouring money into a program to get it done faster, instead of using less money and developing it slower.

Other criticism revolved around the fact that no one at any given point could "win" the space race, or even the race to the moon. As one *Wall Street Journal* editorial opined, "It's impossible to say we or the Soviets are 'winning' in either civilian or military space at any given time, because of a particular feat.... That measuring game...is the real idiot's delight."³⁰ Another author wrote, "The 'space race' is a rather meaningless and tiresome fiction."³¹ Because the race seemed unwinnable, many wondered whether or not the program merited such effort and financial expense.

Professional businessmen were not the only critics of Apollo. Many "average" Americans also found fault in the lunar program. In a *Wall Street Journal* article from 1963, a reporter interviewed several average Americans about their thoughts on the space race. Stanley Moore, "an unemployed Negro laborer," said, "I suppose we'll hear plenty about it if the Russians get there first, but I'm worrying about number one and going to the moon isn't going to help me any." Later in the same article, a vice

president of a bank criticized the program: “A group of brilliant engineers have found a glamorous toy and want to play with it.”³² These public critiques tended to cast Apollo as an optional government endeavor rather than a critical national project. The project’s military goals and the sense of urgency that such goals would normally have generated had clearly disappeared from public view. This demonstrated the tendency of public rhetoric to describe Apollo as an effort for civilian national interest.

Project Apollo was a unique government action in that the federal government touted it publicly as a prestige-based action. This was, however, a foreign concept for the US government. Prior to Apollo, no US president had acted solely for the purpose of national prestige. In fact, before WWII, the idea of a government-funded scientific endeavor for such purposes simply did not exist. After WWII, however, the idea of “Big Science” started to gain steam. Large-scale research teams, funded by the government, came to dominate over smaller-scale individual research.³³ Some projects comparable to Apollo that also fell under the category of “Big Science” included the atomic bomb and the hydrogen bomb, both of which had direct military goals and neither of which were based on prestige. No precedent for a prestige-based project such as Apollo, which cost the United States billions of dollars, in fact existed. In the Cold War era, “Big Science” and military objectives seemed inextricably linked.

The 1960s began with no major change in the Cold War climate. The United States still considered the Soviets a military threat, President Eisenhower had placed military bases all over the globe in order to assure national defense and bolster anti-communist governments wherever needed, and presidents Kennedy and Johnson continued these policies as they worked to strengthen US spheres of influence across the globe.³⁴

The USSR's successful Sputnik program, which put satellites into Earth's orbit and even put a man into space in 1961, also frightened the United States.³⁵ NASA and its space programs could not allow the Soviets to surpass them in space technology, the ultimate "sphere" that both the Soviets and Americans vied for.³⁶ The United States needed the Apollo program in order to counter Soviet progress in space technology.

NASA's business relations gave evidence to the military dimensions of the Apollo program. After WWII, the dependence of military contractors on government contracts grew sharply, and, with the advent of "Big Science," the dependence of government agencies on large contractors grew as well. Not surprisingly, NASA tended to hire those contractors who had longstanding government and military relationships. Federal budgets for defense were kept separate from the budget of NASA, yet the contractors worked for both departments. Because of this, contractors publicly developed civilian technology, but quietly used their defense capabilities within NASA.

President Eisenhower perceived new kinds of relationships between the federal government and military contractors as a threat to Americans. In Eisenhower's famous farewell speech, he warned of the dawn of a new age of militarism in the United States.

*The total influence - economic, political, even spiritual - is felt in every city, every State house, every office of the Federal government. ... [W]e must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex. The potential for the disastrous rise of misplaced power exists and will persist.*³⁷

The phrase "military-industrial complex" in this instance refers to the permanent and near-complete support of large military contracting corporations by the national

government.³⁸ In 1961, when he gave this speech, Eisenhower clearly believed that large military contractors threatened the American people. In relying on big corporations for national defense, the federal government might begin to answer to the needs of the corporations instead of the needs of the American people. Eisenhower warned against a growing military presence in all areas of government.

An example of how the military-industrial complex took hold in the United States was the Grumman Corporation. Grumman began as a small company with a staff of only twenty-one in 1930.³⁹ Roy Grumman ran his company with a very personal touch – even as the company grew into thousands of staff, he knew everyone’s first names.⁴⁰ Things changed when hostilities began to rise in the late 1930s among European nations and Congress passed the Emergency Plant Facilities Act, which created a mechanism for the government to pay for facilities for the production of war materials.⁴¹ In this new environment, Grumman began to focus its work almost exclusively on products for the military, and the corporation grew significantly in size.⁴² As with other industrial corporations of the time, Grumman transformed itself from a small company to a large, almost entirely government-funded, contracting factory.

By the early 1960s, when the Apollo Program took shape, contractors such as Grumman, joined by Boeing and Lockheed, had developed longstanding relationships with the military, relationships rooted in the dramatic growth of the defense industry during and after WWII.⁴³ NASA used these same contractors, who were still under contract with the military, for the development of the Apollo Program.⁴⁴ Their associations with the federal government through their defense contracts gave them the upper hand at the bargaining table, and they easily obtained NASA contracts

over companies who did not have the same history of working with the Department of Defense.⁴⁵

A close examination of NASA's budget reveals similar military connections. In 1963, NASA's budget was about \$2.5 billion.⁴⁶ The Department of Defense's budget that same year was about \$51 billion.⁴⁷ However, the two departments were intimately connected, although Congress separated their budgets. The Department of Defense had some agencies within NASA and even funded some of its research.⁴⁸ Specific programs that overlapped between space research and defense connected the two.

While publicly developing space technology for NASA, many military contractors doubly benefitted from the US arms race against the Soviets by quietly utilizing those same capabilities to achieve military space objectives under NASA's budget. These companies took the contracts, understanding that a major public goal of the program was national prestige, but also recognizing that it had military aims.⁴⁹ President Kennedy reinforced the urgency of the situation in 1962, saying "the space program cannot 'afford undue work stoppages, inflated costs of material or talent, wasteful interagency rivalries or a high turnover of key personnel.'"⁵⁰ NASA contractors worked for both progress and technology through Apollo, but the military never overlooked the future uses of space for defense.

These examples demonstrate the defense dimension of the space race and Project Apollo. However, the federal government and the media obscured this dimension from public rhetoric and discourse. Instead, they focused on national prestige as the reason behind the development of this space technology and exploration. But national defense was clearly one of the hidden reasons for the push for rapid development of space technology against the Soviets.

It is probable that the government obscured the defense dimension from public discussion in order to

maintain the project's idealistic appearance. The turbulence of the 1960s in both domestic and foreign relations meant that the military was subject to public criticism. As the decade progressed, the public criticized many military ventures, from nuclear weapons testing to the Vietnam War. NASA likely did not want to associate itself with such national defense or military ventures in order to avoid conflict. The defense dimension of Apollo, therefore, had to maintain the appearance of an idealistic scientific venture designed to unite Americans with the government. It certainly did not want to become a target of social protest.

One look at the nation's nuclear weapons policies of the early 1960s suggests the dangers of becoming a point of protest. It began in the 1940s and picked up steam in the 1950s, resulting in the first organized protest against the testing in Nevada in 1957.⁵¹ Historian Marian Mollin described the rapid increase in support of anti-nuclear testing groups such as the National Committee for a SANE Nuclear Policy (SANE) and the Committee for Non-Violent Action (CNVA), explaining that during 1959 as many as 50,000 alarmed Americans joined in the protests.⁵² In 1963, the protesters succeeded in forcing the passage of the Atmospheric Nuclear Test Ban, which prohibited any explosions of nuclear weapons in the atmosphere, under water, or anywhere else that could lead to public exposure to nuclear material.⁵³ Although the movement did not eliminate nuclear testing, gaining the government's attention and forcing it to respond to the public's anxieties on this issue was crucial.

The example of the anti-nuclear testing movement made it clear that, even in the early 1960s, the federal government could not afford for the public to see Project Apollo as a threatening military endeavor; otherwise, it could have met the same end. Obscuring the program's military dimension was thus highly beneficial.

Even after 1965, as Project Apollo picked up steam and closed in on its first lunar landing, the government continued to worry about anti-military opposition. This was the year in which major bombing campaigns began in Vietnam, a key change from earlier tactics of sending military advisors and training Vietnamese Armies.⁵⁴ Historian Alexander Bloom writes that this policy shift resulted in a more involved US presence in Southeast Asia, thought of as an unnecessary military action by many Americans. Activists organized teach-ins at colleges, where professors and students discussed the morality of the Vietnam War and the US presence in Southeast Asia.⁵⁵ The anti-war movement strengthened throughout the later 1960s, making public officials anxious.

According to Bloom, as the anti-war movement increased, public support for the war decreased, which “agonized” the federal government.⁵⁶ Officials began to take extreme steps to contain it, using force in some cases and illegal surveillance intelligence in others, which later became a part of Watergate.⁵⁷ Government officials, including the president and his national security advisor, Henry Kissinger, limited their public appearances due to the protests.⁵⁸ The government likely feared that public protests against its military actions in Vietnam could translate to other government programs as well.

This “agony” gave the US government a sense of caution when it came to other military endeavors. Obscuring the military aspect of the Apollo Program could have given the government freedom to continue moving forward, as opposed to answering the questions of the public. As a result, indecision and dallying characterized the latter end of the Vietnam War. NASA on the other hand leaned on the civilian aspects of Project Apollo to quiet the military connections and to continue its development.

Project Apollo was a landmark in US history. Americans were the first to walk on the moon, but, more importantly, the first to achieve the technology that gave them the ability to do so. The news media widely covered the Apollo program in the years between its inception in 1961 and its completion in 1969. Public discourse on the project emphasized its value as a vehicle for national prestige and celebrated its ability to promote national unity, but only a narrow view of history would accept these reasons alone as a basis for such a major project.

National unity and prestige certainly impacted the nation during the 1960s. These were critical concerns of the federal government, especially as the nation splintered over controversies like the Vietnam War, nuclear weapons testing, and civil rights. Project Apollo's self-representation as a symbol of national unity and progress likely proved critical to its success. However, that is not to say that other factors, such as military interest in space, were unimportant influences in the program.

The project certainly resulted in increased national prestige, but additional hidden factors, particularly those related to national defense, paved the way for this project. After the Soviets began developing nuclear arms following WWII and then surpassed the United States in the space race in the late 1950s, Americans increasingly viewed the USSR as a military threat. The military motives of Apollo not only included the use of satellites for intelligence, but also the use of military technology to take advantage of the United States' desired capability to send a man to the moon and return him safely. The realization of these goals was made possible by funding from NASA and the Department of Defense, as well as NASA's utilization of military contractors with established relationships with the Department of Defense. The Apollo Project, although seemingly based on prestige according to public rhetoric and discourse, had a significant military dimension as well

as the backing and aid of the Department of Defense. US national security and outer space always have been inseparably bound, and Project Apollo was no exception to this rule.

