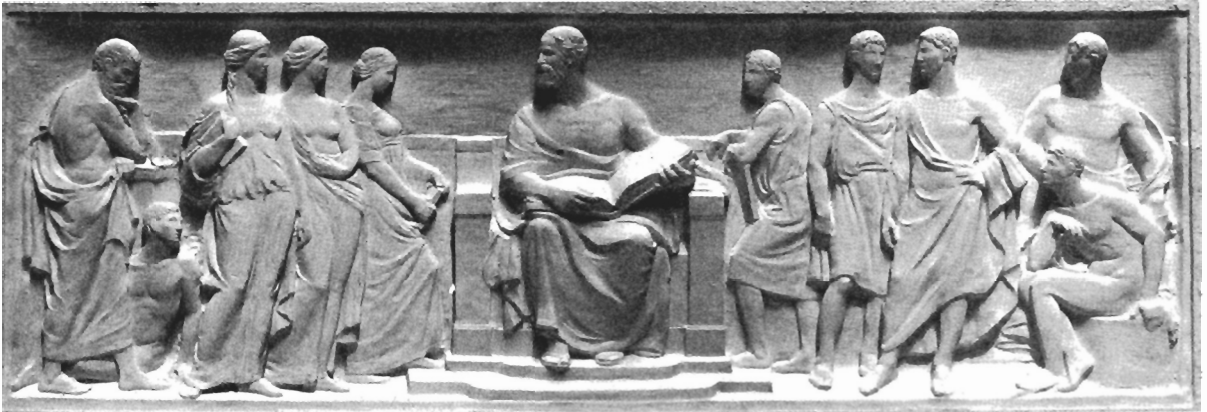


THE COLLEGE OF NEW JERSEY



JOURNAL OF STUDENT SCHOLARSHIP

VOLUME VI
APRIL 2004

THE COLLEGE OF NEW JERSEY

Journal of Student Scholarship

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Preface

There are many ways to measure the quality of education in undergraduate institutions. However, none are as important as assessing the opportunities offered students to engage in research endeavors. Doing so, and publicizing this feature, are now much in vogue among colleges and universities across the country. I am happy to report that The College of New Jersey has been encouraging such scholarship by undergraduates for the 30 years I have been at the College. So, we have been much ahead of the curve.

It is useful to reflect on why involving students in research is considered such an important yardstick of quality undergraduate education. What we seek as we educate our students are three categories of accomplishment. First, we ask that they seriously attempt to become acquainted with the liberal arts, creating a broad exposure to many disciplines. Second, we ask that they immerse themselves in a single discipline, acquiring an in-depth knowledge of an area related to their career goals. It is the third accomplishment that is the most important. We expect that in the process of studying in the liberal arts and in their major that they will achieve a level of intellectual maturation and sophistication significantly greater than when they entered TCNJ as a first-year student. An important part of this is our expectation that students optimize their ability to learn in diverse settings and that they acquire the tools of discovery. It will be these qualities that will provide them with a powerful advantage in achieving both professional and personal success.

Engaging in research activities is closely linked to success in achieving all three of the above goals, but in particular, it is the “icing on the cake” as students mature intellectually. It is creative, independently conducted research that is the hallmark of intellectual achievement, the measure of the highest accomplishment in advanced study in all undergraduate and graduate curricula.

TCNJ Journal of Student Scholarship is just one way that we display and celebrate student research achievements. Students write papers, display their work as posters, and engage in creative projects or artistic performances in many arenas. However, what this journal accomplishes is to provide a permanent record of a few of the very best of our students’ academic accomplishments. Perusing the pages that follow illustrates both the high quality and diversity of student achievement at TCNJ. As such, the *Journal* is a tribute to both students and faculty alike in recognizing the high level of intellectual pursuit that characterizes this college. Once again, we are way ahead of the curve.

Steve Klug
Professor of Biology

A Message from the Editor

This year *TCNJ Journal of Student Scholarship* received a record number of submissions from more students in more disciplines than ever before. The fruit of the selection process is now in your hands. As The College of New Jersey prepares for its sesquicentennial in 2004–2005, this volume reflects the remarkable accomplishments of the College's students under the initial implementation of the innovative and exciting transformed curriculum. The quality of these essays reflects the firm commitment of students, faculty, and administration to premiership among the nation's undergraduate colleges.

I wish to thank the many people who have contributed to Volume VI of *TCNJ Journal of Student Scholarship*, beginning with the students and the professors who encouraged them. I would also like to extend my gratitude to those faculty members who generously served as advisors and sponsors for each paper submitted. The administration of President R. Barbara Gitenstein and Provost Stephen R. Briggs graciously provided moral and financial support and release time, without which this volume would not have been possible. In addition, Vice Provost Suzanne Pasch has staunchly supported the *Journal* since its inception. The staff of the Office of Academic Affairs, including especially Nancy Freudenthal and Ellie Fogarty, has been kind, patient, and helpful with a variety of concerns and inquiries. I also extend thanks to Tony Marchetti and Cindy Friedman of the Office of College and Community Relations. For consultation on production matters, I thank Lisa Angeloni, director of admissions. I offer special thanks to the members of the editorial board of the *Journal* for lending their time and expertise to the reviewing of papers in the midst of many other responsibilities. Paulette LaBar of the Department of English kindly and expertly assisted in the editing of the essays printed in this volume and periodically updated the Web site of the *Journal*. I would also like to thank my wife, Jeanne Conerly, and our daughter, Katherine, for their support and understanding during a particularly busy time. To Professor W. S. Klug, whose many responsibilities include coordinating the Biology Internship Program, I owe thanks for his contributing the preface to Volume VI. Finally, I would like to thank Associate Editor Romulo Ochoa for his wise advice and careful editing of the science essays. As these acknowledgements indicate, this volume is the product of a community-wide effort.

For information about the *Journal*, including submission procedures, format requirements, and application forms, please telephone the editor at 609.771.2155 or contact him by e-mail at dventuro@tcnj.edu; or, visit the *Journal* Web site at <http://sjournal.intrasun.tcnj.edu>.

Now, I invite you to turn to the essays published in this volume, and to read and enjoy them.

David Venturo
Editor
Associate Professor and Graduate Coordinator
Department of English

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Transnational Corporations and Human Rights: A Case Study of ExxonMobil in Aceh

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ABSTRACT

As corporations expand internationally and the scope of their operations broadens, it is increasingly important to consider the human implications of global capitalism. It is vital that we assess, as an international community, the expanded role of transnational corporations (TNCs) in our everyday lives. For many who live in underdeveloped nations where TNCs may extract natural resources or seek cheap labor, the trend towards globalized production may translate into restricted rights, slave-wage employment, and in the worst cases, destruction and violence. Western-based companies, in their efforts to achieve greater economies of scale, are more often interfering in the lives of individuals in developing nations. Oftentimes these individuals are among the poorest in the world and have no means of political expression by which to offer resistance. It is alarming how frequently TNCs work with oppressive regimes or become involved in domestic conflict in such nations, making it virtually impossible for inhabitants to control their own destinies. In extreme cases, violence against those individuals who interfere with the production activity of the TNC is sanctioned by their very own government forces. This paper explores a particular case in which the people of Aceh, Indonesia, have endured widespread infringements upon their human rights due, in large part, to the intrusive presence of the ExxonMobil Corporation. The oil giant, whose interests have become deeply

entwined with those of the Indonesian central government, did not act responsibly in its dealings with state security forces and sacrificed the protection of human rights for the sake of economic interests. ExxonMobil's complicity in and contribution to human rights abuses of the Acehnese people make a strong case for the imposition of corporate codes of conduct.

INTRODUCTION

Since the United Nation's adoption of the Universal Declaration of Human Rights (UDHR) in 1948, much of the human rights discourse and HR advocacy has focused on influencing nation-states to uphold the value of human dignity. The UN Charter itself commits members to "promote universal respect for, and observance of, human rights and fundamental freedoms for all without distinction as to race, sex, language, or religion." The UDHR, as a UN ratified agreement, also focuses on the actions of nations, but only includes weak language aimed at the conduct of non-state actors. The treaty affirms, "every organ of society, keeping this declaration constantly in mind, shall strive by teaching and education to *promote respect* for these rights and freedoms..." [emphasis added]. Clearly, the framers of the UDHR identified governmental authority as the primary protector and also a potential violator of human rights norms. However, many scholars agree that a "power shift" has occurred in the international system since the end of the Cold War, leaving states with

far less power and influence, and non-state actors with much more than they previously have had (Mathews 50). This shift, seen as part of the phenomenon of globalization, includes the rise of multinational or transnational corporations (MNCs or TNCs), which increasingly have the ability both to shape the lives of individuals and influence government policies across the globe.

The far-reaching impact of transnational production on citizens of developing nations, coupled with a perceived lack of accountability on the part of TNCs, has led many in the human rights field to call for more than a "promotion of respect" for human rights on the part of transnational corporations, including a strong commitment to the preservation, protection, and promotion of human dignity within their spheres of influence. In contrast, others have maintained that transnational corporations must and should be loyal only to their economic bottom line and act accordingly. In either case, it is first necessary to assess the role multinational corporations play in human rights abuses in order to develop a workable standard for corporate conduct. At the forefront, the question is raised: do corporations contribute to such abuses by direct or indirect means, if at all? In seeking to address the issue of corporate responsibility, this paper considers the case of ExxonMobil—one of the world's largest corporations. EM has come under scrutiny as a result of its role in the violence plaguing the province of Aceh in Northwestern Indonesia, giving human rights advocates reason more closely to examine the effects of large companies operating in the developing world.

Political History of Aceh

Until recently, human rights abuses in Indonesia were most often associated with the conflict in the province of East Timor. Now that East Timor has gained independence and the violence has subsided, another turbulent region in Indonesia is gaining attention in the international news media. Largely isolated from the outside world, Aceh is a remote

province located on the island of Sumatra between the Indian Ocean and the Straits of Malacca. Upon a cursory examination, Aceh appears to have much in common with the rest of Indonesia. It is an overwhelmingly Muslim region, as are most provinces of the country. The Acehnese people do not necessarily adopt a different political ideology than the rest of Indonesia, nor do they make claim to an especially distinct ethnicity (USCR 1). Yet, the province is currently embroiled in a bloody struggle for independence. A closer look at Aceh's rich and varied history helps to explain deep-seeded Acehnese separatism and feelings of resentment toward the Indonesian central government.

Prior to colonial rule, Aceh was an independent political entity, largely disconnected from the other islands that make up present-day Indonesia (Sulistiyanto 438). For centuries, the island of Sumatra was governed under Islamic law and ruled by a succession of sultans. Islamic culture and religion have played an important role in the history of Aceh and are still the central unifying force in Acehnese society. According to East Asian scholar Priyambudi Sulistyanto, "Islam has influenced the course of social and political change in Aceh, providing a rallying point around which the Acehnese have been able to unite against the incursion of foreigners and outsiders" (USCR 1).

European imperialism reached Aceh around the time of the establishment of the Dutch East India Company in 1602. The Dutch sought to capitalize on an already lucrative spice trade in the region and saw the port of Aceh as a vital point of control. In 1641, the death of Sultan Iskandar Thani began the decline of an autonomous Acehnese society and marked the beginning of Dutch and British efforts to dominate the East Indies. In the decades following, colonial oppression intensified, as did competition among European conquerors, leading to the intrusion of outside beliefs, values, and customs upon indigenous Acehnese society. Dutch and British forces reached territorial

agreement in 1824 and signed the historic London Treaty, also known as the Anglo-Dutch treaty. This legal contract passed all British possessions on the island of Sumatra, including Aceh, to the Netherlands, in exchange for Dutch interests in Singapore and India. Most importantly, the language of the treaty allowed for Aceh's independence from both Dutch and British rule. "The situation was rather confused, with the Netherlands asserting a general sphere of influence of 'native states in amity with the Netherlands government'... [while simultaneously] filling out the territorial boundaries of modern Indonesia by conquering or incorporating these independent states" (USCR 1). Despite their legal maneuverings, the Dutch maintained a strong grip on their possessions in the region for the next 50 years, culminating in a formal declaration of war and invasion of Aceh in 1873. The Acehnese, in their long tradition of resistance, held off their invaders until the onset of WWII, in a conflict that would cost the Netherlands almost 10,000 lives. At that juncture, the Dutch surrendered to the Japanese, who three years later would surrender to the Allies, allowing for the creation of the Republic of Indonesia. This did not signal the end of Dutch influence, however, for territorial disputes between Indonesian and Dutch forces persisted for two years after independence (1).

The next noteworthy development for the people of Aceh occurred in 1949, when Indonesia and the Netherlands signed the Round Table Agreements under UN advisement. This treaty provided for a "transfer of sovereignty between the territory of the Dutch East Indies and a fully independent Indonesia" (USCR 1). The significance of the Round Table Agreements is that the Kingdom of Aceh, although never formally a part of Dutch colonial possession, was included as part of the Federal Republic of Indonesia. The Acehnese people had hoped for a return to pre-colonial status, but instead faced once again, the imposition of rule by outside forces. Aceh desired an autonomous political status

that reflected its separateness from the other regions and cultures of Indonesia, and resisted absorption into the Federal Republic of Indonesia. "Subsequently, the Java-based Indonesian government used armed troops to annex Aceh. Since annexation, the Acehnese have continued to resent what they consider foreign occupation" (1).

In an attempt to appease the Acehnese people, the firmly established Indonesian central government gave Aceh the status of "special territory," a designation intended to confer an "unusually high degree of autonomy in religious, educational, and cultural matters" (USCR 2). The people of Aceh viewed this designation as purely symbolic and practically meaningless. A strong desire for independence remained, and as a result, "Aceh Merdeka (Free Aceh/GAM) was founded as an armed resistance group in 1976" (2). During the 1980s, the Indonesian central government sought out and arrested or killed those suspected of separatist activities. These actions had the opposite-of-intended effect; rebel attacks on police installations and other symbols of Indonesian authority intensified during the latter part of the decade. Increased separatist violence, in turn, led the Indonesian central government to designate Aceh a "military operations area" in 1991—a policy which gave the army free reign to crush rebellion and seek out freedom fighters. During this time, Indonesian security forces (TNI) launched a "counter-insurgency campaign code-named Red Net" (2). This military operation endured from 1991 until 1998—a period in which over 7,000 human rights violations occurred, including murder, rape, torture, and kidnapping.

Table 1. Human rights violations in Aceh during the Military Operations Area period (1989–98)

Type of violation	Total
Disappearances	1958
Killing	1321
Torture	3430
Sexual violence	209
Robbery	160
Total	7078

Source: Compiled by ELSAM (the Jakarta-based Institute for Policy Research and Advocacy) from various sources, 1999.

Amnesty International and other human rights NGOs have reported “serious and widespread violations” as a result of such security operations launched against GAM. One Amnesty report states, “Counter insurgency operations by the Indonesian security forces resulted in gross human rights violations, a large number of which were committed against the civilian population” (Amnesty International 6). Since 1968, scores of witnesses have come forward and reported military atrocities against suspected supporters of Aceh’s independence movement. One civilian recalls, “My hair and nose were burned with cigarette butts. I was given electric shocks on my feet, genitals, and ears until I fainted” (Aditjondro 9). A brief ceasefire was achieved in mid-1998 when Aceh was removed from military operations status, but the violence has since resumed and even escalated.

These horrific violations were allowed to continue unchecked, in large part, due to the nature of the Indonesian central government. Indonesia has been ruled by a succession of autocrats who have operated under the guise of democracy, but have repeatedly violated liberal democratic norms in the pursuit of a “viable state” (Sulistiyanto 439). The Sukarno regime in the 1950s pursued a policy of “guided democracy” under which the military was quite heavy-handed in its suppression of separatist movements. After a military coup in 1965, General Suharto slowly took control of Indonesia. In 1968, he was officially inaugurated as president, and held on to his position by tightly controlling the election process. During his 30-year reign, Suharto consolidated his power and oversaw a corrupt and oppressive regime. Human rights abuses perpetrated by government police and military forces were overlooked and even seen as necessary during this period in Indonesian history.