The triumph of the Apollo Project was manifold. America, already solidified as one of, if not the, greatest military power of the world, became a scientific and technological superpower. Worldwide, nations recognized the unlimited potential for power of a country with Apollo-level technology. The possibilities for military and civilian use of space technology were and are endless. After putting a man on the moon, the United States built on this technology to create amazing tools, like permanent space stations and extremely accurate navigation systems – both also used by the US military. Exploratory missions and even occupations by humans in other planets are well within NASA's reach and will make humans unprecedented masters of their solar system. American government and military, as the first and one of the few possessors of this technology, will determine the direction of how space will be used by humans in the near future.

¹ "Apollo 11 Lunar Surface Journal," *National Aeronautics and Space Administration*, Corrected Transcript and Commentary by Eric M. Jones, 1995.

² Von Hardesty and Gene Eisman, *Epic Rivalry: The Inside Story of the Soviet and American Space Race* (Washington, DC: National Geographic, 2007): 41.

³ Hardesty and Eisman, 243.

⁴ Alexander Bloom, *Long Time Gone* (New York: Oxford University Press, 2001). The essays in Bloom's work demonstrate varied movements and challenges throughout the sixties such as women's rights, anti-war protests, and civil rights for black Americans.

⁵ John F. Kennedy, "Address at Rice University on the Nation's Space Effort," 12

September 1962, in John F. Kennedy Library and Museum, <http://www.jfklibrary.org/>.

⁶ Norman L. Rosenberg and Emily S. Rosenberg, *In Our Times* (Upper Saddle River, NJ: Prentice Hall, Inc, 1999,) 6.

⁷ *Ibid.*, 7.

⁸ *Ibid.*, 13.

⁹ Rosenberg, 13.

¹⁰ *Ibid.*, 13.

¹¹ Richard M. Nixon and Sam Rayburn, National Aeronautic and Space Act of 1958 (Unamended). 2004.

<<http://history.nasa.gov/spaceact.html>>.

¹² "Apollo Program Summary Report," 2-1.

¹³ "Apollo Program Summary Report," *National Aeronautics and Space Administration*, Document # JSC-09423, April 1975, 2-36.

¹⁴ Roger D. Launius, "The Legacy of Project Apollo," *NASA History Office*, 1999.

¹⁵ Hardesty and Eisman, 45.

¹⁶ *Ibid.*, 47.

¹⁷ Dwight D. Eisenhower, "Farewell Address," 17 January 1961. Presidential Speech Archive, Miller Center of Public Affairs, University of Virginia, <http://millercenter.org/scripps/archive/speeches>.

¹⁸ John F. Kennedy, "The Goal of Sending a Man to the Moon," 25 May 1961. Presidential Speech Archive, Miller Center of Public Affairs, University of Virginia, <http://millercenter.org/scripps/archive/speeches>.

¹⁹ John F. Kennedy, "Address at Rice University on the Nation's Space Effort," 12 September 1962. Presidential Speech Archive, Miller Center of Public Affairs, University of Virginia, <http://millercenter.org/scripps/archive/speeches>.

²⁰ John F. Kennedy and James Webb, "JFK Exchange with NASA on Priority of Moon Landing," John F. Kennedy Presidential Library and Museum, Excerpt of 21 November 1962 White House meeting on space program- White House Tape #63. <http://www.jfklibrary.org/>.

²¹ James E. Webb, "America's Role in Space Today: Head of United States Space Agency Gives Five Reasons Why This Country Must Move to Master Space Flight," *New York Times*, 8 October 1961, M1.

²² NASA Eleventh Semiannual Report to Congress, CIS U.S. Serial Set, Annual Reports of Administrations and Boards, 89th Congress 1st Session, 32.

²³ NASA Twelfth Semiannual Report to Congress, 26.

²⁴ NASA Twelfth Semiannual Report to Congress, CIS U.S. Serial Set, Annual Reports of Administrations and Boards, 89th Congress 1st Session, 28.

²⁵ Linda N. Ezell, *NASA Historical Data Book: Programs and Projects 1958-1968*, (Washington, DC: The NASA Historical Series, 1988), iii.

²⁶ *Historical Tables: Fiscal Year 2010*, Office of Management and Budget, www.budget.gov, 74.

²⁷ *Historical Tables: Fiscal Year 2010*, 122.

²⁸ "Many Americans Doubt Manned Lunar Flight Is Worth the Huge Cost," *Wall Street Journal*, 19 September 1963, 18.

²⁹ "The Great Hurry," *Wall Street Journal*, 9 August 1962, 10.

³⁰ "Idiot's Delight," *Wall Street Journal*, 27 April 1962, 14.

³¹ "NASA Laments Notion of 'Race' with Reds, But Capitalizes on Its Moon-Struck Rooters," *Wall Street Journal*, 23 August 1962, 8.

³² "Many Americans Doubt Manned Lunar Flight Is Worth the Huge Cost," *Wall Street Journal*, 1963, 18.

³³ Peter Galison and Bruce William Hevly, *Big Science: the Growth of Large-scale Research*, (Stanford: Stanford University Press, 1992), 2.

³⁴ Rosenberg, 108.

³⁵ Yuri Gagarin, *Soviet Man in Space* (Honolulu: University Press of the Pacific, 2001), 9.

³⁶ Rosenberg, 13.

³⁷ Eisenhower, "Farewell Address," 17 January 1961.

³⁸ Rosenberg, 193.

³⁹ Richard Thruelsen, *The Grumman Story* (New York: Praeger Publishers, 1976), 1.

⁴⁰ Thruelsen, 20.

⁴¹ Bill Gunston, *Grumman: Sixty Years of Excellence* (New York: Orion Books, 1988), 33.

⁴² Gunston, 33.

⁴³ Barnes W. McCormick, Conrad F. Newberry, Eric Jumper, and American Institute of Aeronautics and Astronautics, *Aerospace Engineering Education During the First Century of Flight* (Reston, VA: American Institute of Aeronautics and Astronautics, Inc, 2004), 158.

⁴⁴ "Biggest Contract is Signed by NASA," *New York Times* (1923-Current file), Aug 17, 1963, ProQuest Historical Newspapers The New York Times (1851 - 2007), 25.

⁴⁵ "Biggest Contract is Signed by NASA," 25.

⁴⁶ *Historical Tables: Fiscal Year 2010*, 74.

⁴⁷ *Historical Tables: Fiscal Year 2010*, 74.

⁴⁸ Ezell, 1, 17.

⁴⁹ Hardesty, 47.

⁵⁰ "Kennedy Asks Added \$7 Billion to \$9 Billion For Space Program Over Next 5 Years," *Wall Street Journal*, 26 May 1961, 3.

⁵¹ Marian Mollin, "The Struggle Against McCarthyism and the Bomb," in *The Encyclopedia of American Social Movements*, Immanuel Ness, ed. (Armonk, NY: M.E. Sharpe, 2004), 6.

⁵² *Ibid.*, 7.

⁵³ Mollin, 7; John F. Kennedy and Dean Rusk, "Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water," Article 1, 10 October 1963.

⁵⁴ Rosenberg, 147.

⁵⁵ Bloom, 76.

⁵⁶ Bloom, 78-79.

⁵⁷ Bloom, 81-2.

⁵⁸ Bloom, 82.

GOING CRITICAL

THREE MILE ISLAND AND THE FEDERAL REFORM OF THE NUCLEAR POWER INDUSTRY

MYLES DAUTERIVE

On the morning of March 28, 1979, the United States endured a major crisis that heavily impacted its willingness to utilize nuclear technology for peaceful purposes. In the days that followed, Americans were inundated with reports that a major accident at the Three Mile Island Power Plant near Harrisburg, Pennsylvania, had resulted in the release of radioactive material into the atmosphere.¹ Caused by a combination of mechanical failure and human error, the critical failure of one of Three Mile Island's two primary reactors was America's first major commercial nuclear accident.² The accident itself provided tangible evidence that nuclear power represented an unsafe and unreliable venture.³ As such, the accident at Three Mile Island fueled ongoing debate over the propriety of using atomic technology in non-military applications. Despite its negative impact on the image of nuclear power, the incident at Three Mile Island failed to undermine the nuclear power industry in the United States. Instead, the accident provided the impetus for a fundamental alteration of the nuclear power industry by forcing federal officials and industry representatives to develop new, highly stringent safety standards aimed at improving the operational practices of nuclear power plants.

While much has been written on the technical and managerial failures that contributed to the meltdown at Three Mile Island, relatively little research focuses on the accident's long-term impact on attempts to regulate the nuclear power industry. However, several works provide a brief overview of the incident's major historical

consequences.⁴ Books like *TMI 25 Years Later: Three Mile Island Nuclear Power Impact and its Consequences*, co-authored by Bonnie A. Osif, Anthony J. Baratta, and Thomas W. Conkling, along with J. Samuel Walker's *Three Mile Island: A Nuclear Crisis in Historical Perspective* provide brief overviews of the federal government's response to Three Mile Island. However, these works provide relatively limited coverage of the specific actions the federal government pursued to prevent future accidents at nuclear power plants. Despite their broad view, these works, combined with a number of articles, such as James R. Temple's "The Nuclear Regulatory Commission and the Politics of Regulatory Reform: Since Three Mile Island," provide an excellent basis on which to begin an examination of the reform of the nuclear power industry.⁵ Based on the contextual information provided by these works, as well as an analysis of a number of primary sources, this paper traces the response of the federal government to the accident at Three Mile Island through an examination of actions pursued by the Nuclear Regulatory Commission (NRC). This paper will also examine the development of new federal regulations governing the nuclear power industry between 1979 and 1985. Additionally, the following discussion will indicate the role of NRC reforms in facilitating the development of the modern nuclear power industry into a relatively safe venture. As such, the topic explored here will provide an analysis of the transformation of the American nuclear power industry following the accident at Three Mile Island.

The incident at Three Mile Island, which resulted in the release of radiation into the surrounding area, dramatically altered America's willingness to pursue the future development of nuclear power.⁶ However, the Three Mile Island accident failed to curtail the operations of the nuclear power industry. Instead, it sparked a series of reform movements intended to improve the safety of

nuclear power plants. This process manifested itself in two forms. The first of these restructuring attempts originated within the nuclear power industry through the creation of a series of regulatory organizations charged with coordinating reform within the industry itself.⁷ The second major reorganization effort was derived from the federal government through an attempt to alter existing regulatory organizations, such as the NRC, and restructure the nuclear power industry itself. Through the combination of actions pursued by the NRC and legislation passed by the US Congress, the federal government attempted to address several issues highlighted by the Three Mile Island accident. Focused primarily on improving the safety of nuclear power, the federal government adopted stringent inspection and safety protocols intended to help prevent the catastrophic mechanical failure of a nuclear reactor. Similarly, the NRC adopted new training standards in an effort to improve the reliability of power plant operators and the efficiency of nuclear power plant management practices. Federal reform efforts also focused on streamlining the nuclear power industry by overhauling the NRC's power plant licensing procedures. By focusing on this combination of the reform initiatives, this article argues that the Three Mile Island accident resulted in a change in the focus of federal legislation and regulatory standards between 1979 and 1985 that encouraged the creation of increasingly stringent safety standards.

In order to understand the true impact of the Three Mile Island accident, one must first explore the evolution of the nuclear power industry. Nuclear power began as a highly experimental technology. Utilizing research conducted during the Manhattan Project, the United States in the early 1950s began exploring the possibility of harnessing the power of nuclear reactions to generate electricity. On December 20, 1951, the United States activated the world's first nuclear reactor designed

specifically for the production of energy.⁸ Dubbed EBR-1, this plutonium-fueled reactor demonstrated that nuclear power represented a potentially viable energy source. Building on this success, the military initiated several programs intended to explore the practical applications of nuclear power. Centering on the Navy, these programs sought to broaden the military uses of nuclear technologies by utilizing them in a non-weapon capacity. Developed by Adm. Hyman Rickover, the launch of the USS *Nautilus* in 1955 represented the first practical use of nuclear power. Using a prototype reactor, the *Nautilus* became the world's first nuclear-powered submarine.⁹ This new design radically altered submarine warfare, allowing vessels to remain at sea for extended periods of time.¹⁰ The launching of the *Nautilus* indicated that nuclear power held the potential to become a highly efficient and beneficial source of energy.

Despite the success of early experiments, nuclear power required the intervention of the federal government to gain a foothold in the civilian energy market. Beginning in the mid-1950s, the United States developed a series of legislative initiatives intended to spark the growth of the nuclear power industry. Passed in 1946 and later amended in 1954, the Atomic Energy Act represented the first of these initiatives. This piece of legislation created the Atomic Energy Commission (AEC). Despite heavy criticism that the agency focused more on promoting nuclear power than regulating it, the AEC served as the primary government agency responsible for regulating and promoting nuclear technologies.¹¹ The 1954 amendment to the Atomic Energy Act attempted to expedite the construction of nuclear power plants by granting utility companies interested in developing nuclear power plants access to large amounts of fissionable material and advanced research regarding nuclear technology.¹² As such, the Atomic Energy Act created the basic framework

for the often complex relationship between the nuclear power industry and the federal government. To further encourage the development of nuclear power, Congress passed the Price-Anderson Act in 1957. This piece of legislation provided companies operating nuclear power plants with approximately \$560 million per reactor in insurance to help cover the costs of a potential accident.¹³ This act removed a large amount of risk involved in the construction and operation of nuclear power plants. As such, the Atomic Energy Act and the Price-Anderson Act combined to provide a stable environment intended to encourage the development of nuclear power throughout the United States.

During the 1960s and 1970s, the nuclear power industry entered a period of expansion. Despite the proactive federal actions of the 1950s, the nuclear power industry required significant assistance to establish itself in the American energy market. Beginning in the 1960s, reactor developers such as General Electric (GE) and Westinghouse sought to create new markets for innovative reactor designs. In order to spur the growth of nuclear power in the United States, GE and Westinghouse developed the "Turn-key Program" in 1964. This initiative allowed power companies to purchase nuclear reactors for a fixed price set well below market value.¹⁴ This allowed power companies to explore nuclear technology with relatively little risk, thereby stabilizing the nuclear power industry. The increased availability and affordability of nuclear reactors allowed for the development of plans to construct nearly ninety nuclear power plants throughout the United States.¹⁵ Additionally, the turn-key program helped spur the development of plans to expand nuclear power production by nearly 60,000 megawatts.¹⁶ Considering the production of over 983 billion kilowatt-hours of electricity in 1964 by all producers of electricity, the turn-key program represented an opportunity to

greatly expand America's electrical supply.¹⁷ As such, the turn-key program resulted in the expansion of the nuclear power industry by improving the industry's access to valuable technological resources and by reducing the costs of constructing a nuclear power plant.

These developments combined with a series of federal legislation in the 1970s to help further the growth of nuclear power in the United States. The most significant of these pieces of legislation, the Nuclear Licensing and Sitting Act, attempted to provide federal support to companies operating nuclear power plants. Passed in 1978, this act reduced regulations governing the licensing of nuclear power plants. Specifically, it allowed the NRC to reduce its emphasis on mandatory safety hearings while also granting the organization the power to grant operating licenses prior to the completion of all licensing hearings.¹⁸ While an attempt to help bolster the growth of nuclear power, the Nuclear Licensing and Sitting Act represented a pre-Three Mile Island sense of naiveté regarding the safety of nuclear power. Its emphasis on reducing the number of steps involved in licensing procedures indicated a willingness to sacrifice careful scrutiny and regulation in order to expedite the development of nuclear power in the United States. This indicates that federal regulations enacted prior to the Three Mile Island accident focused primarily on promoting the development of nuclear power rather than on creating stringent safety standards.

Despite its promising beginnings, the nuclear power industry in the United States encountered several major challenges during the 1970s. Among the most significant, the oil embargo enacted by the Organization of Petroleum Exporting Countries (OPEC) in 1973 threatened to undermine the industry's stability and expansion. A significant spike in oil prices caused by the OPEC embargo initially bolstered hopes that nuclear power held the potential to become a major player in the American energy

market.¹⁹ However, a severe economic recession in the early- and mid-1970s forced American utility companies operating nuclear power plants to limit expansion of their operations. Consequently, they were forced in 1974 to cancel the construction of several proposed power plants capable of collectively producing nearly 130,000 megawatts of power annually.²⁰ This, combined with a significant increase in the price of plutonium between 1974 and 1976, made the production of nuclear power a highly expensive endeavor.²¹ Additionally, during the mid-1970s US demand for and consumption of energy stagnated.²² This decreased demand for energy, combined with increasing costs, severely undermined economic interests in nuclear power. Thus, economic troubles during the 1970s threatened the stability of nuclear power utilities throughout the United States.

The late 1960s and early 1970s witnessed the rise of an intense social and intellectual opposition to nuclear power. Formed in 1969, the Union of Concerned Scientists (UCS) challenged the credibility of the nuclear power industry. Engaged primarily on examining the safety and technological aspects of nuclear power, the UCS argued that existing safety standards regarding the operation of nuclear reactors were ineffective.²³ Initially formed in response to military experiments with nuclear technologies, the UCS heavily criticized safety standards regarding emergency reactor shutdown procedures.²⁴ Focused specifically on emergency shutdowns initiated by a loss of coolant in a reactor, the UCS claimed emergency procedures left little if any room for error, thereby increasing the chance that a minor mechanical or human failure could result in devastating consequences.²⁵ While not entirely opposed to the continued development of nuclear power, the organization's focus on safety protocols indicated the emergence of a new hesitancy to accept nuclear technologies in a civilian setting. This sentiment

further manifested itself through the emergence of grass-roots anti-nuclear groups such as the Clamshell Alliance. Motivated by environmental and safety concerns, the Clamshell Alliance represented a shift in the ideologies of the anti-nuclear movement.²⁶ While earlier groups, such as the UCS, called for strengthened safety protocols, the Clamshell Alliance and other anti-nuclear movements attempted to curtail the growth of the nuclear power industry.²⁷ As such, the combination of intellectual and grassroots movements further challenged the nuclear power industry by placing increased scrutiny on its safety practices and potentially negative influence on communities across the nation.

Despite the concerns of the UCS and Clamshell Alliance, nuclear power represented a small, but growing, portion of the American energy market in the 1970s. In 1974, nuclear power companies generated 100.5 billion kilowatt-hours of electricity, accounting for roughly 7% of America's electrical production.²⁸ As such, nuclear power ranked behind coal, oil, and natural gas forms of electrical generation, which provided 84.6% of America's total electrical production in 1974.²⁹ However, following the OPEC embargo, the Nixon Administration encouraged the further development of nuclear power. Specifically, President Nixon set high goals for the nuclear power industry, proposing that it provide nearly 30% to 40% of America's electricity by the early 1990s.³⁰ Despite the economic challenges discussed above, the nuclear power industry managed to increase its output, providing nearly 11% of America's electrical production by 1982.³¹ Significantly, this allowed the nuclear power industry to generate the energy equivalent of 1.3 million barrels of oil per day by 1982.³² This boost in production accompanied an increase in the number of nuclear power plants operating throughout the United States. By 1981, the United States possessed seventy-one active nuclear power

plants that produced nearly 53,000 annually.³³ This, combined with plans calling for the construction of nearly sixty additional nuclear power plants, indicated nuclear power's growing role as a viable source of energy for the United States.³⁴

Reform measures prior to the Three Mile Island accident failed to significantly alter safety standards. Beginning with the passage of the Energy Reorganization Act in 1974, the federal government attempted to restructure its oversight of the nuclear power industry. This act, responsible primarily for dissolving the Atomic Energy Commission, an agency criticized heavily for placing a great deal of emphasis on promoting nuclear power rather than regulating it, created an entirely new system of organizations charged separately with the promotion and regulation of nuclear utilities. Significantly, the Energy Reorganization Act created a new government oversight organization known as the Nuclear Regulatory Commission (NRC).³⁵ The NRC based its authority on a tripartite division of responsibilities between the Offices of Nuclear Reactor Regulation, Nuclear Regulatory Research, and Nuclear Safety and Safeguards. Endowed with a mandate to regulate the activities of the nuclear power industry, the NRC held the responsibility to oversee the construction and licensing of all nuclear power plants and the development of technical safety standards. Additionally, the Energy Reorganization Act stipulated that each office fell under the control of a single executive director of operations, who in turn served under a commission of five individuals appointed by the president of the United States. However, the reorganization of federal regulatory agencies failed to provide the NRC with a clear structure of authority. As such, the directors of the various offices within the NRC remained free to report to either the executive director of operations or directly to the commissioners.³⁶ Thus, despite a clear mandate, the NRC

remained a somewhat ineffective organization due to its inability to establish clear lines of communication and authority. Furthermore, between 1974 and 1979 the NRC failed to significantly improve the safety standards of the nuclear power industry. As discussed previously, the NRC held the power to grant operating licenses to nuclear power plants before the completion of required licensing and safety hearings. This indicates that the NRC maintained a focus on promoting the development of nuclear power rather than focusing specifically on developing stringent safety standards. Thus, the NRC's complex system of authority, combined with its conflicting interests to promote and regulate the nuclear power industry, limited the organization's ability to develop stringent safety standards.