In the context of an oppressive central authority, it is also important to consider other economic, religious, and political factors that explain the Acehnese desire for independence. The Jakarta-based government

has struggled for years to consolidate its power over several competing ethnic, religious, and political factions, the Acehnese and East Timorese most prominent among them. Due to its vast natural resources, the loss of Aceh would have unacceptable costs for the Indonesian central government and Java-centered economy. Most significantly, Acehnese hostility toward the central government is the result of a form of “economic favoritism” which allows the tremendous wealth that Aceh’s natural resources produce to be “siphoned back to Jakarta” (Sulistiyanto 439). Aceh is one of the major oil and gas contributors for Indonesia’s annual production of more than 400 million barrels of crude oil and about three trillion cubic feet of natural gas. It is estimated that “Aceh contributes between \$2 and \$3 billion annually to Indonesia’s national revenue... [but] receives only \$82 million from Jakarta for development activities,” leaving the region in dire poverty (439). This economic imbalance has perpetuated Acehnese feelings of foreign exploitation and intrusion.

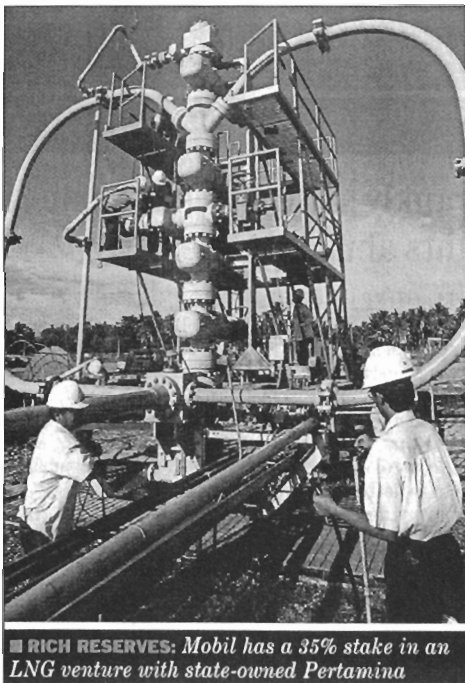
Other factors beyond economics contribute to this popular sentiment among the Acehnese people. As mentioned earlier, Aceh, much like the rest of Indonesia, is overwhelmingly Muslim. However, the Acehnese are especially pious and desire rule by an Islamic state—a goal not shared by those who support the Republic of Indonesia. This religious-political disconnect is a driving force behind separatism in Aceh. Furthermore, certain “progressive” policies of the Indonesian Jakarta-based government, such as its transmigration policy, have helped deepen Acehnese resentment. This particular policy assists residents of the overcrowded cities of Java in relocating to less densely populated provinces such as Aceh, a naturally pristine region.

ExxonMobil’s History in Aceh

Although Acehnese natives have not been able to capitalize on the vast natural resources of their region, ExxonMobil, in conjunction with the Indonesian central government, has

been quite successful in benefiting from Aceh's natural wealth. During the reign of the brutal dictator Suharto, what was then Mobil Oil entered into a production-sharing agreement with the Indonesian state-owned oil company, Pertamina. Three years later in 1971, Mobil accidentally discovered the world's largest depository of liquid natural gas (LNG) in North Aceh, estimated at 14 trillion cubic feet (Engardio 4). That same year, P. T. Arun was founded as a joint venture between Mobil Oil Indonesia, Pertamina, and Japanese-Indonesia LNG Co., with 30, 55, and 15 percent ownership rights, respectively. Seemingly overnight, Aceh had become a great asset to Indonesia, as well as to the American-owned transnational corporation, Mobil Oil. "Aceh provided an estimated 30% of Indonesia's oil and gas exports or 11% of the country's total exports by the late 1980s...[and] nearly a quarter of Mobil's global revenue before the company merged into ExxonMobil Corp" (Down to Earth 1/Solomon 1). Presently, P. T. Arun is still the "jewel in the crown" of ExxonMobil, producing 7% of ExxonMobil's global LNG output.

Figure 5.



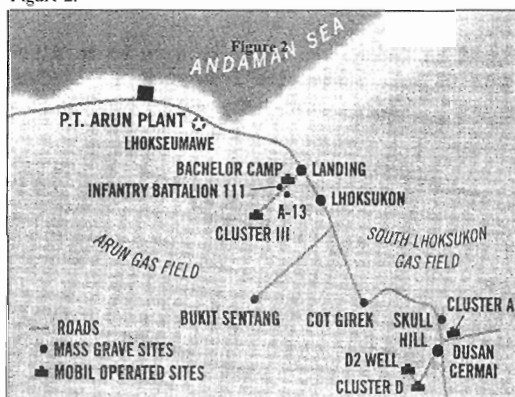
■ RICH RESERVES: Mobil has a 35% stake in an LNG venture with state-owned Pertamina

ExxonMobil's Role in Human Rights Abuses

"On March 9, 2001, ExxonMobil announced it had closed three of its gas fields in Aceh citing 'security concerns'. That same day, the commander of the armed forces and the defense minister announced new military operations against the insurgents in Aceh—the Free Aceh Movement (GAM)" (Jereski 1). The above quote from Robert Jereski, former Executive Director for the International Forum for Aceh, describes the link between ExxonMobil and human rights abuses in North Aceh. As part of its agreement with the Indonesian central government, ExxonMobil's facilities in North Aceh are guarded by Indonesian military personnel—the same military which launched a massive counter-insurgency mission against GAM in 1991. The interests of the Indonesian central government and EM intersect along economic lines: both stand to lose revenue if LNG production must be halted as a result of separatist violence. The Indonesian central government wishes both to maintain its flow of revenue from Aceh to Jakarta, and to crush the Acehnese independence movement. Jakarta has, to some extent, become dependent on the vast funds generated by the P. T. Arun facilities, and has proven that it is willing to use violent tactics to ensure gas extraction proceeds uninterrupted. Seen in this light, it is clear that Exxon has incentives to aid government forces that could eliminate the threat to its facilities posed by Acehnese freedom fighters. The Chairman of Aceh's Student Movement for Reform finds a similar linkage in that ExxonMobil's "use of Indonesian armed forces as muscle has had predictably lethal effects on local villagers" (2). It is this security arrangement that has helped implicate ExxonMobil as "morally, politically, and legally responsible for crimes against humanity in Aceh" (1). Rape, torture, and murder committed by Indonesian military personnel cannot be justified by ExxonMobil on any economic or political grounds.

“On October 10, 1998, a coalition of 17 Indonesian human rights organizations issued a statement asserting that Mobil and P.T. Arun were ‘responsible for human rights abuses’ during the military operation in Aceh” (Engardio 2). A *Business Week* investigation conducted later that year spearheaded the case against Mobil Oil Indonesia (MOI). The magazine’s probe revealed multiple human rights abuses perpetrated on P.T. Arun property and within jointly owned Mobil facilities. The abuses included incidents of torture, kidnapping, and murder, many of which were staged using strategic and logistical support provided by Mobil. The article alleges that MOI provided “crucial logistical support to the army, including earth-moving equipment that was used to dig mass graves” (2). At the time of publication, 12 mass graves had been discovered—one on Pertamina-owned land three miles from a Mobil drilling site.

Figure 2.



Additionally, the article alleges that P.T. Arun facilities—rooms, plumbing, etc.—were used as military camps in which interrogations and torture of suspected GAM members occurred. Specifically, the article identifies an anti-insurgency base camp known as “Camp Rancong” and military post “A-13,” as sites of human rights violations. In total, the *Business Week* probe uncovered more than a dozen sources who “either witnessed atrocities or came upon their aftermath,” two of which claim to have informed Mobil managers of their discoveries (3).

Figure 3.

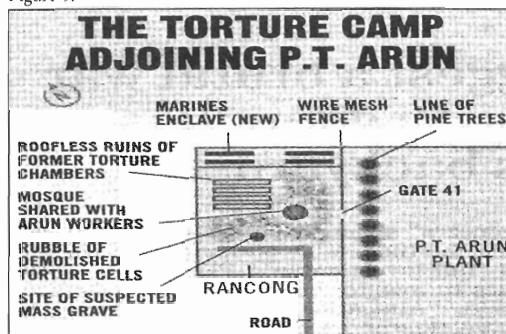


Figure 4.



On June 20, 2001, the International Labor Rights Fund filed a civil suit against ExxonMobil on behalf of 11 villagers in Aceh. The ILRF, a Washington-based non-governmental organization (NGO), charges that Mobil Oil “contracted with the Indonesian military to provide security for its Arun natural gas project, and controlled and directed the units assigned to it” (Weissman 7). In accordance with the findings of *Business Week*, “the suit charges ExxonMobil with complicity in these abuses, arguing that the company directed the forces to a considerable extent, and the military used facilities and resources provided by

ExxonMobil and its Indonesian partner P. T. Arun, also a defendant in the case, in the commission of wide-scale human rights violations” (7). The ILRF argues that Mobil “controlled and directed” TNI forces based on evidence of “conditioning payment on the provision of specific security services, making decisions about where to place bases, strategic mission planning, and making decisions about specific deployment areas” (7). Furthermore, the suit alleges that “Mobil provided buildings and barracks near the company’s operations which were used by Indonesian Kopassus special forces ‘to interrogate, torture and murder Acehnese civilians suspected of engaging in separatist activities’ and provided heavy equipment to dig mass graves” (7). The plaintiffs in the case all claim to have been personally injured or suffered the loss of family members at the hand of TNI Unit 113.

The legal basis for the case is the Alien Tort Claims Act of 1789, which allows foreign residents to sue American corporations or individuals in American courts for their actions abroad. The logic employed by the ILRF is that “ExxonMobil ‘pay[s] a monthly or annual fee for security provided by specific units of TNI’ and that these units are therefore agents of the company, with the company liable for the actions of its agents” (8). Additionally, the ILRF emphasizes that ExxonMobil has done nothing to encourage TNI forces to cease their human rights atrocities, and in fact, the company’s very presence and perceived threat to its facilities from GAM attacks may have provided the Indonesian military with justification for continuing such abuses. Robert Jereski concurred in his 2002 report stating:

ExxonMobil’s security has provided the Indonesian military with a much-needed pretext to escalate its operations in Aceh; one must assume, given the company’s extensive base of expertise on political risk, that ExxonMobil did so knowing the true nature of security risks the company faced. The pretext has resulted in a dramatic escalation in human rights abuses. (Jereski 10)

Mobil and Pertamina flatly deny allegations that they were even aware of human rights abuses in the early 1990s. A company statement, issued shortly after the case was filed, said, “ExxonMobil condemns the violation of human rights in any form...as such, our company rejects and categorically denies any suggestion or implication that it or its affiliate companies were in any way involved in alleged human rights abuses by security forces in Aceh” (ExxonMobil Web site). ExxonMobil emphasizes the fact that it does not own any of the facilities used for its oil-and-gas operations in Aceh and that all real estate is owned by Pertamina. Furthermore, Exxon claims that most equipment was leased, including all bulldozers and earth-movers. The company also argues that no corporation can stop lawful arrests on its premises. Pertamina, in response to its lawsuit, claims it had little control over Rancong once TNI forces commandeered the facility in 1990. ExxonMobil’s final line of defense is that it has been a beneficent presence in North Aceh and has contributed to the local community by building mosques, schools, and roads (Murphy 3).

Corporate Codes of Conduct

Perhaps the greatest achievements of *Business Week*, the ILRF, and others who have brought to light the complicity of ExxonMobil in Aceh will not be victory in court, but rather the impact of negative publicity. “In general, the company’s critics want it to do more to ensure that its investments improve the lot of the average citizen, rather than funding arms purchases or lining the pockets of corrupt officials” (Bianco 6). Nonetheless, Exxon continues to demonstrate recalcitrance and strong resistance to any policy changes. Censure from within the business press finds that “Exxon, in contrast to such self-styled industry progressives as BP and Shell, rarely even deigns to make symbolic gestures in support of human rights campaigns” (6). ExxonMobil has yet to adopt any form of human rights policy or corporate code of conduct. For that very reason, prominent

NGOs such as Amnesty International have begun campaigns aimed at encouraging ExxonMobil to “adopt a comprehensive and verifiable human rights policy” (Winston 3/12/02). This option constitutes the first principle in Amnesty’s “Human Rights Principles for Companies: An Introductory Checklist” which states, “All companies should adopt an explicit company policy on human rights which includes public support for the UDHR.” Here, Amnesty employs strong language in a voluntary code of conduct for corporations. The second principle addresses security and is directly applicable to ExxonMobil’s position in North Aceh violence. “All companies should ensure that any security arrangements protect human rights and are consistent with international standards for law enforcement.” It is evident that ExxonMobil’s conduct in Aceh violates these most basic principles, and undoubtedly others in Amnesty International’s list of 10.

CONCLUSIONS

The evidence overwhelmingly supports the conclusion that ExxonMobil has not only turned a blind eye to human rights abuses in its own backyard, but has, in fact, directly contributed to violations on various occasions. Most fundamentally, ExxonMobil is guilty of a “complicity of silence.” The corporation did nothing to make the atrocities committed by Indonesian security forces known to the international community, but rather Exxon worked to conceal the situation in Aceh. EM initially denied reports of abuses that slowly caught the attention of the international news media, and only changed its position once the activities of TNI were widely known outside of Aceh. No steps were taken to pressure the Indonesian government to end human rights abuses, despite ExxonMobil’s considerable bargaining position. It is conceivable that Exxon may have been able to limit human suffering on and around the P. T. Arun plant if it had refused to resume LNG processing until the Indonesian government met demands for

rights protection. Nonetheless, ExxonMobil acted with short-term goals in mind, and did not consider the economic ramifications of further instability in the region. It is for this reason that the role of NGOs such as Amnesty International is so important to the corporate codes movement, especially in isolated corners of the world. Without the exposure provided by these groups, companies like ExxonMobil see no reason to modify their practices. In the words of the UN High Commissioner for Human Rights, “Some business leaders may think that the political and social environment of the country they are doing business in is none of their affair and that whether or not there are human rights abuses is irrelevant. That is a short-sighted attitude and one that is not borne out by experience” (WinConference 1999). Because the corporate culture within EM led managers to continue LNG production at all costs, particularly at the expense of the local Acehnese, the company suffered in the long run. As terrorist activity escalated, plant shutdowns became necessities rather than options. Moreover, the increased violence resulted in greater negative publicity. Had it taken immediate action to distance itself from the Indonesian central government, Exxon may have jeopardized its production-sharing agreement. Yet, the current situation has deteriorated to a point at which EM is in danger of losing its stake anyway. The disadvantages of short-sighted management should be apparent to ExxonMobil. Purely from the perspective of financial self-interest, Exxon may have been able to avoid costly shutdowns if it addressed separatist conflict and Indonesian human rights abuses correctly, early on.

The broader conclusion that can be drawn from the experience of ExxonMobil in Aceh is well-summed up by David Forsythe, a scholar and human rights theorist. Forsythe states that, “It remains reasonable to expect that if left alone, many TNCs will opt for short-term profits at the expense of human dignity for many persons affected directly

and indirectly by their practices. It seems there must be countervailing power, either from the state, or from human rights organizations and movements, if TNC practices are to be made basically compatible with the International Bill of Rights" (199). Here, Forsythe touches on the fundamental problem exemplified in the case of ExxonMobil's actions in Aceh: in an era of unbridled global capitalism, it is especially difficult to influence MNCs to act in a manner that upholds human rights when this goal conflicts with the aim on which corporations are founded—the pursuit of profit. Only in an international climate, where corporations are given an incentive to uphold human rights, will real progress be made. For this reason, it is important that NGOs such as Amnesty International and nation-states themselves, work to change the incentive structure of global capitalism. Capitalism is highly regulated in most advanced industrial nations in order to protect the rights of the individual. This logic must be extended to account for the rise of globalized production. TNCs must be made to understand that human rights protection is an important aspect of their operations abroad and thus, should be central to their corporate policy. If the international community devotes more attention to activities of transnational corporations and broadens the scope of human rights protection to include global businesses, TNCs will gradually adopt reforms. Whether change comes in the form of international laws aimed at corporate conduct, shareholder resolutions supported domestically, or internal reforms of corporate culture, efforts must continue in order to make multinational companies act more responsibly.