Prior to Three Mile Island, the NRC failed to create strong and effective standards for the selection and hiring of power plant operators. The education standards set by the NRC allowed an individual with relatively little education and experience to gain a reactor operator's license or certification as a senior operator. The certification process for a reactor operator's license required that an individual possess a high-school education and at least two years of experience in a power plant. These standards also required that an individual possess only one year of experience working in a nuclear power plant.³⁷ Interestingly, this requirement failed to specify exactly what constituted an appropriate level of experience. As such, these lax standards allowed an individual with little theoretical or practical experience to operate a nuclear reactor. Compounding this issue, NRC regulations failed to set strict standards regarding the selection of plant managers. Qualification standards for a plant manager certification required that one possess at least "four years of responsible power plant experience" and at least one year of experience in a nuclear plant.³⁸ While these

requirements ensured that individuals with a fair amount of experience in the energy industry held management positions, they failed to ensure that managers had significant experience with nuclear power.

Safety standards set by the NRC also failed to ensure that power plant operators received sufficient training. According to a special report submitted to the Senate Committee on Environment and Public Works in 1980, reactor operator exams established a fairly low score as a passing grade. Designating a score of 70% as sufficient to pass a licensing exam, these assessments allowed license applicants to gain certification despite a lack of proficiency.³⁹ Additionally, operator licensing exams and programs neither mandated nor provided additional training to those applicants who passed their examinations with low scores. Significantly, the failure to ensure supplemental training allowed relatively inexperienced operators possessing an incomplete knowledge of nuclear principles and reactor operations to gain certification.

Compounding this issue, training programs failed to provide operators with the knowledge necessary to handle emergency situations. NRC training standards placed little emphasis on emergency management. Established training protocols focused on preparing operators to follow a set of established procedures that addressed minor malfunctions and daily routines.⁴⁰ These training protocols failed to provide any instruction in the skills necessary to prevent or manage the occurrence of a major nuclear accident. Thus, these training standards taught operators to address predetermined issues, neglecting to teach them to address new and unforeseen problems. Additionally, the operation of a nuclear power plant provided little opportunity for on-the-job-training. Prior to the Three Mile Island accident, nuclear power plant operators remained relatively uninvolved in the management of a nuclear reactor. Concerning themselves almost exclusively with the start-

up and shutdown procedures of a reactor, operators remained fairly passive in the daily operations of nuclear power plants. As such, reactor operators served as simple monitors responsible only for making occasional minor adjustments.⁴¹ Thus, the training provided to nuclear operators afforded little opportunity to learn the creative thinking and practical skills necessary to prevent a major nuclear accident.

The accident at Three Mile Island revealed major flaws in the practices of the nuclear power industry and in the regulations created by the Nuclear Regulatory Commission. In order to understand the long-term impacts of Three Mile Island, one must first study the causes of the accident. The initial problems faced by the Three Mile Island power plant stemmed from mechanical failures. During normal operations, reactor number two at Three Mile Island experienced a minor mechanical glitch. An automated valve known as a Pilot Operated Release Valve (PORV) opened in response to increased pressure levels in the water-based coolant used to maintain a stable nuclear reaction. Although a normal occurrence, the valve failed to close itself, thereby allowing nearly one million gallons of radioactive water to spill out of the core and into the plant itself.⁴² The drop in coolant levels activated the plant's automated emergency systems, causing reserve pumps to divert water to the reactor core in an attempt to maintain a constant pressure. Significantly, the leakage of contaminated coolant fluid resulted in an overflow of Three Mile Island's liquid storage tanks, resulting in the release of nearly one millirem per hour of radioactive material throughout the plant. This released a total of 240 millirems of radiation over the ten-day course of the accident.⁴³ However, mechanical failures represented only a small part of the root causes of the Three Mile Island accident.

Post-accident investigations revealed that human error and poorly designed reactor control room interfaces formed the primary cause of the Three Mile Island accident. The failure of Three Mile Island's operators to recognize the malfunction of the plant's PORV system indicated that reactor control rooms based themselves on a highly complicated design that often provided vague and unclear data.⁴⁴ This same issue also demonstrated the shortfalls of reactor operator training programs. Considering the relatively lenient training standards discussed above, Three Mile Island operators relied heavily on technical readouts that failed to indicate a specific source of the plant's mechanical failures. This led Three Mile Island's operator's to misdiagnose the source of the plant's problems, thereby allowing the workers to adopt incorrect and ineffective counter measures.⁴⁵ Additionally, this incident highlighted many operators' inability to determine alternative sources of various problems. These two factors helped initiate attempts to reform both the safety and operational protocols of the nuclear power industry.

Following Three Mile Island, the federal government launched a number of investigations in an attempt to determine the causes of the accident and possible solutions to help prevent future incidents. The most significant of these, the Kemeny Commission, represented an attempt to develop an in-depth understanding of both the technical and structural flaws that contributed to the Three Mile Island accident. This commission consisted of a number of representatives from a variety of nuclear-related fields.⁴⁶ Based around the promotion of "fundamental changes" in the "organization, procedures, and practices...of the NRC," the final report of the Kemeny Commission focused on the reformation of federal nuclear oversight organizations and their role in determining industry regulations.⁴⁷ Specifically, the

Commission focused on the role of human error in the Three Mile Island accident by identifying it as the result of poor training, confusing regulations, and a mindset in the industry and the NRC that placed a heavy emphasis on maintaining equipment rather than on improving human abilities.⁴⁸ As such, the Kemeny Commission called on the NRC to adopt a series of reforms that focused specifically on the prevention of human error and its role in causing nuclear accidents.⁴⁹ Thus, the report laid the foundations for long-term federal reform efforts throughout the 1980s.

The federal attempt to reform the nuclear power industry embodied itself in the reorganization of the Nuclear Regulatory Commission and the implementation of new policies intended to boost the organization's influence. In 1979, the Kemeny Commission called for the dissolution of the NRC and the establishment of a new regulatory agency under the jurisdiction of the president of the United States.⁵⁰ The drastic nature of this proposal caused many federal officials, including President Jimmy Carter, to seek alternative reforms. Interestingly, President Carter implemented a plan for the reorganization of the NRC that allowed the organization to retain its basic structure. This plan also granted increased power and responsibilities to the Commission's chairman and executive director of operations.⁵¹ This indicated a willingness on the part of the federal government to increase the efficiency and effectiveness of regulatory organizations.

Beginning in 1979, the NRC attempted to bolster its influence over nuclear power companies. In order to accomplish this, the NRC developed and implemented a new initiative known as the "Resident Inspector Program." Based on providing a uniform system of enforcement for federal regulations, the Resident Inspector Program placed one NRC licensed inspector at every nuclear power plant throughout the country.⁵² This program allowed the NRC

to monitor all power plant operations, thereby providing the organization increased control over the nuclear power industry. This program also represented an attempt to proactively prevent mechanical failures in nuclear power plants. According to Karl V. Seyfrit, a deputy regional administrator for the NRC, these inspections prevented nuclear accidents by allowing inspectors and power plant personnel to “take corrective actions just as soon as possible” should a problem arise.⁵³ By 1981 nearly 400 inspectors enforced NRC regulations at power plants throughout the country.⁵⁴ This increased authority over the nuclear power industry reflected a fundamental shift in the focus of the NRC following the Three Mile Island accident. By actively enforcing regulatory standards, the NRC shed its primary responsibility of licensing the construction of nuclear power plants, becoming a full-fledged regulatory agency that directly influenced the daily operations of nuclear plants throughout the country.⁵⁵

To further bolster its control over the nuclear power industry, the NRC advocated for the development and implementation of a highly stringent system of fines and punishments for safety violations. In 1980, the NRC managed to secure the passage of laws that dramatically increased fines from \$5,000 to \$100,000 per safety violation, thereby strengthening its notoriously weak sanctions.⁵⁶ This placed economic pressure on utilities operating nuclear power plants to comply with federal regulations. The NRC further strengthened its regulation enforcement policies by establishing harsh criminal penalties, including imprisonment and steep fines, for those found in violation of federal regulations.⁵⁷ While primarily an attempt to strengthen the NRC’s regulation enforcement protocols, these reforms created an increased level of accountability for both power plant operators and the nuclear power industry as a whole. The combination of stringent fines and increased NRC oversight forced nuclear power companies

to maintain strict safety and operational protocols in order to avoid federal sanctions.

Despite its attempts to quickly increase the strictness of federal inspections and oversight, the NRC proved sluggish in developing new safety standards. Beginning in 1979, the NRC adopted a series of recommendations created by its subsidiary Advisory Committee on Reactor Safeguards (ACRS). These standards focused primarily on two major areas. First, recommendations called on the industry to ensure the safety of communities surrounding nuclear plants by reducing possible threats to human lives.⁵⁸ Second, the ACRS recommendations pressed nuclear power companies to adopt a more proactive role in anticipating and addressing possible reactor problems.⁵⁹ Despite a distinct lack of legislative power, these recommendations attempted to create a comprehensive set of safety regulations that upheld the best interests of both the nuclear power utilities and the general public. Additionally, these recommendations indicated that a reformation of safety protocols required an emphasis on both human and technical variables, thereby ensuring that nuclear power companies accounted for multiple factors in their daily operations.

Building on the ACRS proposals, the Nuclear Regulatory Organization (NRO) developed an in-depth safety policy statement that established both qualitative and quantitative goals for the nuclear industry. Bearing a strong resemblance to the ACRS proposal, the NRO safety goals required nuclear power plants to minimize the potential threats they posed to human lives by protecting the general public from the possible consequences of a nuclear accident.⁶⁰ However, this new set of safety goals also created a series of numerical goals for the nuclear industry. Specifically, these proposals stipulated that a nuclear power plant could not cause more than a 0.1% increase in rates of cancer or accidental death than those set

by other major industries.⁶¹ Significantly, this marked one of the first attempts to create a clear set of legislation intended to strengthen nuclear power safety standards. By providing a numerical value for acceptable cancer and fatality rates, the NRO allowed nuclear utilities the ability to develop new safety measures intended to create a less harmful and more publically oriented nuclear power industry.

Despite the in-depth focus of the previously discussed standards, the NRC continued to develop increasingly complex safety guideless. On March 14, 1983 the Nuclear Regulatory Commission adopted a new safety policy. Utilizing language similar to previous guidelines, these new standards mandated that “individual members of the public should bear no significant risk to life and health.”⁶² While these broad requirements contained little legislative value, their dedication to protecting the public provided the ideological basis for the NRC’s safety regulations. These standards also adopted elements of previous safety goals, mandating that nuclear power plants reduce their potential to increase rates of death resulting from cancer.⁶³ Additionally, these new standards examined the expected costs of implementing new safety technologies, arguing that utility companies owning nuclear power plants spent less than \$1,000 for every person-rem of radiation avoided during the operation of a nuclear reactor.⁶⁴ This argument indicated that safety technologies represented a relatively inexpensive way of preventing a major accident.

Immediately following the Three Mile Island accident, the NRC attempted to reform its licensing protocols for nuclear power plants. In an open break with previous policies, the NRC temporarily suspended all reactor license applications pending further investigation of Three Mile Island.⁶⁵ This temporary moratorium allowed the NRC an opportunity to reevaluate and strengthen its

licensing standards. In 1979, the NRC created a new policy mandating all nuclear power companies to submit an emergency planning report with their license applications. This requirement called on utilities to develop a comprehensive set of plans detailing various emergency procedures intended to minimize the effects of a possible nuclear accident.⁶⁶ Despite the NRC's unwillingness to issue any new reactor licenses following Three Mile Island, this requirement indicated an increased focus on improving safety and the effective management of nuclear accidents.

However, despite an increased focus on safety, some NRC reforms maintained an interest in promoting the development of the nuclear power industry. In a letter submitted during a congressional hearing on April 1, 1981, Joseph M. Hendrie, a former chairman and commissioner of the NRC, proposed a plan allowing nuclear power plants to begin limited operations before receiving full licensure. This proposal authorized nuclear power companies to initiate fueling and testing procedures for reactors undergoing NRC licensing reviews.⁶⁷ While a seemingly simple proposal, the development of the "interim license" program indicated a growing interest among members of the NRC in reducing construction and licensing delays, impeding the development of new nuclear power plants in the United States.⁶⁸ However, the failure of nuclear utilities to order the construction of even a single reactor or power plant since 1979 indicated that this proposal, and others like it, failed to renew commercial interest in the development of nuclear power.⁶⁹

The NRC further augmented its licensing reform efforts through an attempt to streamline the licensing process. To accomplish this, the NRC adopted new policies intended to help reduce the nearly decade-long process involved in securing an operating license for a nuclear power plant.⁷⁰ Interestingly, the NRC attempted to

abandon its requirement that all objections to the construction of a nuclear power plant receive a public hearing.⁷¹ Through this, the NRC hoped to limit the rights of “third party intervenors” and their ability to challenge NRC standards by voicing their concerns over possible safety hazards posed by nuclear power plants.⁷² While intended to help expedite the licensing process, this proposed policy removed public opinion as a major factor in determining the approval of a proposed nuclear power plant. Additionally, this reform indicated an attempt to boost the effectiveness of licensing procedures. Between 1979 and 1981 the NRC issued nearly 1,600 “no significant hazard” license amendments due to public challenges regarding a variety of safety issues.⁷³ As such, by removing a source of possible challenges to NRC regulations, the organization indicated a willingness to suspend its focus on safety in an effort to facilitate the interests of the nuclear power industry. Thus, this series of licensing reforms indicates that the NRC never completely abandoned its pre-Three Mile Island focus on promoting the development of nuclear power.

Federal reform efforts culminated in the National Nuclear Power Plant Personnel Training Act of 1985. Intended to standardize reactor operator training standards, this act augmented existing industry standards by implementing a single set of nationally recognized training practices through the creation of the federally administered National Academy for Nuclear Power Safety (NANAPS).⁷⁴ Intended to provide training to all nuclear power reactor operators and support personnel, the academy developed a curriculum based on teaching its students the principles “necessary and appropriate for the safe operation of civilian nuclear power plants.”⁷⁵ Furthermore, the curriculum adopted by the academy offered a series of training programs intended to fulfill the educational needs mandated by federal licensing

requirements for a variety of positions throughout the nuclear power industry.⁷⁶ This indicated an attempt to dramatically improve training standards by requiring all nuclear power personnel to adhere to a standardized set of rigid protocols. Additionally, the NANAPS curriculum based itself on training and safety standards set by the NRC and nuclear power industry. As such, the creation of the National Academy for Nuclear Power Safety represented an attempt to combine the previously independent reform efforts of the federal government and nuclear power companies.

The reforms initiated by the NRC, combined with measures developed by the nuclear power industry following the Three Mile Island accident, formed the basis of the modern American nuclear power industry. The combination of the reforms discussed above and those pursued separately by the nuclear power industry led to a noticeable decrease in emergency “scrams.”⁷⁷ In the years between 1980 and 1985 the average number of unplanned automatic scrams per unit dropped from 7.3 to 4.5 annually.⁷⁸ The improved safety standards set by the NRC, as well as industry-based reforms, proved effective, forcing the nuclear power industry to significantly improve its power plant operations. As a result of these combined reform efforts, the median number of emergency scrams per nuclear reactor declined from approximately seven emergency shutdowns annually in 1980 to nearly zero shutdowns annually by 2001. This indicates that at least half of all power plants that reported data experienced zero emergency shutdowns in 2001.⁷⁹ As such, the reforms created by the NRC following the Three Mile Island accident helped facilitate the transformation of the nuclear power industry into a safer and more reliable endeavor, while also allowing nuclear power to remain a prominent source of energy for the United States.⁸⁰ As such, the study of the reforms mentioned above allows one to understand

the development of the nuclear power industry in the United States.

The Three Mile Island nuclear accident represents a crucial turning point in the history of nuclear power in the United States. Caused by a combination of mechanical breakdowns and human error, the failure of the power plant's reactor core coolant system highlighted several major flaws in the regulation of nuclear utilities. This incident demonstrated that reactor operators received insufficient training and possessed few of the skills necessary to prevent or manage a major accident. This, combined with confusing control interfaces, prevented the operators of Three Mile Island from accurately diagnosing the source of the reactor's problems. The combination of these two factors led to significant calls for reform. Initial reforms attempted to alter the NRC itself. Focusing primarily on bolstering the authority of the organization, new policies granted increased authority to the NRC by strengthening the powers of its executive director and commission chairman. These policies also granted the NRC increased authority over the nuclear power industry by allowing it to place federal inspectors in all nuclear power plants. Reform initiatives also attempted to stabilize the nuclear power industry by forcing it to adopt stringent safety protocols intended to protect the general public from the harmful effects of a possible nuclear accident. However, the reforms adopted by the NRC also promoted, to a lesser degree, the development of the nuclear power industry by removing safety hearings from the reactor licensing process. Despite this, the Three Mile Island accident forced the Nuclear Regulatory Commission to adopt and implement new standards intended primarily to promote safety rather than the growth of nuclear power.

¹ "Nuclear Power Plant Leaks Radiation," *Chicago Tribune*, March 29, 1979, <http://proquest.com>.

² Kenneth L. Miller, "The Nuclear Reactor Accident at Three Mile Island," *RadioGraphics* 14, no.1 (January 1994): 215, <http://highwire.stanford.edu>.

³ Bonnie A. Osif, Anthony J. Baratta, and Thomas W Conkling, *TMI 25 Years Later: Three Mile Island Nuclear Power Plant Accident and its Impact* (University Park: The Pennsylvania State University Press, 2004), 76-77; James Coates, "Commission's Grim Forecast: It Could Happen Again," *Chicago Tribune*, October 31, 1979, <http://proquest.com>.

⁴ Bonnie A.Osif, Anthony J. Baratta and Thomas W. Conkling. *TMI 25 Years Later*; J. Samuel Walker, *Three Mile Island: A Nuclear Crisis in Historical Perspective* (Berkeley: University of California Press, 2004).

⁵ James R. Temples, "The Nuclear Regulatory Commission and the Politics of Regulatory Reform: Since Three Mile Island," *Public Administration Review* 42, no.4 (July-August 1982): <http://www.jstor.org>.

⁶ Post-accident reports estimated that residents around Three Mile Island were exposed to 1.5 millirems of radioactive material. This exposure represents a relatively small dose compared to naturally occurring sources of radiation. Sources, such as cosmic radiation, may expose one to nearly 116 millirems of radiation annually. Osif, Baratta, and Conkling, *TMI 25 Years Later*, 66, 85.

⁷ The most significant of these organizations arose with the creation of the Institute of Nuclear Power Operations (INPO) in December, 1979. Created as a cooperative enterprise through an agreement signed by the CEOs of every major nuclear power company, the INPO represented an attempt to develop and implement a set of operational and safety standards for nuclear power plants independently of federal authorities. The organization proved highly successful and remains in existence today. However, the INPO remains a highly secretive organization, well known for its refusal to release information regarding its findings or activities to the general public. However, the actions of this organization lie beyond the scope of this article and will not be covered in depth. See Joseph V. Rees, *Hostages of Each Other: The Transformation of Nuclear Safety Since Three Mile Island* (Chicago: University of Chicago Press, 1994).

⁸ James Mahaffey, *Atomic Awakening: A New Look at the History and Future of Nuclear Power* (New York: Pegasus Books, 2009), 206.

⁹ Terence Price, *Political Electricity, What Future for Nuclear Energy?* (New York: Oxford University Press, 1990), 7.

-
- ¹⁰ "Under Way On Nuclear Power: Atom Sub Blazes New Transportation Trail," *Christian Science Monitor*, January 18, 1955, microfilm.
- ¹¹ Osif, Baratta, and Conkling, *TMI: 25 Years Later*, 78-79
- ¹² Osif, Baratta, and Conkling, *TMI 25 Years Later*, 76-77.
- ¹³ Richard Curtis, Elizabeth Hogan, and Shel Horowitz, *Nuclear Lessons: An Examination of Nuclear Power's Safety, Economic, and Political Record* (Harrisburg, PA: Stackpole Books, 1980), 210.
- ¹⁴ However, while these turn-key reactor deals facilitated the growth of the nuclear power industry, they also resulted in severe financial loss for both GE and Westinghouse. Both companies lost a combined \$1 billion between 1964 and 1967. Peter Pringle and James Spigelman, *The Nuclear Barons* (New York:, Holt, Rinehart, and Winston, 1981), 265.
- ¹⁵ Mahaffey, *Atomic Awakening*, 303.
- ¹⁶ It should be noted that 1 megawatt is equivalent to 1 million watts of electricity. 1 megawatt can also power 1000 homes for roughly one hour. Scott Fenn, *The Nuclear Power Debate: Issues and Choices* (New York: Praeger Publishers, 1981), 77.
- ¹⁷ Federal Power Commission, *Statistics of Electric Utilities in the United States: 1964* (Washington, DC: Government Printing Office, 1964), VI.
- ¹⁸ Fenn, *The Nuclear Power Debate*, 58.
- ¹⁹ William Sweet, *The Nuclear Age: Atomic Energy, Proliferation, and the Arms Race* (Washington, DC: Congressional Quarterly Inc., 1988), 47.
- ²⁰ Pringle and Spigelman, *The Nuclear Barons*, 400.
- ²¹ Pringle and Spigelman, *The Nuclear Barons*, 403.
- ²² Sweet, *The Nuclear Age*, 54.
- ²³ Sweet, *The Nuclear Age*, 17.
- ²⁴ Gary L. Downey, "Reproducing Cultural Identity in Negotiating Nuclear Power: The Union of Concerned Scientists and Emergency Core Cooling," *Social Studies of Science* 18, no. 2, (May 1988): 235-236, 251, www.jstor.com.
- ²⁵ The concerns of the UCS were later validated by the Three Mile Island accident. Downey, "Reproducing Cultural Identity in Negotiating Nuclear Power," 251.
- ²⁶ Pringle and Spigelman, *The Nuclear Barons*, 373.