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Male SuperVision: The Gaze at Work in William Blake's *VISIONS of the Daughters of Albion*

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ABSTRACT

William Blake's illustrated poem, *VISIONS of the Daughters of Albion* raises questions about sexual freedom and identity politics. Some critics have declared Oothoon, the female protagonist, an example of a feminist ideal, a woman who achieves subjecthood as she champions for sexual liberation. A feminist appropriation of psychoanalytic criticism, however, uncovers a protagonist who fails to achieve true subjecthood as she perpetuates the status quo.

As a visual narrative, *VISIONS* lends itself to the investigations of feminist film theory, specifically Laura Mulvey's insights into the male gaze. By applying Mulvey's stipulations of pleasure in the visual narrative, we can understand why Oothoon fails to carve her own identity within the poem.

INTRODUCTION

Feminist appropriations of traditional theoretical methods have extended the scope of feminist theory from initial inquiries about positive and negative representations of women to an investigation of texts as distinct producers of meaning. Film theorist E. Ann Kaplan argues that feminist film critics were the first to go beyond the concern with content and into the question of how meaning is produced with the awareness of "cinema as a signifying practice" (119). To explore the systematic production of images in film, critics employed the tools used in other theoretical studies. Feminist use of psychoanalytical criticism in particular inspired examinations of

the formation of female identity in visual narratives. Laura Mulvey's "Visual Pleasure and Narrative Cinema," looks at the visual narrative as a system in which the interplay between male and female characters results from and depends on the patriarchal unconscious, specifically the construction of the male gaze. Mulvey's use of psychoanalysis as a "political weapon" (2182) demonstrates how feminist examinations of "patriarchy with the tools it provides" ultimately highlight oppressive standards at work in any given text (2183). While "visual narrative" connotes a certain type of film project, Mulvey's insight illuminates the reading of any narrative that seeks to address identity politics in terms of gender and/or sexuality.

William Blake's long poem *VISIONS of the Daughters of Albion* provides an example of a narrative that can benefit from Mulvey's explication of the male gaze. In 1793, Blake etched *VISIONS* on 11 plates in a relief printing style with green ink (Blake Archive). Though Blake preceded the technology of film by centuries, *VISIONS* certainly qualifies as a carefully crafted visual narrative. More than just an illustrated poem, *VISIONS* resembles cinema in the deliberate design of each specific plate. The structure of the poem reflects the narrative style of cinema, for Blake's choice of illustrations and their placement in relation to the typography is indeed a calculated arrangement similar to a film's mise-en-scène and organization.

How can film's feminist psychoanalytical criticism, then, specifically Mulvey's

discussion of the gaze, help us reevaluate Blake's poem as a commentary on sexual identity? Largely, the poem has raised questions about sexuality, slavery, and freedom of the mind and body for critics employing a variety of methodological approaches. Traditionally read as a "hymn for free love," by such critics as Harold Bloom (qtd. in Vogler 272), *VISIONS* presents Oothoon, a female virgin raped and held captive by Bromion on her way to see her true love, Theotormon. Oothoon laments and calls out to the immobilized Theotormon. Her expressions throughout the rest of the poem urge Theotormon to think differently about sexual experiences. As a result, past critical readings have often presented Oothoon as a poster child for unabashed female sexuality and a champion of mind/body liberation for all. By applying Mulvey's understanding of the male gaze to Blake's visual poem, we can understand Oothoon's role in the dynamics of the visual narrative as a structure of the patriarchy. A feminist psychoanalytical interpretation allows us to see that Oothoon actually reinforces a system of inequalities despite her awareness of the sexual imbalances of desire within the patriarchal structure.

Essentially, the visual narrative appeals to the pleasure of vision, or gazing, and the pleasure of representation, or mimesis. These two distinct pleasures result from infantile stages as described by Sigmund Freud and Jacques Lacan, respectively. The first pleasure of vision, or scopophilia as Freud defined it, is the objectification of an unaware person to the voyeuristic gaze. Though the visual narrative deliberately appeals to vision, and thus hardly seems to cater to the hidden, discreet element that adds to the pleasure of voyeurism, Mulvey reminds us that "narrative conventions give the spectator an illusion of looking in on a private world" (Mulvey 2184). Indeed, *VISIONS* appeals to readers in this illusory way as well. The first plate of the poem states: "The Eye sees more than the Heart knows." This motto and indeed the poem's

title demonstrate the central role of vision within Blake's work. Further, the frontispiece shows the three figures bound and tortured, no one able to see the other, though Bromion's eyes are exaggeratedly open and once again recall the question of vision. The large, looming eye in the sky seems to stare back at our own gaze (2). Thomas Vogler points out "the composition of the plate emphatically locates the reader's perspective in an eye *within* the cave...as voyeur-readers" (Vogler 287-8). Like other visual narratives, then, Blake's poem establishes the reader's position as a spectator, thus enabling a character to exist for our objectification.

A second form of visual pleasure results from the mirror stage, as explicated by Lacan. Mulvey offers several points of analysis about this stage, though the most important impact the mirror stage has on the spectator's reception of the visual narrative is the spectator's identification with the representation (Mulvey 2185). As opposed to the pleasure of objectification, the voyeur finds pleasure in identifying with certain characters. Sexual objectification and the ego-boosting of identification call upon different psychological drives, for "the first is a function of the sexual instincts, the second of ego libido" (2185). Yet the apparent dichotomy finds a balance in the visual narrative due to their shared reference point: the castration complex (2186). Thus, because both of these drives are rooted in and depend upon the "straight, socially established interpretation of sexual difference which controls images," the psychology of a visual narrative easily appeals to patriarchal desires (2182).

Mulvey's insights help us recognize that Oothoon, as the woman, becomes the lone source of erotic fixation in *VISIONS*. As in all visual narratives, the objectified woman's role is twofold (2184). On one level, the female serves as an erotic source for the other characters within the narrative. In *VISIONS*, Oothoon exemplifies the erotic for both Bromion and Theotormon in various ways. The poem begins with Oothoon

hidden in the vale, thus unseen from the sexually charged gaze. Then the young woman ventures toward Theotormon determined to develop their sexual relationship. With this decision, Oothoon says in line 13 of plate 4, "...thus I turn my face to where my whole soul seeks." In her desire to become sexualized, Oothoon offers her body and looks to achieve, as Mulvey calls it, "to-be-looked-at-ness." Indeed, the artistry of the title plate establishes Oothoon's function as the erotic spectacle on both levels. In this visual, Bromion hunts Oothoon from the sky, his eyes wide and fixed on the fleeing woman. Oothoon's face remains completely turned toward Bromion's controlling gaze while her body remains completely turned to the gaze of the external spectator, the previously established "voyeur-reader."

Oothoon's function as erotic object for readers illuminates more complexities of the masculine gaze. Mulvey reminds us that, "As the spectator identifies with the main male protagonist, he projects his look onto that of his like, his screen surrogate, so that the power of the male protagonist as he controls events coincides with the active power of the erotic look, both giving a satisfying sense of omnipotence" (2187). Since one of the "voyeur-readers'" pleasures results from identification, and the patriarchal reinforcement of the gender binary privileges the male as the ego's ideal, then we are to look to Bromion and/or Theotormon for mimesis.

Because Bromion and Theotormon seem to oppose each other as an antagonist and a protagonist, respectively, readers might inherently find no delight in identifying with Bromion. One could also argue that Theotormon's lack of action makes him an "anti-protagonist," and thus an equally undesirable surrogate. Readers must look to which character, then, for identification? A psychoanalytical examination reveals that pleasure in identification lies not within one or the other, but indeed with both Bromion and Theotormon. Why? Because together, they offer a synergistic escape from the anxiety of

castration. Through identification with both characters, the "voyeur-reader" finds catharsis for the polar emotions of pleasure and pain rooted in and dependent upon castration anxiety.

In order to cope with the apprehension, the male unconscious adapts the gaze to allow for one of two coping methods. One way, "fetishistic scopophilia, builds up the physical beauty of the object, transforming it into something satisfying in itself" (2188). Castration anxiety melts when one views woman as a mere assemblage of body parts. In a glorification of the female body, part by part, the site of castration becomes just another site of beauty and mystery in the male fantasy.

Bromion and Theotormon exemplify different versions of the other coping method, sadistic voyeurism. This avenue begins with an interest in investigating woman, seeking a dramatization of the moment of castration, and "has associations with sadism: pleasure lies in ascertaining guilt, asserting control, and subjugating the guilty person through punishment or forgiveness" (2188). Bromion's rape of Oothoon represents the preoccupation with the moment of castration, as rape grossly violates and potentially mutilates the body. Further, Bromion seeks to control Oothoon through enslavement. When Bromion claims in plate 4, "Stamp't with my signet are the swarthy children of the sun:/They are obedient, they resist not, they obey the scourge: Their daughters worship terrors and obey the violent," he reaffirms the position of patriarchal order (4.21-3). Thus, Bromion uses ownership as a way to maintain pleasure and cancel the fear of woman as castrated other.

Theotormon's different attempts to alleviate his anxiety become sadistic toward Oothoon as well. When Theotormon's eagles tear at Oothoon's flesh at her request, he indeed "severely smiles" (5.18). A surface reading of the text indicates Theotormon's reaction arises from his jealousy of Oothoon's sexual experience with Bromion.

Yet a psychoanalytical investigation reveals that Theotormon constantly punishes Oothoon despite her pleas of pure love as a way to cope with his devastating anxiety. Plate 7 shows Oothoon chained in the black wave that curves above Theotormon, who shields his eyes from her image. The anxiety that comes with the gaze overwhelms Theotormon so much that he attempts to block his vision. When he breaks his silence to express his pain, he wonders if his thoughts could ever find comfort in this situation, or if his mind will only bring "poison from the desert wilds, from the eyes of the envier" (7.11). Indeed, Theotormon is "the envier," the desirer, the bearer of the look. The "desert wilds" are his male unconscious, and the "poison" that comes from both the unconscious and the eyes of the envier is the image of woman as the castrated other. Theotormon's self-serving efforts to shield his eyes and negate the castration complex force Oothoon to deal with guilt and regret. Chained to the stigma of woman as other, Oothoon again experiences the sadistic outcome of voyeurism.

Oothoon's response to the sadistic treatment might suggest her strength as an active female character, for she repeatedly attempts to claim subjecthood throughout the rest of the poem. Oothoon's actions, however, stem from her desire to soothe and please the passive-aggressive Theotormon. Why does Oothoon continue to desire a reaction from Theotormon? According to E. Ann Kaplan, repeated objectification conditions the female psyche to find pleasure in "to-be-looked-at-ness." "Given the male structuring around sadism...the girl may adopt a corresponding masochism" (126). Oothoon's "desire to be desired," manifests itself in several ways throughout the poem. In her first, and particularly masochistic, attempt to regain Theotormon's desire, Oothoon commands Theotormon's eagles to "rend away this defiled bosom that I may reflect, /The image of Theotormon on my pure transparent breast" (5.15-16). Such logic implies that

the mutilation of her womanly, sexualized flesh will alter her place as erotic source, erase the visual cues which stir castration anxiety, and thus elevate Oothoon from object to subject via the "pure" reflection of Theotormon.

Unfortunately, such self-injury actually caters to the patriarchal mindset and fails to carve any independent identity for Oothoon. The mutilation of flesh reenacts the moment of castration and thus feeds into Theotormon's sadistic wishes. Also, her intention to reflect Theotormon's image is an attempt to prove her likeness to the subject; but simple mimicry of male power does not qualify as a distinct, true identity for Oothoon. She merely provides Theotormon with more pleasure in representation.

Though Oothoon fails to achieve subjecthood, she continues to question the system that keeps her imprisoned literally and figuratively as an object. In plate 8, Oothoon turned away from our own intrusive gaze, and isolated herself from Bromion and Theotormon. She recognizes the cycle of patriarchal relationships under the guise of "false desire," (8.27) and continues to question the dynamics of sexual desire in relation to the constructed codes mandated by religion and even the "Father of Jealousy," in plate 10. As she wonders about the "Father of Jealousy," she asks if his influence could affect men in love "till his eyes sicken at the fruit that hangs before his sight" (10.20). A psychoanalytical reading of Oothoon's statements in this plate reveals her awareness of the patriarchal unconscious as the "Father of Jealousy." The unconscious projects a controlling gaze onto the "fruit," or woman, until inevitably the "eyes sicken" and see woman as a signifier of castration. Oothoon's continuous references to eyes and vision throughout the poem make her indeed, as Vogler says, a "specialist of perception" (283).

While Oothoon's repeated references to eyes and visions throughout the poem demonstrate her awareness of the power dynamics that surround her, she fails to rupture the structure or

offer any example of how to break free from the system she criticizes. In fact, her final call to action only reaffirms the sexual imbalances at the root of the patriarchal order. Plainly, Oothoon offers to trap other girls for Theotormon's sexual gratification as she watches happily by the side. Here Oothoon attempts a role reversal to recreate a relationship with Theotormon similar to those of traditional power dynamics, only with a role reversal. Like Bromion, she will capture young women for sexual objectification, and like any male controller of the gaze, Oothoon will watch with fetishistic scopophilia and "view his dear delight" (10.28). In her promise to watch with no jealousy, Oothoon thinks she will represent to Theotormon the possibility of "Love! Free as the mountain wind!" (10.16). However, Oothoon's self-positioning as a voyeur of women who are "passive recipient(s) of male desires and sexual actions" (Kaplan 126) only highlights her masochistic idea of sexual experiences between men and women. To place other women in the "dominance-submission pattern, with the women in the latter place" (127) perpetuates the cycle of imbalance while Theotormon, once again, would experience a pleasure in actualizing the fantasy of exchanging women in the ultimate patriarchal kinship system (127). Though she removes herself from the sexual exchange in which women cater to Theotormon's "bliss," Oothoon's seizure of dominant behavior mimics masculine domination, and changes nothing about the imbalance. Ultimately, role reversals do nothing to negate the construction of the gaze, but rather reinforce the problem of *difference* as a determining factor in the power dynamics of sexuality.

As *VISIONS* concludes, the artistry repeats images representative of the patriarchal dynamics explored within the poem as a visual narrative. Oothoon floats above the same "margin'd ocean" (11.12) where she encountered, and continues to experience, the system of inequality. Though she tries to float above it all, her outstretched arms mimic Bromion's flight as he pursued

Oothoon for his next victim of violence and control. Thus, Blake leaves us with the image of Oothoon's mistaken notions of subjectivity as a reflection of dominant behavior.

Oothoon only caters to a system of inequalities despite an understanding of the power dynamics behind desire within the patriarchal structure.

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Macbeth and Prince Hal: The King as Actor

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ABSTRACT

In "Macbeth and Prince Hal: The King as Actor," the attitudes, behaviors, and expectations of the main characters in William Shakespeare's *Macbeth* and *Henry IV, Part 1*, are examined in the light of Elizabethan and Jacobean interpretations of monarchy. Although Macbeth is not without justification in his belief that he should be king, his political success is destroyed by his inability to dissemble and his preference for direct action. Hal, on the other hand, more fully follows Machiavellian principles and is thus better able to conceal his feelings and to adjust his behavior to fit circumstances. The relative success or failure of each monarch is analyzed in terms of his ability to "act the part."

INTRODUCTION

Macbeth, the paradoxical hero of a paradoxical play, is a man of action who cannot "act." His failure is rooted not in his "vaulting ambition" (1.7.27) so much as in his inability to dissemble. Prince Hal, as he is depicted in *Henry IV, Part 1*, is a master dissembler, cognizant of the need for the political skills of manipulation and insincerity. Hal is a consummate actor who is always aware of the effect he has on others, whereas Macbeth, bound by a limited understanding of his own persona, is defeated by his inability to reinvent himself. Stephen Greenblatt in his essay, "Invisible Bullets: Renaissance Authority and Its Subversion, *Henry IV and Henry V*," asserts that Hal "fully understands his own behavior through most of the play as a role that he is

performing" (46). Unfortunately for Macbeth, he is never able successfully to play his "role" as king. Interestingly, both plays abound in dramaturgical imagery and Shakespeare seems to suggest that to be king is to play a part, that monarchy is a form of acting. My purpose is to analyze the relative failure and success of Macbeth and Prince Hal in their roles as king and king-to-be, with reference to Elizabethan ideas about the monarchy. Hal seems to succeed because of his inherent grasp of the public relations aspect of kingship and his talent as an actor. He is a far more Machiavellian character than Macbeth and strikes the reader as more modern.

My first goal is to address Macbeth's tattered reputation and to make the case that he is entitled to be seen as a worthy successor to Duncan. In his discussion of the historical sources of *Macbeth*, David Norbrook writes:

Scottish traditions in any case involved an ambivalent attitude toward the monarchy, combining fierce pride in the antiquity of the royal house with a willingness to take action against individual rulers who stepped out of line (85).

Thus, it was not unheard of for the succession to fall to someone other than the king's son. Norbrook goes on to discuss King James's motivations in wanting to strengthen the principle of succession; his own position on the throne was not entirely secure, and *Macbeth*, performed during his reign, reflects this insecurity:

The opening of the play presents the disorder that was seen in Boece and Buchanan [sixteenth-century Scottish historians] as springing from the rejection

of the elective system and implies that the real cause is the weakness of the principle of legitimacy. And the strengthening of this principle will require pragmatism as well as piety, cunning tactics in order to procure virtuous long-term ends. James proceeded in his project of strengthening royal authority in precisely this way (95).

The tactics utilized by James as described by Norbrook are the skills that Macbeth lacks and Prince Hal possesses in abundance: political pragmatism, and an ability to be an actor.

Yet Norbrook's discussion seems to make clear that Macbeth is in many ways entitled to be a candidate for king. Shakespeare, too, implies Macbeth's qualifications. Duncan, though repeatedly described as "gracious," is a weak and uninvolved monarch. He depends on second-hand sources of information, as when he questions the bloody Captain for news of the battle at the start of the play. Our impression is of Duncan (and Malcolm) situated well away from the battle, themselves unable to overlook the events as they unfold, preserving their own safety, and totally dependent on others to do their fighting for them. It is worth noting that Duncan is under assault from two traitors, the Thane of Cawdor and Macdonwald, as well as the Norwegian king. His kingdom is in great disarray and under enormous threat, suggesting that his authority is weak and his leadership weaker. The fact that both Cawdor and Macdonwald are rebelling suggests that there is some consensus that Duncan should be replaced; he is not universally loved and respected. Yet Macbeth loyally defends him and almost single-handedly saves the day, as reported by the bloody Captain and Ross. Duncan praises Macbeth as "valiant cousin, worthy gentleman" (1.2.26), thereby acknowledging Macbeth's royal bloodline and social rank; Macbeth is suited by birth and class to be king. Duncan, the Captain, and Ross continue to lavish praise on Macbeth, describing him as "brave" (1.2.18), "valor's minion" (1.2.21), "Bellona's bridegroom" (1.2.62), and "noble" (1.2.78).

Thus, even before the audience sees him, it is inclined to admire Macbeth, whose

reputation as the darling of public opinion precedes his appearance on the stage.

Compared to the anemic Duncan and Malcolm, bloody Macbeth, even when he is not physically present, exudes a masculinity and authority lacking in the current king and his heir. He generates a sense of excitement and anticipation, much like that of a celebrity about to make a public appearance. He *is* a hero; he is not playing a part. He has spent the day "disdaining Fortune" (1.2.19), wading through blood on a battlefield, oblivious to his own safety, intent on his patriotic goals. This is the real Macbeth, and he is royal by nature.

Although wrapped in a supernatural aura that perhaps typifies the Elizabethan stereotype of a witch, the Weird Sisters may also be viewed in more modern terms as the vox populi. I envision them as Macbeth's "groupies," waiting to intercept him as he returns from the battlefield, as representative of a faction of Scots who would support his candidacy as the next king. Thus, the witches call him Thane of Cawdor and King as expressions of their belief in his worthiness for those positions, much as we might endorse candidates who should run in the next presidential election. A picture in the Folger edition of *Macbeth* taken from Holinshed's *The Historie of Scotland* shows Macbeth and Banquo meeting the witches, who are dressed in ordinary Elizabethan garb and do not seem threatening (18). They address Macbeth as Thane of Glamis because they know who he is, suggesting that he enjoys celebrity status among the common people.

Shakespeare may have felt obliged, given King James's feelings about usurpers, to add a sinister atmosphere to the witches' appearance and motives; but the words they say to Macbeth may be read simply as political encouragement or support of his advancement. It is obvious in Act 1 that Scotland is rife with political discontent; so, it would not be surprising that Macbeth be considered by some faction as a desirable successor to Duncan. He has demonstrated his ability to

free Scotland from assault by traitors and foreigners. On hearing the witches' comments to Macbeth, Banquo asks them what his own chances are, suggesting that Banquo, too, may be mentioned as a contender for the throne. Banquo's private aspirations may explain the intensity with which he studies Macbeth's reaction to the witches' show of support, and why, in Act 2, he obliquely declines to join forces with Macbeth in an unspecified future undertaking (2.1.36-39). That Scotland appears to entertain men other than Malcolm as Duncan's successor legitimizes Macbeth's expectations of advancement.

Then, Duncan betrays Macbeth. He is fully cognizant of the great service Macbeth has done him, but the generosity of his speech is not matched by his actions. Duncan rewards Macbeth by giving him the title of a traitor, even before the traitor is executed. Duncan, of course, is eager to wipe out all memory of the original Thane of Cawdor, a man whom he unwisely trusted. The dignified manner in which the Thane of Cawdor faces death is puzzling if we, too, must regard him as a villain. Malcolm relates to his father the report that he receives at second-hand from one who saw the Thane die, a narrative method that again emphasizes the detachment of Duncan and Malcolm from the events that most concern them: "Nothing in his life/Became him like the leaving it" (1.4.8-9). Macbeth apparently does not know that the Thane is considered a traitor until he is informed by Angus. To the witches Macbeth responds, "The Thane of Cawdor lives/A prosperous gentleman" (1.3.75-76). Reading between the lines, we might suspect that the executed Thane is to be regarded as villainous only because he has unsuccessfully opposed Duncan, further evidence that Duncan is not universally supported in Scotland.

When announcing Macbeth's promotion, Ross describes the overwhelming praise that Macbeth has been given in many reports, reaffirming how deserving Macbeth is in the eyes of the public and how much Duncan must be aware of his indebtedness to him:

As thick as tale
[Came] post with post, and every one did bear
Thy praises in his kingdom's great defense,
And poured them down before him (1.3.101-104).

Angus adds, "We are sent/To give thee from our royal master thanks,/Only to herald thee into his sight,/Not pay thee" (1.3.205-108). Ross assures Macbeth that the new title is "an earnest of a greater honor" (1.3.109), not Macbeth's entire reward.

As he absorbs the implications of the news and calculates that much of what the witches predicted has already come true, an evil idea crosses Macbeth's mind: "My thought, whose murder yet is but fantastical,/Shakes so my single state of man/That function is smothered in surmise,/And nothing is but what is not" (1.3.152-155). Macbeth is, after all, a man of action, not of contemplation. Yet he resists the temptation to take matters into his own hands: "If chance will have me king, why, chance may crown me/Without my stir" (1.3.158-159).

Macbeth's attitude changes when he meets with Duncan. The king has no further reward for him, only empty praise: "Only I have left to say,/More is thy due than more than all can pay" (1.4.23-24). Duncan then sheds some grateful tears and effectively smacks Macbeth in the face by nominating Malcolm as his heir. Duncan awards others with unspecified titles as well: "which honor must/Not unaccompanied invest him only,/But signs of nobleness, like stars, shall shine/On all deservers" (1.4.45-48), making Macbeth's promotion even less significant. Having quelled, through Macbeth's bravery, the rebellion against him, Duncan seeks to shore up his shaky monarchy by immediately naming his successor, and he chooses to favor bloodline over merit. Nothing about Malcolm qualifies him to be king except his lineal relationship to Duncan.

As Norbrook points out, "If Duncan has to nominate his son, presumably the implication is that he could have nominated someone else, that the system is not one of pure primogeniture" (94). However, Shakespeare,

writing under the patronage of King James, could not be seen to promote other schools of thought regarding the monarchy:

If the audience can sympathize with Macbeth even though he outrages the play's moral order, it may be because vestiges remain of a worldview in which regicide could be a noble rather than an evil act. Shakespeare may have come under pressure from his royal patron to substitute a mystical and legitimist version of Scottish history... (116).

The adjective repeatedly attached to Duncan is "gracious." The implication is that if Duncan errs, it is on the side of too much generosity. Duncan violates King James's own dictum regarding leniency as described in James's treatise on monarchy, *Basilikon Doron*: "For I confess, where I thought (by being gracious at the beginning) to win all men's hearts to a loving and willing obedience, I by the contrary found the disorder of the country and the loss of my thanks to be all my reward" (338). By seeming to depict Duncan as overly "gracious," Shakespeare is able to criticize James's ancestor while upholding James's own definition of a strong monarch.

As soon as he leaves Duncan's presence, Macbeth's anger explodes: "The Prince of Cumberland! That is a step/On which I must fall down or else o'erleap,/For in my way it lies" (1.4.55-57). He expresses his options in terms of action, "fall" or "o'erleap," not in terms of strategy or subtlety. Indeed, Macbeth finds it difficult to conceal his feelings. Lady Macbeth admonishes him:

Your face, my thane, is as a book where men
May read strange matters. To beguile the time,
Look like the time. Bear welcome in your eye,
Your hand, your tongue. Look like th' innocent
flower,

But be the serpent under't (1.6.73-78).

Macbeth, the man of action, is a poor actor. As she goads him to commit the murder, Lady Macbeth accuses him of being afraid to take action, a criticism that Macbeth finds unbearable: "Art thou afeard/To be the same in thine own act and valor/As thou art in desire?" (1.7.43-45). At the end of Act 1, Macbeth commits his bodily efforts to the

murder: "I am settled and bend up/Each corporal agent to this terrible feat" (1.7.92-93); he is able to take action.

Once he is the king, Macbeth finds it difficult to play the required role. Unable to be Machiavellian in his demeanor, he resorts to bursts of action that are self-defeating because they undermine his credibility as king. Niccolo Machiavelli famously argues that a prince must be capable of deceit, "But one must know how to mask this nature skillfully and be a great dissembler" (335). He adds, "All men will see what you seem to be; only a few will know what you are, and those few will not dare to oppose the many who have the majesty of the state on their side to defend them" (336). Lady Macbeth seems to be following Machiavelli's advice as she intends to frame Duncan's sleeping guards for his murder, for "Who dares receive it other,/As we shall make our griefs and clamor roar/Upon his death?" (1.7.88-91).

Macbeth is incapable of the subtlety required by Machiavellian philosophy. He decides to take action rather than tolerate his suspicions of Banquo, for example, even though Machiavelli would find such action unnecessary and counterproductive: "In all men's acts, and in those of princes most especially, it is the result that renders the verdict when there is no court of appeal" (336). That is, Macbeth ought to ignore Banquo and depend upon popular opinion to support the king. However, Macbeth determines to kill Banquo because "Our fears in Banquo/Stick deep, and in his royalty of nature/Reigns that which would be feared" (3.1.53-55). By taking action instead of "acting," Macbeth only succeeds in undermining himself.

His inability to dissemble and his preference for direct action reveal themselves in the banquet scene. He asserts, "What man dare, I dare" (3.4.121) and challenges the ghost to appear in the form of a bear, rhinoceros, or tiger; but he is incapable of pretending that it is not there. Macbeth cannot "change according as the winds of fortune and the alterations of circumstances dictate"

(336), as Machiavelli admonishes a prince must be able to do.

Richard Horwich, in "Integrity in *Macbeth*: The Search for the 'Single State of Man,'" argues that Macbeth's goal is to restore wholeness to his sense of self, even if to achieve such wholeness requires further immoral behavior: "Macbeth's behavior is best seen as that of an absolutist, a man for whom no compromises, accommodations, or half-measures are possible" (309). I would argue instead that Macbeth's dilemma is his frustration over his clumsiness as king in taking direct action to solve his problems and his lack of talent for dissembling. Though he has the courage to become king and is able to take the necessary steps to replace Duncan, he lacks the political instincts and the acting ability that would assure his popularity. Again and again he resorts to scandalous action, murdering Banquo, then Lady Macduff and her children, until finally the thanes decide that they would be better off with Malcolm. When Lennox tells him that Macduff has fled to England, Macbeth angrily resolves to take direct action against his family: "The flighty purpose never is o'ertook/Unless the deed go with it. From this moment/The very firstlings of my heart shall be/The firstlings of my hand" (4.1.165-168).

The use of dramaturgical imagery is especially pronounced in the last act of the play, as Macbeth fully embraces action and drops any pretense of being an actor. He curses the fleeing thanes and cries, "The mind I sway by and the heart I bear/Shall never sag with doubt nor shake with fear" (5.3.10-11). Calling for his armor he vows, "I'll fight till from my bones my flesh be hacked" (5.3.38). This is the Macbeth we recognize from the descriptions of his valor in Act 1: the fearless soldier who does not need to speak or to dissemble, but who is respected for his deeds alone. His disdain for the life he has been living as king is expressed in his soliloquy, which compares such a life to play acting: "Life's but a walking shadow, a poor player/That struts and frets his hour upon

the stage/And then is heard no more" (5.5.27-29). Anticipating his defeat, he notes, "At least we'll die with harness on our back" (5.5.59), and he dies in his true persona, as a soldier.

Although it was written earlier and under a different monarch, Shakespeare's *Henry IV, Part 1* reveals a more Machiavellian attitude toward monarchy. Like *Macbeth*, *Henry IV, Part 1* depicts monarchy under the influence of the reigning monarch, in this case Elizabeth I. While *Macbeth* ends with a restoration of order through primogeniture, an outcome flattering to James I, *Henry IV, Part 1* manages to appeal to both supporters of direct succession and meritocracy: Hal is a prince who deserves to be king not only on the basis of his lineage, but also because he presents himself as the best man for the job, much as Elizabeth did herself. Leonard Tennenhouse writes:

Since Elizabeth's ascendancy could be justified according to her father's will and primogeniture both, her very person temporarily reconciled the competing viewpoints formulated during the debates concerning her succession. . . Elizabeth was a paradox, in other words, by virtue of the contradictory definitions of monarchical authority her succession had occasioned (113).

In Elizabeth's time, a more flexible attitude toward monarchy prevails because Elizabeth is so secure in her position. In such an atmosphere, Shakespeare is free to explore the career of a Machiavellian monarch, Henry V. Tennenhouse points out that the history plays, including *Henry IV, Part 1*, show "that authority goes to that contender who can seize hold of the symbols and signs legitimizing authority and wrest them from his rivals, thus making them serve his own interests" (121). Prince Hal "takes on a populist energy" (121) and "uses the strategies of disguise and inversion to occupy a range of positions" (122). He fulfills Machiavelli's admonition to mask his true nature and "be a great dissembler" (335). Unlike Macbeth, the blunt man of action, Hal is a consummate actor, possessing a chameleon-like quality for blending into his

surroundings so that he seems completely natural in any environment. Stephen Greenblatt points out a direct parallel between the qualities embodied by Hal and the nature of the monarchy in Elizabethan England and further posits that both Hal and the monarchy are reflected in the dynamics of the theater:

To understand Shakespeare's whole conception of Hal, from rakehell to monarch, we need in effect a poetics of Elizabethan power, and this in turn will prove inseparable, in crucial respects, from a poetics of the theatre. ... Royal power is manifested to its subjects as in a theatre, and the subjects are at once absorbed by the instructive, delightful, or terrible spectacles, and forbidden intervention or deep intimacy (44).