²⁷ John Kifner, "2000 Occupy Nuclear Plant Site in New Hampshire, Vow To Stay," *New York Times*, May 1, 1977, <http://proquest.com>.

²⁸ It should be noted that a kilowatt-hour refers to the generation of one kilowatt of energy per one hour of electrical production. A kilowatt is equivalent to 1000 watts of electricity. Federal Power Commission, *Statistics of Privately Owned Electric Utilities in the United States: 1974* (Washington, DC: US Government Printing Office, 1974), XI.

²⁹ Cole, oil, and gas-based forms of electrical production generated 1.229 trillion kilowatt-hours of electricity in 1974. Federal Power Commission, *Statistics of Privately Owned Electrical Utilities*, XI.

³⁰ Michael T. Hatch, "Nuclear Power and Post Industrial Politics in the West," in *Governing the Atom: The Politics of Risk*, edited by John Byrne and Steven M. Hoffman (New Brunswick, NJ: Transaction Publishers, 1996), 205.

³¹ Subcommittee on Energy Research and Production of the Committee on Technology, 1982 *Department of Energy Authorization*, 97th cong., 1st sess., 1981, 3.

³² Subcommittee on Energy Research and Production of the Committee on Technology, 1982 *Department of Energy Authorization*, 44.

³³ Subcommittee on Energy Research and Production of the Committee on Technology, 1982 *Department of Energy Authorization*, 44.

³⁴ American Enterprise Institute for Public Policy Research, *Nuclear Energy: A Reassessment* (Washington, DC: American Enterprise Institute for Public Policy Research, 1980), 215.

³⁵ Osif, Baratta, and Conkling, *TMI 25 Years Later*, 80; "Energy Reorganization Act," *NRC: Our Governing Legislation*, www.NRC.org.

³⁶ Walker, *Three Mile Island*, 37.

³⁷ Subcommittee on Nuclear Regulation for the Senate Committee on Environment & Public Works, *Nuclear Accident and Recovery at Three Mile Island: A Special Investigation*, 16th Cong., 2nd sess., 1980, 66.

³⁸ Subcommittee on Nuclear Regulation for the Senate Committee on Environment & Public Works, *A Special Investigation*, 66.

³⁹ Subcommittee on Nuclear Regulation for the Senate Committee on Environment & Public Works, *A Special Investigation*, 71.

⁴⁰ Walker, *Three Mile Island*, 75.

⁴¹ John J. Goldman, "Nuclear Power Industry Learns Lessons of Failure," *Los Angeles Times*, May 23, 1983, www.proquest.com.

⁴² Rees, *Hostages of Each Other*, 11.

⁴³ More than double the average annual exposure to radiation experienced by an individual, the levels of radiation within the TMI plant proved high enough to cause severe illness and possible death to anyone exposed. Walker, *Three Mile Island*, 85.

⁴⁴ American Enterprise Institute for Public Policy Research, *Nuclear Energy: A Reassessment*, 10.

⁴⁵ Walker, *Three Mile Island*, 76-77; Nuclear Regulatory Commission Special Inquiry Group, *Three Mile Island, A report to the Commissioners and to the Public* (Washington DC: Government Printing Office, 1980), 14.

⁴⁶ Osif, Baratta, and Conkling, *TMI 25 Years Later*, 81.

⁴⁷ President's Commission on the Accident at Three Mile Island, *Report of the U.S. President's Commission on the Accident at Three Mile Island-The Legacy of Three Mile Island: The Need for Change* (New York: Pergamon Press, 1979), 7.

⁴⁸ Subcommittee on Energy Research and Production of the Committee on Science and Technology, *Oversight: Kemeny Commission Findings*, 96th Cong., 1st sess., November 4, 1979, 6-7.

⁴⁹ President's Commission of the Accident at Three Mile Island, *The Legacy of Three Mile Island*, 9.

⁵⁰ President's Commission on the Accident at Three Mile Island, *The Legacy of Three Mile Island*, 61.

⁵¹ Temples, *Politics of Regulatory Reform*, 315

⁵² Rees, *Hostages of Each Other*, 33.

⁵³ Subcommittee on Oversight and Investigations of the Committee on Interior and Insular Affairs, *Nuclear Regulatory Commission's Inspections Process: Hayward-Tyler Pump Company*, 97th Cong., 2nd sess., April 6, 1982, 12-13.

⁵⁴ Scott Fenn, *The Nuclear Power Debate*, 59.

⁵⁵ Richard T. Sylves, "Carter Nuclear Licensing Reform versus Three Mile Island," *Publius* 10, no. 1 (Winter, 1980): 76, <http://www.jstor.org>.

⁵⁶ Subcommittee of the Committee on Government Operations, *Nuclear Safety: Is NRC Enforcement Working?*, 97th Cong., 1st sess., December 1, 1981, 3.

⁵⁷ Subcommittee of the Committee on Government Operations, *Is NRC Enforcement Working*, 3.

-
- ⁵⁸ David Okrent, "The Safety Goals of the U.S. Nuclear Regulatory Commission," *Science* 236, no. 4799 (April 17, 1987), 236, <http://jstor.com>.
- ⁵⁹ Okrent, "Safety Goals," 236.
- ⁶⁰ Okrent, "Safety Goals," 297.
- ⁶¹ Okrent, "Safety Goals," 298.
- ⁶² Baruch Fischhoff, "'Acceptable Risk': The Case of Nuclear Power," *Journal of Policy Analysis and Management* 2, no. 4 (Summer 1983): 560, <http://jstor.com>.
- ⁶³ Fischhoff, *The Case of Nuclear Power*, 560.
- ⁶⁴ A person-rem is a unit of measurement quantifying one's level of exposure to radiation. Fischhoff, *The Case of Nuclear Power*, 561.
- ⁶⁵ Sylves, *Carter Nuclear Licensing Reform*, 73, 76; Casey Burko, "Atom Power Faces Crises in Licensing," *Chicago Tribune*, December 20, 1979, <http://proquest.com>.
- ⁶⁶ Subcommittee of the Committee on Government Operations, *Emergency Planning Around U.S. Nuclear Power Plants: Nuclear Regulatory Commission Oversight*, 96th Con., 1st sess., 1979, 379.
- ⁶⁷ Subcommittee on Energy and the Environment of the Committee Interior and Insular Affairs, *Nuclear Regulatory Commission Operating Licensing Process*, 97th cong., 1st sess., April 1, 1981, 68-69.
- ⁶⁸ Subcommittee on Energy and the Environment, *Operating Licensing Process*, 9.
- ⁶⁹ Osif, Baratta, and Conkling, *TMI 25 Years Later*, 86.
- ⁷⁰ Subcommittee of the Committee on Government Operations, *NRC Licensing Speedup*, 13-14.
- ⁷¹ Subcommittee on Energy and The Environment of the Committee on Interior and Insular Affairs, *Nuclear Regulatory Commission Operating Licensing Process*, 8.
- ⁷² Third Party Intervenor was considered any member of the general public who filed a challenge against either an NRC regulation or proposed construction of a nuclear power plant. Subcommittee of the Committee on Government Operations, *NRC Oversight: Limitations on Intervenor in Licensing Proceedings*, 96th cong., 2nd sess., 1980, 2.
- ⁷³ Subcommittee on Energy and the Environment of the Committee on Interior and Insular Affairs, *Operating Licensing Process*, 9.

⁷⁴ Subcommittee on Nuclear Regulation of the Committee on Environment and Public Works, *Nuclear Regulatory Reform*, 99th Cong., 1st sess., 1985, 202-203.

⁷⁵ Subcommittee on Nuclear Regulation, *Nuclear Regulatory Reform*, 205.

⁷⁶ Subcommittee in Nuclear Regulation, *Nuclear Regulatory Reform*, 205.

⁷⁷ The term “scram” refers to an emergency shutdown of a nuclear reactor. These shutdowns utilize a series of control rods, usually consisting of various types of metals capable of absorbing neutrons, which drop into a reactor core to help slow or stop a nuclear reaction.

⁷⁸ Rees, *Hostages of Each Other*, 186.

⁷⁹ Osif, Baratta, and Conkling, *TMI 25 Years Later*, 90.

⁸⁰ By 2004, over 100 nuclear power plants generated 22% of America’s electricity. Osif, Baratta, and Conkling, *TMI 25 Years Later*, 86.

THE NEW LIFE OF LATVIANS IN AMERICA

LUKE KALNAJS

"I'm very sure my parents would never have returned to Latvia after [having] their three American children...and building their lives here...I remember my mother telling me the story (I must have been around ten many years after the fact) of when she and my father got all dressed up in their best clothes to go for their citizenship ceremony – it still chokes me up – they were so proud." – Liga Kalnajs

To start a discussion on Latvians in America, one must explain the reasons why they refer to themselves as American Latvians, rather than Latvian Americans. The former has more significance; it demonstrates the fact that they valued their ethnic identity over that of their host country. It also emphasizes the importance their refugee status played in how they defined themselves.¹ In this article, I examine the significance of Latvians' refugee experience and to what extent they assimilated into American culture while also trying to preserve their own traditions. Research on refugees from World War II has not been conducted to a greater extent until the last two or three decades, but recently study on the subject has been expanding. Displaced Latvians in particular have not been studied in depth until more recently, with the most comprehensive research coming out in the last few years. In what little research has been done on American Latvians, it is widely thought that there was a strong belief among the group that their stay in America was only temporary until Latvia gained its freedom. However, I argue that although they hoped this was true, most of them

knew that it was an impossible dream. Not only had they experienced Soviet oppression and knew how hard it would be to remove them from their homeland, but they had also created new lives for themselves in America, as well as a distinct “Latvianness.” By examining American Latvians’ backgrounds, communities, and political beliefs, especially that of my own family, it becomes easier to understand why they would not have left America.

BACKGROUND

Examining the events during and following the Second World War helps explain why Latvians came to America and affords an opportunity to understand their values and political beliefs. Latvia is a small country on the Baltic Sea, with Russia bordering it to the East. Russia had a history of occupying Latvia. Formed after the First World War, in 1918, the first modern-day state of Latvia lasted until the Soviet Union re-occupied Latvia in 1940, following a secret agreement the Soviets made with Nazi Germany.²

During 1940, the Soviet Union subjected Latvia’s social and political elite to imprisonment, deportation to labor camps or to Siberia, and execution. The horrors of 1940 were permanently engrained in Latvians’ collective memory.³ Because of this, many Latvians welcomed the Nazis as liberators when they invaded Latvia in 1941 and removed the hated Communist regime. However, this relief was short lived. The Nazis remained in Latvia until 1944, and during this time they forced many Latvian males to serve in the Nazi army.⁴ When the Soviets defeated the Nazis in 1944 and re-established Soviet Communist rule, between 200,000 and 240,000 (estimates vary) Latvians fled to the West for fear of persecution. Of these, about 45,000 would eventually end up in America.⁵ This included my paternal grandparents, Karlis and Lucija. To understand

how intensely dramatic the invasion of their homeland would have been, imagine how the events of September 11, 2001, felt to Americans. However, instead of being able to start the healing and rebuilding process immediately, imagine waiting fifty years for it to begin.⁶

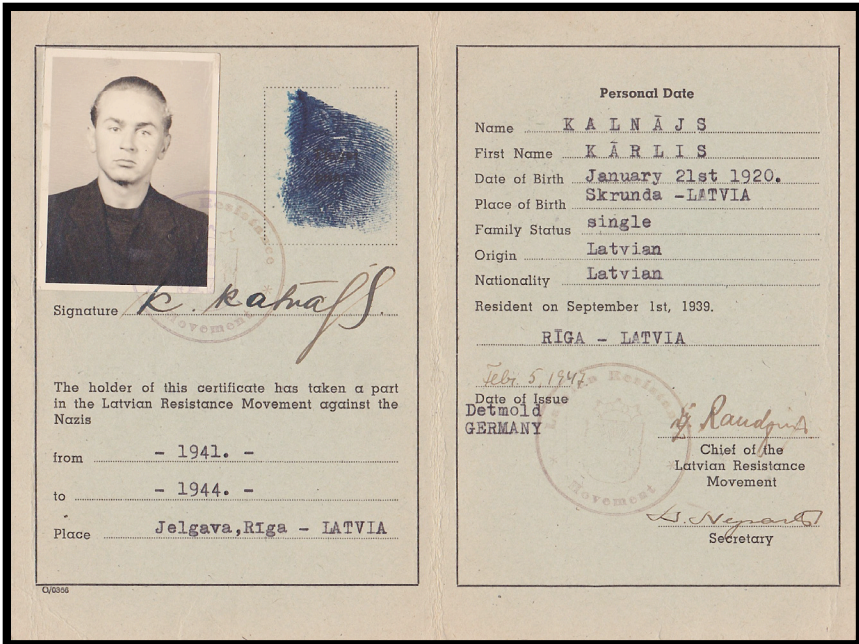


Figure 2: My Grandfather Karlis' Resistance Certification

My grandfather, Karlis, was a part of the Latvian resistance movement against the Nazis when they invaded. However, he was eventually one of the many Latvian males forcefully conscripted into the Nazi Army. The Nazis used the Latvian units on the front-line; they were seen as expendable, which prevented the Nazis from losing their more valuable German troops. During a battle, my grandfather took a piece of shrapnel through the cheek, and became an American prisoner of war. An American surgeon saved his life, operating by candlelight. Karlis faked a slow recovery, and when he was strong enough, he

walked out of the hospital and ended up in a Displaced Persons (DP) Camp in Germany, where he met, and eventually married, my grandmother, who had escaped from Soviet Latvia in a cattle car with her friend.⁷ The fact that my grandfather was able to escape service in the Nazi Army would prove to be beneficial for my grandparents' attempt to come to America. The Latvians who had still been in the Nazi Army at the end of the war had a more difficult time trying to re-settle because many of the western countries were suspicious of their involvement with the Nazis.⁸



Figure 3: My grandfather Karlis sitting on his suitcases on his way to America

COMING TO AMERICA

America started accepting people from the DP camps in 1948, after the passage of the Displaced Persons Act, which allowed for the entrance of 200,000 DPs over the next two years. It was soon expanded to allow for the entrance of 400,000 DPs. In order to come to America, those in the DP camps needed to be sponsored by a person or organization in the United States who could provide them with a job and a place to live when they arrived. This ensured that they would not be a burden on US taxpayers.⁹ My grandparents spent almost six years in their DP camp in Germany until 1950, when they were finally able to get a sponsor and come to America.¹⁰ The communities that Latvians started in America often consisted of Latvians who had been in the same DP camps in Europe.¹¹

Over 50% of the Latvian political and social elite became DPs after the war, because they had the most to fear if they returned to Soviet occupied Latvia.¹² In addition, the literacy rate among Latvians in America was close to 100%.¹³ Although they were educated, when they came to America they usually had to take unskilled laborer jobs, in part due to the language barrier.¹⁴ However, they were extremely grateful to have these jobs. Both of my grandparents were college educated in Latvia. My grandfather had taught orphan boys in Latvia, and he was studying theology at a university until the Soviets arrived in 1940 and decided it was not a valid subject. My grandmother taught English as a second language in the DP camp. When they came to America, my grandfather had a construction job lined up, which he was very grateful to have, and my grandmother was a maid for a few years.¹⁵ An important value my dad and his sisters had instilled in them growing up was to never judge anyone by what they did for an occupation. One of the Latvians in their community had been a general in the Latvian Army, and

the rest of the community looked up to him. Nevertheless, he and his wife cleaned office buildings for a living in America.¹⁶ Latvians like to assert the fact that while they often had to take unskilled jobs in the United States, many of them had the education to be white-collar workers. One story told about one family's grandfather demonstrates this:

*Grandfather was a janitor in Ada, Ohio....at the university... But when the students at this place had math problems to solve, and he saw that they had problems, then he would help them out. And then word got around that the janitor knows more than many of the professors. And so he got the job and stayed at the university as a professor.*¹⁷

The Latvian community sponsored friends and families so they could come to America; Latvians usually tried to migrate in whole families when possible. This helped contribute to the creation of close-knit communities. My aunt's community was very active in trying to gain sponsorships for other Latvians to come to America.¹⁸ This was also the case in Latvian American communities throughout the country.¹⁹ There were several organizations that helped with the resettlement process for Latvians. One of these organizations was the Church World Service (CWS). An article from the *New York Times* in 1949 demonstrates its involvement, and the type of welcome that DPs often received. A Latvian minister identified a Latvian couple that had just gotten off the boat in America because their pins bore the letters CWS, and he greeted them in their native tongue. He helped guide them through customs and then took them to lunch before helping them board the train that would take them to their sponsor in Chicago.²⁰

AMERICAN LATVIAN COMMUNITIES AND FAMILIES

Latvians in America were bound together by the shared feeling that they were American Latvians, not Latvian Americans.²¹ While they did accept many American values, they resisted assimilation into American culture and tried to preserve their own culture as much as possible. This was largely because of their belief that they would be the only Latvians left after the Soviet occupation, Russification (the Soviets' attempt to wipe out Latvian culture by imposing Russian culture), and political persecution.²² This helps demonstrate the point that although American Latvians believed their stay in America was only temporary until their homeland became free, they knew that the Soviets were trying to wipe out their culture and that it would be an almost impossible task for Latvia to regain independence. They did not realistically think about going back to Latvia. My grandparents "...did not ever consider going back to Latvia, because it was not Latvia, but an occupied, oppressed communist state where Russians were trying to annihilate the Latvian culture."²³ The strong language used also demonstrates the deep animosity that American Latvians felt toward the Soviets. I believe that American Latvians valued the freedoms they enjoyed in America more than many Americans did. While many Americans tend to take their freedom for granted, American Latvians had experienced the oppression of the Soviets and knew what it was like to lose these freedoms.

My grandparents, just as countless other American Latvians, expressed this freedom in a number of ways. My grandparents "...were always involved in Latvian society here (church, school, old friends, etc.) and keeping the Latvian spirit alive, but they were extremely grateful to be in the United States and appreciated its freedoms immensely. I grew up very grateful to be able to say anything without being dragged off to Siberia."²⁴ Even

though they went to great lengths to preserve their culture, they were also proud Americans.



Figure 4: My Dad, his Two Sisters, and His Mother Dressed in Latvian Folk Outfits, Fall 1963

In general, American Latvian communities were very tight knit. Many in the Latvian communities were involved in a number of political, religious, and cultural organizations that existed on the local level. There was also a large umbrella organization, the American Latvian Association (ALA), which still exists today.²⁵ Another far-

reaching organization was the Latvian Young Women's Christian Association, which my grandmother joined while in the DP camp. My grandparents were very involved in their local Latvian organizations. The neighborhood that they lived in on Long Island was predominantly Latvian, with Latvians living in nine out of ten houses. The house that my aunt and her siblings grew up in was built by her father, along with the help of other Latvians that had various construction skills.²⁶ My grandparents would also help those just arriving to America. My aunt recalls Latvians staying at their house for a night or two, sleeping on a mattress in the living room, on their way to their new home. These were often friends of her parents from the DP camp.²⁷ This is just another demonstration of how the American Latvian community was able to unite. Many families also tried to keep in contact with their loved ones that remained in occupied Latvia. My aunt Baiba recalls her mother writing back home to her parents; they always knew when things were not going well there, even if there were no news reports, because they would not receive any letters from Latvia for long periods.²⁸

Education was extremely important to Latvians, and Latvian schools for children were common throughout American Latvian communities. The school that my father and his sisters attended was at their church from nine in the morning to one in the afternoon on Saturdays.²⁹ My Aunt Baiba recalls, "When all the other kids were watching cartoons on Saturday morning, I was going to Latvian school." They studied Latvian geography, history, music, and literature, among other subjects. She joked that she knew more about Latvia than she could ever remember. In fact, she "learned more in Latvian school than [she] did in American school." In addition, she and her siblings only spoke Latvian growing up. She was the oldest, and as such she did not learn English until she went to public school.