As a future king, Hal is not only a "safe" choice, like Malcolm, but a desirable one. According to David Berkeley and Donald Eidson, "The main theme of *Henry IV, Part 1* is the politic concealment and exhibition of seminally transmitted virtue" (28). An important part of Hal's kingly qualifications is his ability to dissemble. In a comparison of Hotspur and Hal, Anthony La Branche points out Hal's pragmatism: "Even as a specialist in honor Hotspur is superseded, by a man who is a better warrior and also more perfectly balanced in matters of honor and courtliness. But it is clear that Hal has accepted these values only on occasion and as an instrument to a special end" (379). He adds that Hotspur "has not yet awakened to the 'new' methods and attitudes as Hal has done" (379); rather, Hotspur represents an older, dying order.

In her fascinating study of the uses of credit in the Henry plays, Nina Levine uses the extension of credit and the development of contracts as a model for Hal's relationships with his public:

early modern credit relations offer a useful model for understanding the complicated interplay between economics and politics in the Henry IV plays. Credit relations not only provide a means of materializing and historicizing Lancastrian economic language in ways that open up its political implications; they also direct attention to an

alternate locus of authority within the plays and, with it, an alternate form of obligation, centered not in the lineal succession of dynastic rule but in the heterogeneous networks of the economic community" (412).

She sees the play as one that "turns on problems of debt and obligation" (413). Hal's forays into the world of his future constituents enable him to obligate them to him and force him to understand his obligations to them. Levine makes the instructive point that, because Henry IV's credit is not particularly good, i.e. he usurped the throne from Richard II, Hal must seek another means of establishing his credit with the English people: "And it is, in fact, to the marketplace and not to his heritage that the prince returns to redeem his name, renegotiating a troubled inheritance within the flexible structures of credit and commerce" (416).

It is in the marketplace, represented by the tavern, then, that Hal uses his ability as an actor to establish his credit with the "masterless" men who will one day support him. Falstaff's repeated references to "when thou art king" (1.2) may be seen, in Levine's terms, as his attempts to establish credit with the future king. In his soliloquy Hal calculates the effect of his deliberate withholding of his kingly nature until a time when it will be better appreciated:

Yet herein will I imitate the sun,
Who doth permit the base contagious clouds
To smother up his beauty from the world,
That when he please again to be himself,
Being wanted he may be more wondered at
By breaking through the foul and ugly mists
Of vapors that did seem to strangle him
(1.3.150-156).

Here Hal expresses his conscious effort to appear as he is not, so that when he chooses to reveal himself, the world will be both astonished and appreciative. Similarly, "Elizabeth, an unflinching pragmatist, exhibited a genius for apparent consultation and compromise among disputing constituencies, a talent that paradoxically secured and increased her own power" (McDonald 304).

Hal seems positively to enjoy acting. He proposes to Poinas that they tease the waiter Francis, then offers a satirical imaginary dialogue between Hotspur and Kate, then suggests that they summon Falstaff so that they can enjoy Falstaff's version of the botched robbery (2.4). In all of these activities, he seems to be weighing the manipulability of men and storing away his conclusions for future reference. He hides Falstaff from the sheriff, but he also promises to go to court in the morning and to reimburse the robbery victims with interest (2.4.438-441). Although he seems here to be acting as a responsible future king, we might ask ourselves whether he is doing this primarily to enhance his image for Peto's benefit.

In conversation with his father, Hal strikes the proper note of contrition. He also promises that he will exceed the virtues of Hotspur: "For the time will come/That I shall make this northern youth exchange/His glorious deeds for my indignities" (3.2.144-146). Hal's strategy of acting as a prodigal son is effective. In relaying Hal's challenge to Hotspur, Vernon comments on Hal's seeming transformation:

He made a blushing cital of himself,
And chid his truant youth with such a grace
As if he mastered there a double spirit
Of teaching and of learning instantly (5.2.61-64).

Hal has succeeded in being valued for his own sake, not merely as the present king's nominee. Ever self-conscious of revealing his true feelings, he explains his behavior to Hotspur's corpse: "If thou wert sensible of courtesy,/I should not make so dear a show of zeal;/But let my favors hide thy mangled face;/And, even in thy behalf, I'll thank myself/For doing these fair rites of tenderness" (5.4.94-98).

Hal survives the battle and receives great acclaim, while Macbeth dies and is characterized as a "butcher." The difference in their fates rests largely on their varying abilities as actors. Had Macbeth possessed Hal's gift for dissembling, his grasp of Machiavellian principles, he, too, might have been a popular

ruler. But Macbeth's story is also an emblem for the reign of James I, who sought to privilege primogeniture over popular support, while Hal derives his life from the age of Elizabeth, a period of broader definition of the qualities that befit a monarch.

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Linguistic Analysis of Fronted [ɔ]: A Community Approach

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ABSTRACT

Given the dense, multiplex nature of this campus, it follows that the linguistic norm, whatever it may be, will be enforced very strongly. Thus, the longer someone is in the speech community, and the more involved he or she is in the community, the more aware of and influenced by these norms he or she would be. This level of involvement can be gauged by considering a series of factors, including campus involvement, linguistic reference point, and allegiance to hometown. In this paper, I will prove that the more an informant is involved in this language community, the less he or she uses the fronted [ɔ].

INTRODUCTION

The community of The College of New Jersey provides a fascinating group of students from all over the state and of various economic, ethnic, and regional backgrounds. Because New Jersey is situated between two major cities, New York and Philadelphia, New Jersey residents typically look to one of those two places as their linguistic reference point. In this study, I will focus on the pronunciation of the vowel [ɔ]. Some students force the vowel to the front of the mouth in a process called “fronting.” The fronted vowel is a hallmark of speech in some areas of South Jersey, which typically looks to Philadelphia as its linguistic reference point. Students from North Jersey, who look to New York, do not front the [ɔ].

The basic hypothesis tested in Leslie Milroy’s study in Belfast, Northern Ireland,

and my own is that “closeness to vernacular speech norms correlates positively with the level of integration of the individual into local community networks” (Milroy, 134). Thus, the more active in the community a student is, the more he or she adheres to the prestige. In my study, I aim to prove that the pronunciation of [ɔ] as a back vowel, not as a fronted vowel, is the prestige speech form for those who normally front the vowel, but the vernacular as well as the prestige for everyone else. This suggests that New York has more “linguistic pull” than Philadelphia.

The dense and multiplex nature of the campus community of The College of New Jersey allows it to serve as a “norm enforcement mechanism” (Milroy, 50). The size of the school, about 3,600 on-campus residents, is small enough that a student can know most people, and know all people through other contacts. This results in a dense web of contacts. Students at this college live and work together, thus serving several capacities as friends, roommates, neighbors, co-workers, and classmates. TCNJ is also a multiplex community, since each person fulfills several relationships for other people. It’s possible for students to remain in the community to have most needs met. Lesley Milroy’s work in Belfast, as well as my own, centers upon the notion that communities affect language: “differences in network score are related to differences in linguistic score” (Milroy, 150).

Because there are such limited options for which form can be the prestige, and given the dense, multiplex nature of this campus, it

follows that the linguistic norm, whatever it may be, will be enforced very strongly. Thus, the longer someone is in the speech community, and the more involved he or she is in the community, the more aware of and influenced by these norms he or she would be. This level of involvement can be gauged by measuring a series of factors, including number of years in the community (length of exposure to norms) and degree of participation in the community (strength of exposure to norms). Attitudes toward New York and Philadelphia were also taken into account as shaping an informant's relationship to the prestige pronunciation.

Introduction to Methodology

The main concern Leslie Milroy had when she set out to study the linguistic patterns of the working-class communities in Belfast was the effect observing the system would have on the system. When people are conscious of being taped, they tend to modify their speech away from the vernacular, making study of their everyday language difficult, since their most pure and typical registers were being "corrected." Access to the vernacular was thus in small windows of opportunity—when the informants were distracted, upset, or unaware of the taping being done, and otherwise momentarily lapsed into their normal speech.

In the most casual segment of the interviews, I encouraged the participants to speak as freely as possible. In the article *Field Methods of the Project on Linguistic Change and Variation*, William Labov defined conversation in terms of modules, or topics that typically evoke an emotional response. Modules that were touched on in conversations with informants included: "friends," "dating," "school," "future," and "language." Discussing these topics did much to distract informants from being self-conscious. Informants slipped into their vernacular speech as they got wrapped up in their stories.

In addition to providing instances of everyday speech, these modules revealed much about where an informant's point of

linguistic reference might be. Responses to the question "*Where do you see yourself in 10 years?*" for instance, spoke much about their pronunciation and how tightly they held onto their accent. How informants evaluated their own accent ("*Have you ever been teased for how you speak?*") reveals much about stigma and prestige.

From Milroy's study, we can conclude that during certain "speech events" and under certain constraints, informants will "modify their speech away from the vernacular" (Milroy, 106). Familiarity with the norms of this particular language community will prompt speakers to correct their speech in the direction of the prestige variety. To elicit this "corrected" response, I had informants read a short word list. This was more formal than the informal "story-telling" parts. Informants concentrated on pronunciation of each word, which revealed under which phonemic environments fronting would occur. To elicit the most formal, careful response, informants read a poem. The even rhythm, regular rhyme scheme, and constant tempo did not distract the informants while reading it, so all attention was on the pronunciation of the words. The fact that it was a famous poem made the informant even more conscious of his or her speech, as the great formality of the speech demanded a certain level of polish and deliberateness.

Milroy argues that "speakers can only know the pronunciation of vowels if they have some knowledge of the linguistic norms of the speech community" (Milroy, 105). I believe the students at TCNJ are fully aware of the linguistic norms of their speech community, given the highly academic nature of the setting, and the fact that there are only two possible vowel pronunciations, so only one can be the prestige form. Reading word lists and poetry out loud is appropriate because this population is highly literate. As an academic community, there is a high premium on reading and speaking skills. Having informants speak and read on tape, is, in effect, asking them to demonstrate

what they believe to be the prestige pronunciation on this campus.

METHODOLOGY

I interviewed 40 TCNJ students, ranging in age from 18–22 years. Their proximity to Philadelphia ranged from very close (about 10 minutes away) to very far (opposite side of the state).

Excluding a series of background questions asked in the beginning, the interview process consisted of three stages. The first stage was a “story-telling” session, during which the informants were encouraged to relate a favorite anecdote or discuss an event of emotional importance. Because I am a peer and in many cases, a “friend of a friend,” informants felt comfortable talking to me. I transcribed these interviews and measured the vowel in question using PRAAT software. Fronted [ɔ] is defined as any [ɔ] in which the second formant, which measures a vowel’s location in mouth, from front to back, exceeded 1200 Hz. I then calculated the percentage of times the [ɔ] was fronted using this formula:

Number of times [ɔ] was fronted

Total number of words containing this vowel
X 100 = Percentage of fronting for “stories.”

The second stage involved reading a list of 15 words containing this vowel in various linguistic environments, including in open and closed syllables, and after various vowel and consonant combinations. The “word list” percentage was calculated using this formula:

Number of times [ɔ] was fronted

15 X 100 = Percentage of fronting for “word list.”

For the third and final stage, I had the informants read a poem, “A Poison Tree,” by William Blake. I used the same formulas used for calculating the percentage of fronting for “stories” and a percentage was arrived at for “poem.”

Informants were also asked to describe a typical person from New York, as well as a typical person from Philadelphia. They were

also asked a) which city they would rather work in, and b) working in which city carries more prestige.

“Percentages of fronting” were plotted against community involvement, or “C.I.” scores. These scores were obtained by awarding points based on the following system :

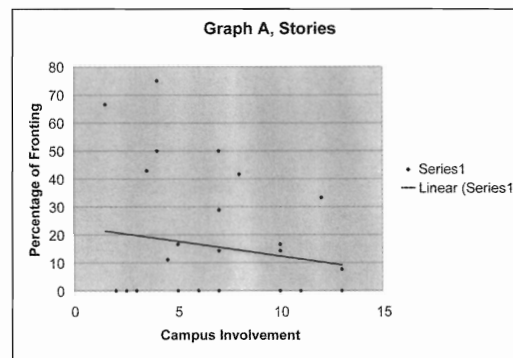
- number of years at TCNJ (1 pt. for first-year students, 2 for sophomores, etc.);
- number of on-campus jobs;
- number of clubs and/or sports;
- presence on the Dean’s List.

Here, I used my familiarity with the TCNJ community to award extra points for activities I know are more time consuming. For example, two points were given for participation on the cross country team, but only one point for being a member of the Rugby team. As demonstrated in the graphs, the more involved on campus an informant was, the less he or she fronted the [ɔ].

RESULTS

As the graphs demonstrate, the percentage of fronting tends to be highest during the most informal part of the interview (graph A). This result was as expected, since during casual speech, people tend not to monitor their accents.

Figure 1.



Of the two most formal parts of the interview, for 75% of the participants, the rate of fronting was higher in the poem (graph C) section than in the word list section (graph B). I would account for this because the word list was short, only 15 words, so careful

Figure 2.

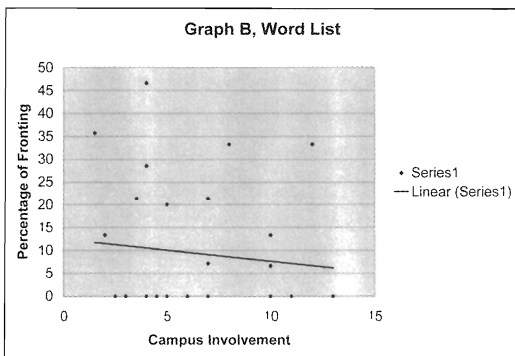


Figure 3.

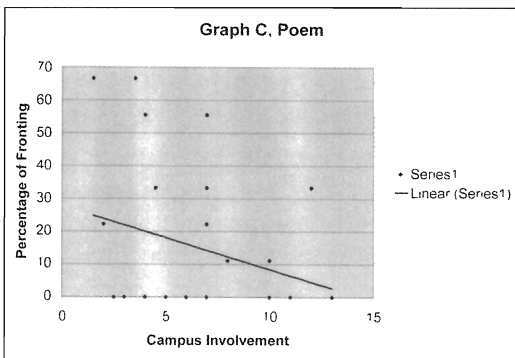
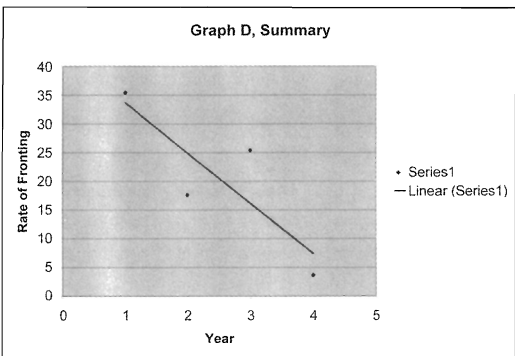


Figure 4.



attention could be paid to each word. The poem, however, was longer; thus less attention could be paid to careful pronunciation.

Also, the longer a student had been in the linguistic community, the less he or she fronted the back vowel [ɔ]. As graph D shows, there is a downward trend in the rate of fronting from the first year, which had a class average of 35.45%, to the senior year, which had a class average of only 3.66%.

Finally, there is an inverse relationship between a student's Campus Involvement

Index (C.I.) and the rate of fronting: overall, people with higher C.I.s also tended to have lower fronting rates. While the relationship between C.I. and rates of fronting in "stories" and "word list" was statistically insignificant, the relationship between C.I. and the rate of fronting in the "poem" section was very significant.

The Pearson Correlation for "stories" was $-.267$. For "word list," it was slightly better, at $-.361$. Thus, both were statistically insignificant. For "poem," however, the correlation was $-.708$, which is statistically significant.

A regression analysis yielded a constant of 62.014 , and a coefficient of -5.5053 . Using these figures, I constructed a prediction equation to predict the average rate of fronting (in the "poem" section) based on the C.I. Index:

$\text{Rate of Fronting} = 62.014 - (-5.5053)(\text{C.I.})$. For example, if a student has a C.I. Index of 7, then by substituting $\text{C.I.} = 7$ into the equation, the student would likely have a rate of fronting of 26.643% (on average). This is consistent with the data in chart 1.

DISCUSSION

What is the prestige?