The younger siblings would usually learn English from the eldest.³⁰

One of the main ways Latvians tried to preserve their culture was through folk history and family stories. While the importance of folklore is not unique to Latvians, to them it was – and is – one of the most important tools for supporting their culture.³¹ My Aunt Baiba emphasized the importance of folk stories and music for Latvians. There were many songs and stories that everyone in the Latvian community knew.³² As a second generation American, I remember my dad telling me the story of Lāčplēsis, or “Bear Slayer.” It is one of the most famous stories that every Latvian knows. Written by Andrejs Pumpurs in 1888, it was based on existing Latvian folklore and tells how Lāčplēsis, who was part man and part bear, fights a bear that attacked his chieftain and rips the bear apart with his bare hands. The story was meant to show Latvia’s conquerors that their culture and history was important, and it was later applied to the Soviet occupation. I also remember being sung Latvian lullabies when I was a child, and I still know the words to them, even though I do not know what they mean. An example of one lullaby is “Aijā žūžū,” which lacks a literal translation:

Aijā, žūžū, lāča bērnis, aijā žūžū

Pekaiņāmi, kājiņāmi, žūžūžū

When someone in the family has a birthday, we always sing the Latvian version of “Happy Birthday”, in addition to the traditional American song. Family stories and history were also extremely important. My grandmother would constantly talk about Latvia with her children.³³ For most Latvians, these stories were told by grandparents or parents to their children and often came up spontaneously

in conversation.³⁴ In addition, American Latvians had a great appreciation for Latvian art. My Aunt Liga remembers every family having original Latvian artwork on their walls.³⁵



Figure 5: Latvian Choir in Traditional Dress

There were many other American Latvian communities in the United States, with the largest in New York, California, Illinois, New Jersey, and Massachusetts. However, there were other enclaves that American Latvians lived in as well, including several in Michigan. The largest of these was in Kalamazoo, which was essentially started by one Latvian who had immigrated to America before the war. The church at which he was a Reverend played a major role in helping with sponsorships for Latvian DPs.³⁶ They formed a close community, just as the Latvians in my grandparents' neighborhood had. Latvians eventually started coming to Kalamazoo in large numbers, and began forming organizations. Folk history and emphasis on Latvian culture were just two of the

shared characteristics among all Latvian communities. Just as my aunts had in their community, there were summer camps, Latvian schools, community gatherings and events with folk dancing where they wore traditional Latvian folk clothing, and choirs that sang folk songs.³⁷ Overall, American Latvians invested a great amount in creating a wide variety of organizations, and they were extremely active and well organized in their cultural life. They had established a unique Latvianness in America, and although they wanted to see their homeland become free again, it would have been hard to uproot themselves from the lives they had created in the United States.

POLITICS AND ANTI-COMMUNISM

It should be evident from the discussion on why Latvians fled their country and became DPs as to why they shared such a deep hatred of the Russians and Communism. They had suffered at the hands of the Soviets and wanted others to know about the oppression of the Soviet system. The anti-communism of political refugees was much different than the American anti-communism and “McCarthyism” from the early years of the Cold War. This was due to the fact that the former was *ethnic* anti-communism. For many American Latvians, ethnic anti-communism was a major aspect of their experience in the United States. Its main focus was centered on three core elements. The first was to educate the world about the truths of communism, as they had experienced it. Secondly, it focused on their struggle to free their homeland. This was a main difference from American anti-communists because the politics that affected their home country concerned Latvians more than threats of communism inside America. The third element was the belief that all totalitarian regimes were similar, and they wanted to demonstrate the similarity between

Communism and Nazism.³⁸ Their ultimate political mission was to free Latvia from Soviet rule.

They used several major arguments to further their anti-communist ideas. One major argument they used for their anti-communism campaign was public opposition to Soviet colonialism as an attempt to show the threat the Soviet Union posed to freedom around the world.³⁹ They also developed the idea of a “Baltic Holocaust” by the Russians. They backed up this claim with factual evidence that the Soviet Union had arrested, deported to Gulag, or executed around 600,000 Estonians, Latvians, and Lithuanians since 1940.⁴⁰ There was also the concept of “captive nations,” which included the nations that had lost their independence due to Soviet occupation.⁴¹ Overall, there was often a strong anti-Russian element to their politics. My grandparents’ view of the Vietnam War demonstrates the differences between American ideas of anti-communism and ethnic anti-communism. Initially, they had been very excited about Vietnam and saw it as a fight against communism, but as the war dragged on they realized the real politics, and quickly became critical of the United States and its anti-communist aims.⁴²

The fact that so many American Latvians had been of the political and social elite helps explain why they were so organized in American politics. These individuals formed a government-in-exile to some degree, and helped direct the American Latvians’ anti-communist strategies. They also saw themselves as the legitimate representatives and true voice of occupied Latvia. Their main goal was to ensure that the United States never changed its position on non-recognition of Latvia’s incorporation into the Soviet Union.⁴³ Many members of the American Latvian society were also constantly engaged in a propaganda battle with the Soviets. During the 1950s, several American Latvians created the Committee to Free Latvia, which helped found the Assembly of Captive European Nations. Funded by the

Free Europe Committee, this organization was closely linked to the CIA.⁴⁴ American Latvian anti-communists skillfully used American politics to further their cause. They would lobby to get resolutions passed in Congress, such as one that would call on the president to bring up the freedom of the Baltic States to the United Nations. A meeting in 1950 of over 1,200 members of Latvian, Lithuanian, and Estonian social, religious, and patriotic groups called on the US government to help liberate their home countries.⁴⁵ They would also target the UN directly. However, after a few years it was clear to many American Latvians that although the United States and other western governments talked about the liberation of their homeland and other captive nations, they were not going to fulfill their promises.⁴⁶ Only time was going to tell if their homeland would ever be free again.

The fact that there was no homeland to return to was a major reason for American Latvians' attempts to retain their heritage. However, this also contributed to their assimilation into American society (however limited it was at first), because they knew they were here to stay. This caused surprisingly little tension, though. For the most part they were able to strike a healthy balance between the preservation of their own culture and assimilation into their new one. They were proud Latvians *and* proud Americans. Although they resisted assimilation at first, as time passed and the younger generation of American Latvians, such as my father and his sisters, came of age, they slowly became more and more American. Despite this, they always maintained a strong sense of Latvianness. Even though the only connection I have to Latvia is my grandparents, who passed away when I was young, I have always been extremely proud of my Latvian heritage. It is now clearer to me more than ever why I take so much pride in this—the story of Latvians in American has been an amazing success story. They overcame

incredible hardships to make a new life for themselves in America and set down the foundation for generations to come. American Latvians were and are a proud people that achieved great success in preserving their culture while also creating a new life for themselves. They were able to establish a unique Latvianness in their new country.

Some Latvians initially may have seen their lives here as temporary, but soon they came to the realization that going home was an impossible dream. They went to such great lengths to preserve their culture not only because they believed they might be the only Latvians left after the Soviet occupation of their country, but also because they knew they needed to establish strong communities with a strong cultural identity in their new country. They wanted to preserve what they could of their culture. When Latvia finally gained its independence in 1991, very few American Latvians returned home.⁴⁷ It is impossible to know if this may have been different had Latvia gained its freedom earlier, but I believe it would have needed to be gained within a decade of the Soviet occupation, and even then it would only have been the older generation. American Latvians had created new lives for themselves in America, and it would have almost been like uprooting themselves again. Latvians certainly would have celebrated their country's freedom and visited Latvia, as they did in 1991, but they had created a distinct Latvianness in America and they were here to stay. However, further research studying oral histories from American Latvians who grew up in America, with a focus on how they felt about returning to Latvia, would be immensely helpful in supporting this idea.

¹ Ieva Zake, *American Latvians: Politics of a Refugee Community* (New Brunswick: Transaction Publishers, 2010), 1.

² *Ibid*, 12.

³ *Ibid*, 13.

-
- ⁴ Ibid, 13.
- ⁵ Maruta Karklis, Liga Streips, and Laimonis Streips, *The Latvians in America: 1640-1973* (Dobbs Ferry: Oceana Publications, Inc, 1974), 32.
- ⁶ Liga Kalnajs, e-mail message to author, April 6, 2011.
- ⁷ Baiba Kalnajs, e-mail message and phone interview by author, April 2, 2011.
- ⁸ Ieva Zake, *American Latvians*, 34.
- ⁹ Karklis, Streips, and Streips, 33.
- ¹⁰ Baiba Kalnajs.
- ¹¹ Meija, Silvija D., *Latvians in Michigan* (East Lansing: Michigan State University Press, 2005), 29-30.
- ¹² Ieva Zake, *American Latvians*, 33.
- ¹³ Baiba Kalnajs.
- ¹⁴ Karklis, Streips, and Streips, 33.
- ¹⁵ Baiba Kalnajs.
- ¹⁶ Ibid.
- ¹⁷ Guntis Šmidchens, "Latvian Folk History and Family Stories in America," *Lituanus: Lithuanian Quarterly Journal of Arts and Sciences* 33, no. 3 (Fall 1987).
- ¹⁸ Baiba Kalnajs.
- ¹⁹ Silvija Meija, 27-28.
- ²⁰ Doris Greenberg, "Latvian DP Couple Get Welcome Here: Minister's Greeting in Native Tongue Is Typical of Care Awaiting Newcomers," *New York Times*, March 10, 1949.
- ²¹ Ieva Zake, *American Latvians*, 37.
- ²² Ibid, 1.
- ²³ Baiba Kalnajs.
- ²⁴ Baiba Kalnajs.
- ²⁵ Ieva Zake, 41.
- ²⁶ Baiba Kalnajs.
- ²⁷ Ibid.
- ²⁸ Ibid.

-
- ²⁹ Ibid.
- ³⁰ Ibid.
- ³¹ Laura Hilton, "Cultural Nationalism in Exile: The Case of Polish and Latvian Displaced Persons," *Historian* 71, no. 2 (Summer 2009): 296.
- ³² Baiba Kalnajs.
- ³³ Ibid
- ³⁴ Guntis Šmidchens.
- ³⁵ Liga Kalnajs.
- ³⁶ Silvija Meija, 27-28.
- ³⁷ Ibid., 32-35.
- ³⁸ Ieva Zake, *American Latvians*, 51.
- ³⁹ Ibid., 55.
- ⁴⁰ Ibid, 59.
- ⁴¹ Ieva Zake, *Anti-Communist Minorities in the U.S.: Political Activism of Ethnic Refugees* (New York: St. Martin's Press LLC, 2009), 139.
- ⁴² Baiba Kalnajs
- ⁴³ Ieva Zake, *American Latvians*, 62.
- ⁴⁴ Ieva Zake, *Anti-Communist Minorities*, 139-140.
- ⁴⁵ "Freedom is Asked For Baltic Nations: Latvian, Estonian, Lithuanian Groups Appeal to Truman and Congress for Help," *New York Times*, November 19, 1950.
- ⁴⁶ Ieva Zake, *Anti-Communist Minorities*, 141.
- ⁴⁷ Silvija Meija, 60.

Published by The Virginia Tech Department of History