The basic premise for this study is that the non-fronted pronunciation of [ɔ], here defined as measuring less than 1200 Hz on PRAAT, is the prestige pronunciation on this campus. This particular pronunciation is associated with the speech of northern New Jersey, which looks to New York as its linguistic reference point.

How do we know it's the prestige?

We can deduce that this pronunciation is the prestige purely from the graphs. Students from south Jersey invariably "corrected" their speech from their vernacular pronunciation to the non-fronted pronunciation. This was an unconscious betrayal of the prestige: in certain speech events, participants modify their speech "away from the vernacular" (Milroy, 106), and toward what is considered the prestige variety. Conversely, students from north Jersey never deviated from the non-fronted

Table 1:

Student Number	Total for C.]	% stories	%list	% poem
1	5	0	0	0
2	4	0	0	0
3	2	0	0	0
4	4	0	0	0
5*	4	0	0	0
6	6	0	0	0
7	6	0	0	0
8*	4	0	0	0
9*	3	0	0	0
10*	3	0	0	0
11	4	0	0	0
12*	10	16.6	6.6	11.1
13*	7	50	0	22.2
14*	8	41.6	33.3	11.1
15*	5	16.6	20	0
16	5	0	0	0
17	3	0	0	0
18	5	0	0	0
19*	13	7.69	0	0
20*	2	0	13.3	22.2
21*	4	50	46.6	55.5
22*	7	28.846	7.143	55.5
23*	4	75	28.571	55.5
24*	1.5	66.6	35.714	66.6
25*	2.5	0	0	0
26*	3.5	42.857	21.429	66.6
27*	4.5	11.1	0	33.3
28*	5	0	0	0
29*	7	14.286	21.429	33.3
30	5	0	0	0
31*	10	14.286	0	0
32	3	0	0	0
33	6	0	0	0
34	11	0	0	0
35*	10	0	13.3	0
36	12	33.3	33.3	11.1111
37	7	0	0	0
38*	5	0	0	0
39*	6	0	0	0
40	13	0	0	0

bold font = self-identified as being from North Jersey

regular font = self-identified as being from Central Jersey South Jersey

* = self-identified as being from South Jersey

[ɔ], as they did not feel a need to “correct” their speech; their vernacular is the prestige.

The degree to which south Jersey residents maintained the fronted varied according to their community involvement, as well as from one part of the interview to another. The more active a participant is, the less likely he or she was to front the [ɔ] during “poem” section. During the most informal parts, the rate of fronting tended to be highest. This is in keeping with the findings of Leslie Milroy and William Labov: when participants become emotionally involved in telling a story, they pay less attention to their accent.

There was a dramatic difference in the rate of fronting from the casual portion to the more formal parts. On the whole, rates of fronting decreased from “stories” to “word list,” and from “stories” to “poem.”

Surprisingly, 75 percent of the participants fronted more in the most formal interview, the “poem,” than the less formal part, “word list.”

Discussion of accents also yielded proof of what pronunciation was the prestige, as well as if there was a stigma attached to the south Jersey vernacular pronunciation. When asked if they had been teased for their accent, most participants from south Jersey responded yes. They seemed particularly weary of the words “phone” and “home,” as they were the words most cited by north Jersey residents. This would account for the lower rates of fronting in the “word list” section: the first word on the list, “home,” made them extremely aware of their accent.

Why is this the prestige?

People refer to particular linguistic reference points because they somehow wish to align themselves with whatever values or attributes those areas represent. Associated with New York, in addition to many favorable traits, is the notion of wealth and success (chart 3). Using New York as a linguistic reference point (i.e., speaking like a New Yorker, or in this case, pronouncing “O” like one), thus represents a desire to associate one’s self with those traits.

Participants were asked to describe a typical person from New York, and a typical person from Philadelphia. Everyone had an adjective to describe New Yorkers. The most typical phrases were “on-the-go,” “busy,” and “fast-paced.” Most participants from northern New Jersey, however, could not describe a Philadelphian. Only south Jersey residents could describe someone from Philadelphia, and those who could tended to be from right outside the area. The most common adjectives were: “toned down” and “chill,” “calmer” and “friendlier.” The general consensus was that they are either nicer, or merely less intense than New Yorkers. The words used to describe those from Philadelphia had more to do with personal attributes, while the words describing New Yorkers had more to do with action.

Connected to the idea of being from New York was the idea of being motivated, which

suggests success. When asked the question “in which city would you most likely work?” A number of people responded with remarks on the socioeconomic difference between New York and Philadelphia: “Philly has less money, and more poor”; “New York is more prestigious, because it has more money”; “New York has more resources.” One participant described the typical person from Philadelphia as “unemployed, living in low-income housing.” Thus, linked to New York is the idea of being motivated, successful, and rich, while associated with Philadelphia is the notion of having less money, and hence, being less successful.

Competing with the desire to align oneself with these values is the strength of the allegiance to one's hometown. Questions such as “where do you see yourself in 10 years?” yielded responses from “as far away as possible” to “exactly where I live now.” The less wedded the participant is, the more likely he or she is to correct accent—they want to get small-town feel out of their voice. Students who did not want to stay close to home at all had high levels of campus involvement and were less inclined to front [ɔ]. Students who were interested in staying close to home, however, had lower levels of campus involvement and were more likely to front [ɔ] (if they were from South Jersey). Thus, students with strong ties to a hometown strongly held onto the patterns of their local linguistic reference point, and those who planned on traveling further adopted the linguistic patterns of New York.

CONCLUSION

In conclusion, the longer and more involved an informant is, the less he or she will front the back vowel [ɔ]. This points to the prestige pronunciation on this campus, and reveals New York, and the desire to align oneself with certain values and traits associated with New York, to have more “linguistic pull” than Philadelphia.

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Enlightened Loyalist to Proud Patriot: Benjamin Franklin and the Great Shift of Allegiance

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ABSTRACT

This paper analyzes Benjamin Franklin's changing outlook toward the British Empire between the critical years of 1765 and 1775—the tumultuous period immediately prior to the outbreak of the American Revolution. Drawing upon both primary and secondary sources, “Enlightened Loyalist to Proud Patriot: Benjamin Franklin and the Great Shift of Allegiance,” explores the complex nature of Franklin's transformation during an era rife with chaos and differing political ideologies. More importantly, by reconsidering the phases of his transformation—in light of the several recent scholarly monographs devoted to the ever-popular Franklin—it seeks to provide a comprehensive discussion on the ways in which his position reflected broader shifts with regard to how the American colonists conceived of their relationship with Great Britain.

Essentially, this essay examines and discusses key elements of Franklin's original writings, which illustrate the stages and the ramifications of his gradual shift of allegiance. In the process, it also offers insight into why his change in philosophy occurred and expounds upon this crafty and versatile man's political involvement in the larger scheme of world affairs. Finally, this paper compares the many ways in which Franklin struggled to justify his views toward life under English rule during the aforementioned years to gain a deeper understanding of his puzzling transition, along with the impact it had on the movement toward independence.

INTRODUCTION

Since the conversation your Excellency was pleased to honor me with, on the subject of *uniting the colonies* more intimately with Great Britain, . . . I have something further considered that matter, and am of the opinion, that such a union would be very acceptable. . . Your Excellency's most obedient and most humble servant, . . .

—Benjamin Franklin, December 22, 1754¹

You are a member of Parliament, and one of that majority which has doomed my country to destruction. You have begun to burn our towns, and murder our people. Look upon your hands! They are stained with the blood of your relations! You and I were long friends—you are now my enemy—and I am yours.

—Benjamin Franklin, July 5, 1775²

At the onset of the War of Independence, Benjamin Franklin ardently supported the patriot cause. Yet, for much of his life he loyally supported the vast British Empire. For many years, Franklin considered Great Britain to be his homeland, often appearing more suited to the leisurely lifestyle of a dignified Englishman than that of an ordinary American colonist. Once he had his first taste of luxuriant life in England—a lifestyle “he learned to enjoy considerably”³—nothing else would suffice, or so it seemed, for he planned to retire to London. For countless years he assumed that what was beneficial for the British Empire was also in the best interests of the American colonies, and vice versa. It was not until the eve of independence that Franklin outwardly disavowed his allegiance to the Crown and hurled himself wholeheartedly into the war effort.

This transition was as a reaction to measures taken by the British Parliament, during the 1760s and 1770s. A close reading of Franklin's writings reveals the ways in which Parliamentary disputes and the constantly changing political currents of colonial America compelled Franklin privately to repudiate his loyalty to the Crown much earlier than scholars such as H. W. Brands and Edmund S. Morgan suggest.⁴ Franklin did not merely rise one morning from a long, pleasant night's slumber and decide to rebel. A sudden change of this magnitude would have been well out of character for Franklin. Although Franklin's metamorphosis from loyalist to patriot may appear sudden, as if he had an epiphany, in reality his conversion occurred over the course of several decades.

When one considers the strong possibility that Benjamin Franklin had nothing to lose and seemingly everything to gain from remaining dedicated to the monarchy, his transition becomes even more puzzling and, at the same time, provocative. The fact that he was willing to sever his many ties to England for the American cause sheds considerable light on the depth of his character. The purpose of this paper is to analyze Franklin's changing outlook toward the British Empire during the critical years 1765–1775—the turbulent period immediately prior to the outbreak of the American Revolution. Drawing upon both primary and secondary sources, I interrogate the stages of Franklin's previously unexplained transformation from an enlightened British loyalist to an impassioned American patriot during an era rife with differing political ideologies, along with the implications it had on the movement toward independence. More importantly, by reconsidering the phases of his transition, my work seeks to disentangle his evolving position and provide a comprehensive analysis of the ways in which it reflected broader shifts occurring simultaneously in the minds of the American colonists with regard to their perception of the Anglo-American relationship.

As historians have long recognized, the movement toward independence from England was far from a straightforward, linear process. The ever practical and rational Franklin labored over his decision to embrace revolutionary patriotism; it undoubtedly brought him intense emotional anguish. In the words of one writer, “few happenings in Franklin's life caused him any more anguish or occupied more of his time than the deepening dispute between Britain and the colonies after 1764.”⁵ How and why he changed so radically from being a dignified loyalist to a passionate patriot and ardent defender of the American cause is, strangely enough, still not altogether clear. The majority of existing secondary historical literature does not analyze—at least in satisfactory depth—his transformation.⁶ In the years leading up to 1765, Franklin was unstintingly loyal to the British Empire. By 1765, however, after Parliament introduced policies designed heavily to tax the American colonies in order to reduce Britain's debt from the Seven Years' War, he began to have serious doubts about remaining devoted to the British cause. After 1765, Franklin no longer was committed wholeheartedly to the empire. Rather, he demonstrated loyal opposition to the monarchy through a series of essays to the British press. Although Franklin did not actively resist Parliament and support the movement toward rebellion until after 1770, it is clear that thereafter he was the colonists' most vocal advocate, gradually becoming a formidable adversary of the Crown.

Benjamin Franklin symbolizes a legendary rags-to-riches American dream come true. A “harmonious human multitude,” and a distinguished self-made man of science, letters, philosophy, and statesmanship, Franklin seemingly represented nearly everything distinctly American, especially throughout the latter part of his life.⁷ His superior writing skills, coupled with an exquisite combination of wit and political savvy, enabled him to emerge as an eminent spokesperson for American values, and ultimately to become

one of the nation's most famous founding fathers. Over the course of his lifetime, the dynamic Franklin transformed his argumentative style of writing into a refined instrument of diplomacy. Perhaps with the exception of Abraham Lincoln, no key political figure of the past few centuries was more adept at garnering popular support for his ideas through persuasive writing than Franklin, one of the "finest prose writers in the colonies."⁸ Even today, Franklin's words speak volumes about the ways in which enlightened individuals can better their lives and, more significantly, contribute to the community at large through hard work, honesty, industry, and frugality. His pithy and unpretentious prose easily engages both the casual reader and the professional historian. As J. A. Leo Lemay explains, Franklin always remained aware of three key considerations: the personal characteristics of the writer and the recipient, the nature of the relationship between them, and the occasion.⁹ Moreover, "It is only by a continuous reading of the entire body of Franklin's Revolutionary writings, from grave to gay, from lively to severe, that any one can know how brilliant was his wisdom."¹⁰ For these reasons, Franklin's letters and many of his other writings play an integral role in helping contemporary readers understand the ways in which his views, as well as those of the American colonists, gradually evolved over long periods of time.

As Antonio Pace writes, "Franklin fitted perfectly into [the] rose-tinted concept of America as a fountain of youth for humanity, and of the American Revolution as a decisive rejection of the corrupt Old World."¹¹ Verner Crane attests, "it is probable that no other American wrote so frequently upon the issues of the quarrel" between the British and the colonists.¹² Although Franklin was a prolific writer, he also was an active politician. Because Franklin was the intellectual architect of the independence movement, it is imperative to trace the under-acknowledged change in his philosophy. Comprehending

the impetus behind his shift is crucial to achieving a more thorough understanding of his overall perspective on life and the liberty of mankind. Viewed through the lens of imperial resistance, an important, albeit often overlooked facet of Franklin's legacy becomes much clearer. That said, let us now take a journey through time, into the late 1700s, and capture the intense emotional climate of the initial stages of Franklin's transformation, along with its far-reaching impact on America's pivotal struggle for independence.

February 1765 marked a change in Franklin's attitude toward the British Empire. This is most evident in his writings on the disadvantages of Britain's taxing its American colonies. Along with three colleagues in London, Franklin met with Prime Minister George Grenville to argue against Parliament's plan to impose an onerous tax on all printed items in the colonies.¹³ Normally a staunch supporter of measures that would potentially benefit the British Empire, Franklin sensed the level of opposition to the proposed tax from the American colonists.¹⁴ Six months later, Franklin described the impact the stamp tax would have on the colonists. In his opinion, the colonists did not enjoy the same freedoms as Englishmen and were subject to many hardships. He further alleged that in all likelihood the new tax "would be extremely grievous."¹⁵ In response to Englishmen who accused the colonists of being ungrateful and disloyal to the Crown, Franklin wrote that "all the colonists have the most grateful sense of the assistance that has been granted them, and are as loyal subjects as any the King has." As a result, "they are to be commended for their opposition" to the plan of taxation under consideration, for they "do no more than what every good member in the British Parliament would do in the same circumstances."¹⁶ This letter is important in that it is one of Franklin's first essays which illuminates his belief in the colonists' right to voice their opposition to Parliament's imposition of burdensome new taxes. Above

all, it signifies a notable change in his outlook on the interrelationship between Great Britain and its colonies.

In another letter, Franklin reiterates that the colonists are “thankful for the favours they have received; have always had a great respect for the Parliament, and love good order and government.” He adds that even when expressing their disapproval of the proposed tax, the colonists are a reasonable people who have shown a “great effort of virtue, in not suffering their respect for the mother country” to abate.¹⁷ Clearly, then, Franklin believed the colonists were not attempting to undermine Parliament’s authority to enact laws applicable to English subjects, but rather were asserting their right to oppose new taxes as loyal constituents of the Crown. It is evident, nevertheless, that he realized he must not further anger those in England by implying that the colonists should rebel against Parliament. For this reason, Franklin made a conscious effort to stress the colonists’ willingness to abide by any policies set forth by Parliament as long as the laws did not bring undue hardship upon them.

In a December 1765 essay, Franklin argues, contrary to the popular opinion in Britain at the time, the American colonists are not “slaves” of the British nor did they deserve to be treated harshly or unfairly by Parliament.¹⁸ More than that, he gently but firmly reminds his readers that the first settlers of the colonies were, in fact, English gentlemen of fortune who, to that juncture, remained loyal to the King of England and retained “as high a sense as any Briton whatsoever.” Franklin contends that the colonists should be treated with decency and candor. He asserts that they are neither rebellious nor particularly anxious to become independent from the mother country. Writing as an Englishman, Franklin explains, “The Americans, I am sure, for I know them, have not the least desire of independence,” and he then expressed his hope “to see prudent measures taken by our rulers, such as may heal and not widen our breaches.”¹⁹ With this

letter it becomes apparent that even though Franklin still considered himself to be more of a British subject living in an English empire than an American diplomat and ideologue, with each passing day he was becoming increasingly aware that the colonists’ position must be supported. Franklin understood that many in Britain harbored more than a few damaging misconceptions about the colonies. At this stage of his conversion, however, he was only beginning to have doubts about his allegiance to the Crown. His transformation would not be complete until nearly a decade into the future.

Not every British subject in America viewed the imperial relationship in the same way. As early as 1764, some colonists began expressing the idea that the inhabitants of one region should not exercise control over those of another, even if the two areas were joined. According to one historian, “within a year or two the idea was extended to a denial that Parliament, representing the electors of Great Britain, could exercise any authority over the colonies.” Franklin’s posture later in 1766 more clearly reflected this broad shift in the colonists’ outlook on imperial-colonial relations.²⁰ Some of Franklin’s contemporaries, most notably Thomas Jefferson, James Wilson, and John Adams did not voice similar views until 1775.²¹ This constitutes one of the core reasons why Franklin, rather than his contemporaries, ultimately emerged as the voice for American independence.

Hostility to the passage of the Stamp Act was “unexpectedly extensive and deep.”²² It created a hotbed of dissention within the colonies—of which Franklin was well aware. As one colonial leader exclaimed, “This single stroke has lost Great Britain the affection of all her colonies.”²³ Historian Eliga Gould explains, “Supposing themselves to be equal members of a greater British nation, colonial polemicists initially responded to the Stamp Act by demanding that they be accorded the same rights of taxation and representation they assumed belonged to the British people in general, no matter where within the king’s

extended dominions they resided.”²⁴ Franklin knew that the colonists “would never submit to a direct tax by a [legislative] body in which they had no representatives.”²⁵ Although Franklin realized that the rise of radical opposition groups, such as the Sons of Liberty, created the framework for collaborative resistance,²⁶ he also assumed that these organizations developed a solid foundation for future violent action. For this reason he began actively to encourage the royal government reconsider to the colonists’ protests brought forth by his fellow statesmen.

Franklin conjectured that, unlike other measures previously enacted by Parliament, the Stamp Act “forces the money from the [colonies] under heavy penalties, and denies [them both] common justice in the courts” and adequate opportunity in Parliament to voice their views. To Franklin it was clear that the Stamp Act must be repealed, as he argued primarily from the viewpoint of the colonists. *This shift is significant, for it highlights the degree to which Franklin’s perspective as a political author had evolved.* In much of his past correspondence, Franklin had written from the standpoint of an English citizen. Beginning with this essay, however, his compositions reflect his growing concern that the colonists were being oppressed by “laws made by a legislature in which they [are] not represented.”²⁷ In short, his entire outlook was evolving in that he no longer blindly supported all measures taken by Parliament, even if they potentially could benefit the people of Great Britain, without analyzing how such initiatives might impact the colonists.

During the middle of February 1766, Franklin was interrogated by the Committee of the Whole of the House of Commons regarding the consequences of the Stamp Act. Franklin explained to the British governing body how America’s views toward Great Britain had changed considerably since the early 1760s, when most colonists looked favorably upon the Crown. Despite

the intense hearing, which was a barrage of 174 questions, Franklin remained unfazed and continually argued on behalf of the colonies.²⁸ His efforts were not entirely in vain, for the Stamp Act was repealed soon after. A pamphlet of the proceedings was later published, and in the words of Moses Coit Tyler, it is “the result of a most consummate piece of political and editorial craftsmanship on the part of Franklin himself—a master...in the art of touching the springs of popular conviction and sympathy.”²⁹ Another scholar likewise remarks, “[I]t was a remarkably able piece of pro-American propaganda” which Franklin used forcefully to defend the colonists.³⁰ Demonstrating remarkable mental agility, Franklin single-handedly thrust the American cause to the fore and assisted the colonists in having the Stamp Act repealed. *More importantly, Franklin’s attitude during the interrogation marked a considerable turning point in his steady transition.* Franklin proved he no longer was a loyal subject of King George III, but rather an advocate of the colonists.

As Edmund S. Morgan argues, “the advent of Parliamentary taxation inaugurated a quarter century of political discussion in America that has never since been matched in intensity.” “[T]he ongoing imperial debacle “posed continental, even global, problems that called forth the best efforts of the best American minds.” Tall among the distinguished intellectuals who “steered Americans through the Revolution” stood Benjamin Franklin.³¹ Morgan explains that many of Franklin’s contemporaries found inspiration in the ideas of a small but influential set of 17th century Englishmen who had developed their own republican political theories. These ideologies conflicted sharply with the ideals of the Crown. The English thinkers contended that the monarchy was betraying the British constitution, which they believed espoused republicanism.³² It also has been speculated that the American intellectuals admired the works of James Harrington and Thomas Paine, “the

contemporary exponents of republicanism,” whose writings reflected their strong sentiments. Harrington’s *Oceana* and Paine’s *Common Sense* were widely circulated among Franklin’s contemporaries.³³

Colin Bonwick notes that in the late 18th century the American colonial mind “was diverse and maturing rapidly.”³⁴ Numerous colleges as well as the American Philosophical Society were founded in the years leading up to the Revolution. Education played a prominent role in the lives of most male colonists. The American people were intelligent and most educated men had access to the radical texts of the period. Although we cannot know for certain if Franklin actually read them, such works may have planted the seeds of rebellion in the minds of the colonists.

The colonists became disillusioned with Parliament once they believed that it was not adequately representing their interests and this was no coincidence. As one scholar explains, republicanism often is considered to be the primary organizing principle of American Revolutionary theory. Franklin later joined the colonists who repudiated their allegiance to the Crown, as he consciously chose to represent and defend their position. The colonists’ views were the source from which Franklin derived his intellectual energy. In essence, Franklin’s shift reflected the large-scale changes that were evident in the colonists’ attitudes toward the interrelationship between their mother country and themselves.

As the imperial crisis deepened, Franklin often explained that even though he still wished to see a stronger union established between Britain and America, he recognized that many Americans wanted to separate from the Crown entirely, for they had grown disillusioned with the royal government. He asserted, “Upon the whole, I have lived so great a part of my life in Britain, and have formed so many friendships in it, that I love it and wish it prosperity, and therefore wish to see that union...on which it can be secured and established.”³⁵ He claimed that

to the Americans, in stark contrast, “the advantages of such an union [with Britain] are not so apparent.”³⁶ With a hint of petulance, he added that while the colonists still respected Britain, every oppressive act would sour their tempers and hasten their final revolt: “For the seeds of liberty are universally sown there and nothing can eradicate them.”³⁷

Franklin understood that the colonists were on the verge of rebellion. In this respect, it was clear that in order to avoid a civil war between America and Britain, Parliament had no choice but to address the colonists’ grievances. Now, Franklin strongly supported the colonists’ stance. It is no coincidence that one can trace the first emergence of an American national consciousness or sense of identity to Franklin’s initial defense of the colonial position. Although Franklin no longer envisioned himself as an imperialist, at this stage of his life he was not quite ready, at least publicly, to advocate a complete separation from the mother country or a rejection of imperial authority.

Privately, Franklin may have supported a colonial revolt. Yet he would not have acknowledged that sentiment to anyone save his closest friends and colleagues, especially while living in England. Franklin kept such thoughts silent, fearful of the implications of his beliefs. Otherwise, he risked being charged and convicted of high treason, an offense which most certainly would have led to a swift drawing, hanging, and quartering at the public gallows, as a warning to all. It was a dangerous chance that Franklin was not yet willing to take.

The colonists’ views on liberty and equality played a key role in their subsequent decision to rebel and declare their independence from England. They believed that since the institution of government “derived its authority from contract, it was essential that the citizens should be in certain crucial respects equal.” The sole purpose of government, according to the colonists, was to protect its citizens’ lives, privileges, and property.

If a government failed “in this primary purpose,” the colonists believed that they were entitled to repudiate their consent to its authority and create a new government.³⁸ This idea ultimately “underpinned the legal case for repudiating [their] allegiance to George III” and forming a new government. As one historian attests, at the heart of the colonists’ arguments against parliamentary taxation was their assertion that they “enjoyed the liberty or immunity from it.”³⁹ Franklin sympathized with the colonists’ anger toward the Crown, and around this time he began representing their interests more overtly in his writings.

Two months later, Franklin’s essay, “Benevolus,” was published. It harshly criticized Parliament’s ideas concerning the American colonies and its right to impose taxes upon them.⁴⁰ He also called attention to the false assumption that the previous two wars involving England were fought for the protection of the American colonists. Most importantly, Franklin rejected the idea that the colonists believed Parliament had no authority over them. He wrote that the colonists, in fact, had yet to question Parliament’s right to enact laws and regulations, with the one exception being the issue of raising money from the colonies through oppressive internal taxes.⁴¹ Ideally, the colonists should be allowed to submit portions of their money to the Crown *voluntarily* rather than be *forced* to grant money to the King through unreasonably high tax rates.

Even though Franklin publicly hoped for a stronger bond between America and Great Britain, by the middle of 1767 he realized that far too many obstacles stood in the way of such a union. Inwardly Franklin no longer wanted the colonies to strengthen their ties to the mother country. Always one carefully to cloak his innermost feelings in a shroud of mystery, it is no surprise that he would have kept such sentiments private. His internal debate undoubtedly left him feeling torn and distraught, yet no one close to America’s most dignified statesman seemed aware of it. As a

result, the precise time when Franklin reached the conclusion that the colonists must rebel remains contested.

A week later, on April 18, 1767, Franklin responded to an anonymous article in *The Gazetteer and New Daily Advertiser* whose author satirized the colonists’ attitudes toward the British Empire. In his response, Franklin poked fun at what he “believed” Prime Minister George Grenville and his supporters assumed to be right, wrong, and reasonable for the American colonies. As one editor of Franklin’s *Papers* notes, “Their ideas he represented as being quite as outrageous as those which the writer in the *Gazetteer* attributed to the Americans.” Using identical rhetorical devices, Franklin imitated the exact style and form of the author’s letter effectively to counter his argument.⁴²

In the first section of his paper, Franklin wrote that even though “we went to war with the French in America, merely on a dispute between the two Crowns, . . . and though you yourselves told us ‘you were in no danger from the French. . .,’ . . . it is *right*, O ye Americans! for us to declare we went there for *your defence*, at *your request* and charge you with all the millions spent. . . giving you no credit for the millions you spent in maintaining a number of troops equal to ours.”⁴³ This statement is noteworthy. It proves that while his writings may seem superficial and innocuous to the passing glance, he often conceals powerful messages behind his carefully chosen words. His derisive writing style is indicative of his underlying disdain for Britons’ notions of what was right and wrong with regard to imperial-colonial relations.

Franklin discussed the Seven Years’ War at length because he realized the colonists’ role in it lay at the heart of the imperial conflict. It was necessary, in his view, that the British be made aware of the ways in which the colonists’ intervention impacted the final outcome of the campaign. As two contemporary scholars indicate, after the war “the colonists looked forward to a more promising relationship with the empire.”

Unfortunately, “these hopes were dashed by a program of imperial reform.” As a result, the colonists acted “not against tyranny inflicted but also against tyranny anticipated.”⁴⁴

On the whole, Franklin employs his characteristic wit and sarcasm to shed light on the outrageous viewpoints held by the British concerning the American colonists. *Even more significant, the essay illustrates the progression in his shift of allegiance.* The tone of the piece is unmistakably defiant, and it conveys Franklin’s displeasure with Great Britain, more clearly than his previous writings. As 1767 drew to a close, an exasperated and at times utterly disgusted Franklin declared, “This nation is indeed too proud to propose admitting American representatives into their parliament; and America is not so humble, or so fond of the honor, as to petition for it.”⁴⁵ For a man so enchanted with England but a few years prior, Franklin’s perspective on British imperialism had changed radically. These writings, however, were only the first few in a long series of articles that he composed to acknowledge and defend the colonial position, as well as to express his own feelings of bitterness toward the country and people he once had cherished.

Shortly thereafter, in January 1768, British readers could find Franklin’s “Causes of the American Discontent before 1768” in their newspapers. It was, according to Verner Crane, “perhaps the most famous contribution by Franklin, after the Examination, to the propaganda of the American Revolution.”⁴⁶ It describes in great detail the various wrongs committed by Parliament against the American colonies after 1765 and further analyzes American sentiment toward the British monarchy. More specifically, Franklin assumes the role of spokesperson for the American colonies.

Upon highlighting the reasons why the colonists viewed Parliament in such a negative context, Franklin again begins writing from the perspective of an American: “For notwithstanding the reproaches thrown against us in [The British] public paper and

pamphlets, notwithstanding we have been reviled in their senate as rebels and traitors, we are truly a loyal people.”⁴⁷ This shows the degree to which his sense of national identity had changed since 1765, when he wrote almost exclusively from the perspective of an Anglophile. Franklin believed that it was his duty to transcend the prevailing public image of the colonists. Appealing to the emotions of Britons throughout the empire, he explained that he wished Parliament never would have driven the American colonists to such feelings of outrage and hostility. He believed that a rupture with Great Britain was forthcoming, the results of which would be catastrophic for the empire in its entirety. Franklin was not showing concern for England, but instead he was trying to persuade Parliament to end all sources of American agitation. In essence, his views were becoming more radical and less suited to that of an enlightened imperial expansionist who favored American autonomy within the empire.

Franklin believed as time passed, more and more citizens of the empire would repudiate Parliament’s right to rule the colonies—a rather bold assertion from the monarchy’s previously most loyal subject. Nevertheless, in his private correspondence, Franklin admitted, “There is nothing I wish for more than to see [the present dispute between Great Britain and the colonies] amicably and equitably settled.”⁴⁸ Although Edmund S. Morgan writes, “Franklin still loved England and the English,” I believe Franklin’s affection and respect for the nation he had proudly regarded as his home for many years had waned considerably in light of the recent events.⁴⁹ At the same time, it is worth noting that he did not long to witness its demise at the hands of the colonists. Nor did he wish to stand idly by and ignore the pleas of his true countrymen across the European side of the Atlantic. He tried to establish a mutually beneficial posture through his writings by continually urging American and British leaders to reach a compromise.

This serves as a testament to his character as a clever, open-minded diplomat. Franklin realized, though, that his strong ties to both England and America placed him in a rather difficult situation. His internal struggle forced him to confront one of the “most powerful, haunting, and brain-and-heart-cudgeling questions”⁵⁰ a man in his position could ponder—should he betray the Crown and the people he loved and risk his life to support the drive toward independence?

Franklin finally was ready to answer the question he had long tried to ignore. After years of advocating, in a variety of ways, for an end to the long-standing debacle, he declared, “I do not find that I have gained any point, in either country, except that of rendering myself suspected, by my impartiality; in England, of being too much an *American*, and in America of being too much an *Englishman*.”⁵¹ Franklin’s inherent loyalty and sense of national identity never again would be questioned, for soon after, unlike any of his predecessors or contemporaries, he hurled himself wholeheartedly into the American struggle for independence.

As Franklin’s able biographer, H. W. Brands, explains, “The fundamental problem was that any effort to subdivide sovereignty was almost certainly doomed to fail. Either Parliament was sovereign over the American colonies or it was not.”⁵² The year, 1770, denotes a critical period in which hostilities between the colonies and Great Britain continued to intensify. Franklin’s prose from this era underlays his awareness that the situation had become precarious. Over a span of two months beginning in January, he composed a series of 11 essays, each of which was entitled “The Colonist’s Advocate.” In one such paper Franklin lashes out at Parliament: “To assume that Title of the *Colonist’s Advocate* is to undertake the Defence of Three Million of the most valuable Subjects of the British Empire, against Tyranny and Oppression, brought upon them by a wrong-headed Ministry.” Franklin points to the fact that “the late fatal Rupture between us and our

Colonies, is owing to an Innovation [The Townshend Acts] introduced under the Administration of Mr. Grenville.”⁵³

Franklin, as always, remained adamant that Parliament’s policy of taxing the colonists without representing their interests in government was one of the main reasons why the tensions that existed between America and Britain had not been mitigated. At this point, he began to believe that a momentous American uprising was inevitable.

Perhaps Parliament had become too much of a thorn in Franklin’s side than even he could bear, for six months later, in a terse letter to Samuel Cooper, he explained that he no longer favored any type of union between Britain and America. The recent measures taken by Parliament were unconstitutional, and therefore, unacceptable in the colonists’ view.⁵⁴ *The message conveyed in this letter constitutes a shift in Franklin’s views regarding the benefits of living under British rule.* He declared sternly that Parliament was corrupt, “does not like us, and conceives itself to have an Interest in keeping us down and fleecing us.” Evidently to Franklin, living under British sovereignty no longer was in the best interests of the American colonies.⁵⁵ In November, 1770, his essay, “The Rise and Present State of Our Misunderstanding,” was featured in *The London Chronicle*. It carefully extrapolates and outlines the sources of American disgruntlement with its role and position in the British Empire. He wrote, “Harsh treatment may increase the inflammation, make the cure less practicable, and in time bring on the necessity of an amputation; death indeed to the severed limb, weakness and lameness to the mutilated body.”⁵⁶ He feared that if the royal government did not attempt to alleviate the tension and hostility, a bloody, tumultuous uprising would ensue, threatening to tear the once powerful British Empire asunder, and all but ensuring that the American colonies would break away from the mother country once and for all.

In this instance one can find Franklin’s ideas pervading American views on the

delicate balance of power between government and the governed. As historian I. Bernard Cohen argues, Franklin consistently set forth the American position to the British populace as *he* [my emphasis] viewed the situation.⁵⁷ His skills as a statesman at this phase of his career ultimately lay in his ability to transform the largely discontented, but hesitant colonists into a bolder, more unified group of individuals who were aware of their rights as citizens along with the wrongs being committed against them by Parliament. Perhaps more than anything else, this enabled them to push for revolutionary changes under American leadership. Moreover, there now were sharper undercurrents in Franklin's letters to the British press than there had been in previous years, which the editors had to "tone down."⁵⁸ The colonists, for the most part, understood they were being "represented by a man whose stature was proportional to the justice" and breadth of their claims.⁵⁹ Other than Franklin "there were few Americans who discovered so early that the crux of the dispute was an issue broader than taxation, namely the problem of Parliamentary sovereignty in the dominions."⁶⁰ Ironically, the man who often wrote extensively about the ways one should give back to the community—all the while earning a sizeable income as an entrepreneur—suddenly found himself serving society in a much more direct, altogether different role than he ever could have imagined. The bespectacled, soft-spoken printer from Boston was now the colonists' most outspoken advocate.

The figure of Franklin, already world renowned from his years as a scientist and philosopher, had become symbolic of the colonists' new identity and ideology. In retrospect, the ways that Franklin's stance toward the Crown and Great Britain changed, during the years between 1765 and 1770, are quite striking. His optimism for reconciliation, which "[characterized] the 1760s gave way to bitterness in the 1770s as affairs did not mend but became worse."⁶¹ Prior to 1766, Franklin was a vigorously

imperialistic Anglophile writing from the perspective of a dignified Briton. By 1770, however, the situation was starkly different. His sentiments, both public and private, had become more democratic. He no longer was a fervent supporter of Parliament or King George III, but instead he had become a passionate defender of the American cause, and he wrote from the viewpoint of an angry, outraged colonist. The colonists were complaining, and Franklin was listening.

As Edmund S. Morgan attests, "Franklin did not stop yearning for an American continent peopled by the British until 1775;"⁶² the colonists, moreover, already had become the antithesis of the British commonwealthmen. According to Morgan they contrasted in birth, behavior, and now, in outlook. From 1770 onward, he had no intention of supporting any state that was directly governed by the English, for he envisioned America as a nation independent of Britain. He emphasized, "The true Art of governing the Colonies lies in a Nut-Shell...It is only letting them alone."⁶³ Franklin constantly exhorted the British to change their behavior and "urged them to listen to American opinion."⁶⁴ Moreover, "he pleaded with his London readers to stop regarding the colonists 'as foreigners' and to recognize that their claims rested on the same basis as those of the British themselves."⁶⁵ Time and again his pleas were ignored.

In spite of everything that had happened during the past few years, Franklin remained hopeful that a peaceful solution would eliminate the ever-widening breach between America and Great Britain. He was keenly aware, nevertheless, that chaos, in the form of a violent rebellion, loomed ominously on the horizon. One can only begin to imagine the intense emotional agony Franklin experienced as he watched those from his homeland and the great empire he had grown to love so dearly become mortal enemies. He would continue to promote peace and harmony for years into the future, but after 1770, at sixty-four years of age, Franklin was

a profoundly changed man, for he knew in his heart that no such reconciliation was forthcoming. Franklin's days as a subject of the Crown were numbered, and the clock was ticking. Not yet a Revolutionary, he had become an American nationalist conjecturing on behalf of the colonists, and one of the Crown's most formidable adversaries. In the eyes of the British he clearly was a force to be reckoned with. Although Franklin's transformation would not be complete until the eve of independence in 1775 when he finally concluded that independence from England was the only viable option for the colonies, by 1770 it was clear that he had crossed his own personal Rubicon, and there would be no turning back.

As one noted scholar states, "By the early 1770s Franklin was by far the most famous American in the world, and arguably the most illustrious subject of George III."⁶⁶ Similarly, in the words of another historian, "no other contemporary had a keener appreciation of the underlying centripetal forces that had long helped to hold the empire together and to contribute to its success."⁶⁷ As time passed and the Anglo-American struggle intensified, more and more colonists viewed themselves as inherently different from those living in Great Britain.

The British troops stationed in America only made the already hostile situation more volatile. Their presence created a powder keg of tension, which erupted in violence with the colonists and set the streets of Boston ablaze with gunfire on March 5, 1770. The details of the deadly skirmish remain hazy; however, the ramifications of it were obvious almost immediately. The Massacre set the stage for future united action against the British, and this worried Franklin. He soon left England for Boston, "ironically...the city he had fled in his own personal rebellion half a century earlier."

The events at Boston further changed his outlook on the imperial conflict. "Until 1770 Franklin had often chosen to blur the issues between America and Britain, hoping

reasonableness might soften reason and allow both sides to live with a solution imperfect on strictly logical grounds." The Massacre "forced him to focus, to think very carefully about what an acceptable ultimate outcome might be."⁶⁸ Soon after, the Massachusetts House of Representatives formally appointed Franklin as the state's agent in Britain—a post which he accepted eagerly even though he knew that doing so would arouse doubts in Britain about his loyalty to the empire. As H. W. Brands further illustrates, Samuel Adams and the other members of the state committee considered Franklin as "one of their allies in England who help ensure that the true circumstances of the late crime at Boston not be muddied by the enemies of American liberty." More importantly, Thomas Cushing reiterates that the assembly had the utmost confidence in Franklin's skills and asserts that Franklin's acquaintance with the state would enable him to defend it adequately.⁶⁹ This helps prove the colonists were convinced that Franklin's political views reflected their own and also that he would continue to represent and defend their interests. Franklin was a key diplomatic figure on both sides of the Atlantic and it was increasingly apparent that his progression toward patriotism symbolized the colonists' shift. While Franklin cherished his life in London, he was more than willing to return to his homeland when the situation became critical. Boston "had been at the forefront of American resistance" to Parliament since 1765, and Franklin frequently visited the town in order to remain in contact with its citizens. He believed that "his personal experience of ministerial arrogance coincided with the political experience of the people."⁷⁰ The Boston Massacre reinforced Franklin's belief that the colonists' liberty was at stake and from that point onward, he was careful not to jeopardize their interests in any way. His shift of allegiance had reached a crucial stage. The statesman's days as a loyalist were behind him—that chapter in his life was closed. Now, it was only a matter of time before his ties to the Crown would be severed completely.

In the words of historian Colin Bonwick, “Almost all Americans came to consider independence as a desirable goal only when their dispute with Britain reached crisis point in the mid-1770s. Until that time their actions consisted far more of *ad hoc* responses to unfolding British policy than purposive intentions of their own.” More importantly, “the highest level of community for pre-Revolutionary Americans was not the continent but the empire. Commonality consisted largely of shared experience as subordinate members of a wider imperial society.”⁷¹ Franklin’s political transformation reflected this attitude among the colonists. While some viewed “the possibility of imminent independence as absurd,”⁷² Franklin’s writings indicate that the majority of Americans supported the movement toward gaining freedom from the fetters of the mother country.

A year later, in 1771, Lord Hillsborough, a high-ranking British official remarked “that he would have nothing to do with Franklin”⁷³ after learning of his harsh attitude toward the monarchy. Hillsborough was not the first British official to show hostility toward Franklin and he certainly would not be the last. Losing the support of the ministry was expected. It was not necessary to convince the British of his ideas about liberty—they already were a free people, in his view. What he needed was the continued support of the colonists. Franklin believed that living under imperial control did not constitute freedom. That conviction influenced, if not clouded, all other issues and reinforced his sense of duty to the American colonies. Although Samuel Adams “still suspected him of closet Anglophilia,”⁷⁴ Franklin was not hiding his true feelings. His words and actions paralleled his evolving views. He may have been an Anglophile in the years leading up to 1765, but in the years after his mindset had shifted dramatically. It was a profound and agonizing change for him. Still, as Brands illustrates, Franklin was not yet in favor of an armed attack in retaliation for the Boston Massacre.

The outlook was bleak, yet his allegiance to the Crown had not completely dissolved. In time that, too, would change.

While Edmund S. Morgan argues that in the aftermath of the stormy meeting between him and Hillsborough, Franklin “was still thinking of America’s role inside the empire, not outside of it,” I believe the opposite was true. Granted, Franklin was not yet in favor of rebellion. However, as another scholar maintains, his papers from this period reveal his “increasing conviction that America was fundamentally distinct, and essentially independent of England.”⁷⁵ These works contrast sharply with his writings from the middle to late 1760s when he believed that America was inherently linked to England. Moreover, they serve as a testament to his belief that times had changed and the benefits of living under British control no longer were evident to him, as they had been in past years.⁷⁶

Around the beginning of August 1772, Franklin again outlined the sources of American disillusionment. One might wonder why Franklin continued to produce essays which elucidated the colonists’ position despite the Crown’s refusal to change imperial policy or respond to his arguments. Franklin was not ready to concede and submit to Parliament, for that would render the colonists powerless in their struggle to regain their rights as citizens of the empire. More significant, however, is Franklin’s method of referring to the colonists as Americans. In previous works, Franklin often regarded his constituents as colonists—individuals who collectively were subjects of the royal government. Now, Franklin made a conscious effort to set the colonists apart from the British by describing them as Americans. Franklin no longer portrayed his brethren as a colonized people who were subordinate to their British colonizers. Instead, he implied the colonists were a distinct group of individuals who would benefit more from living under their own democratic form of government than they would under the

oppressive, seemingly authoritarian rule of the Crown.

During the summer of 1772, the colonists began drafting their own criticisms of the royal government. Their statement rejected British authority over the colonies, regardless of whether it was exercised by Parliament or the monarchy.⁷⁷ After years of mistreatment and ill will, the colonists were edging toward independence, as the seeds of rebellion had been planted firmly in their minds.

The colonists had grown tired of living under a monarchy that refused to recognize their interests as loyal subjects of the king. For years they declined to take action. Now, however, the colonials demanded the same rights and privileges as their brethren across the Atlantic. They were ready to fight for what they believed the crown rightfully owed to them. This phenomena is commonly regarded among sociologists as the revolution of rising expectations.

More pointedly, by the end of 1772, there was “substance to support the impression among British statesmen that Franklin was the eminence grise behind the defiant pronouncements he delivered” on behalf of the colonists. Although Franklin may have been a man of negotiation, “he had believed from the outset that the Americans were right and Parliament wrong.” Furthermore, I agree with Morgan’s assertion that “Franklin was convinced that an absolute insistence on American rights was the only way to sustain America’s relationship with the country he loved almost as much as his own.”⁷⁸

As the colonists became bolder, so did Franklin. His works from 1773 continue to reflect the Americans’ increasingly radical convictions. Among his more noteworthy writings from this year are “Rules by Which a Great Empire May Be Reduced to a Small One” and “An Edict by the King of Prussia,” which were published in *The Public Advertiser*. Both satiric essays were designed to persuade Britons to reconsider and address the American colonies’ grievances or face the strong possibility of losing their

most profitable territories in a violent struggle for power. As J. A. Leo Lemay writes, “Like Americans before and after him, Franklin uses tall tales to burlesque the preconceptions of his audience—and to show them how ridiculous their notions are.” He further explains, “Perhaps the best known of all the pre-Revolutionary political satire is ‘An Edict by the King of Prussia.’”⁷⁹ Though Franklin used humor in these writings, it is evident that he had become increasingly pessimistic with regard to the relationship between the colonies and mother country. He no longer downplayed the conflict nor did he attempt to appease the crown. Thus, Franklin’s steady transition from loyalist to revolutionary continued to evolve.

Franklin was a negotiator and diplomat, but he also was a skilled propagandist. The titles of his pieces often “put readers on notice that something was amiss.”⁸⁰ Franklin’s sister, Jane Mecom, wrote him expressing “hope that he might be the instrument of restoring harmony between America and Britain.” Franklin noted that his strategy to resolve the conflict had changed over the years. He wrote, “I had used all the smooth words I could muster, and I grew tired of meekness when I saw it without effect. Of late therefore I have been saucy.”⁸¹ “Saucy” was putting it lightly. The reality was that Franklin’s works had become more radical, in language and in content, over the past several years. While his articles from the mid 1770s never were profane or unduly harsh, they illustrated a highly critical attitude that was not evident in his earlier writings.

Toward the end of the year, in a letter to his son, William, the elder Franklin struggled to justify his views, which contrasted sharply with William’s, who continued to serve as the royal governor of New Jersey. He wrote, “From a long and thorough consideration of the subject, I am indeed of opinion, that the Parliament has no right to make any law whatever, binding on the colonies.” Franklin, nonetheless, admits, “I know your sentiments

differ from mine on these” and he subsequently tries to offer William advice for attaining success in politics: “If you can promote the prosperity of your people, and leave them happier than you found them, whatever your political principles are, your memory will be honored.”⁸² It was clear that father and son knew that their relationship had suffered mightily in light of the colonial dispute. Their views differed, and sadly, it was not long before Benjamin completely turned his back on William. In this letter, though, the father demonstrates his devotion to his country but simultaneously shows concern for his son, even as he remained loyal to Britain. Franklin’s transition from loyalist to patriot caused him considerable anguish and his mixed feelings toward William are illustrative of this difficult period in his life.

Despite his opinion of Parliament, Franklin still was “a man of the world” who enjoyed living in England, for he found London, his home for over a decade, a more familiar and comfortable place in which to reside than colonial America. Although the outlook was not promising, he hypothesized that in time the colonies could become stronger and more respectable. As a result, “it will soon be thought proper to treat us, not with justice only, but with kindness; and thence we may expect in a few years a total change of measures with regard to us.”⁸³ Franklin rarely was idealistic, but in this instance he seems to be just that—perhaps to convince himself that a rebellion would not occur. Regardless, his prediction could not have been further from the truth.

No event further alienated Franklin from England than his grilling at the “Cockpit” before the Privy Council on January 29, 1774. Unlike his interrogation regarding the Stamp Act eight years earlier, this hearing destroyed Franklin’s career in England and sent him packing for America to garner support for what would later become the War of Independence. Before commenting on the details surrounding Franklin’s well-publicized humiliation at the Privy Council

session, as well as its extensive ramifications, one must understand what led to the hearing in the first place.

In December 1772, Franklin wrote to his longtime colleague, Thomas Cushing, explaining, “There has lately fallen into my hands part of a correspondence that I have reason to believe laid the foundation of most if not all our present grievances.”⁸⁴ How the “correspondence” ended up in his hands remains a mystery. As H. W. Brands notes, tampering with another’s mail was common in Franklin’s day—he believed his own letters to America were being pilfered. Besides, “the pragmatist in Franklin was never one to set airy principle above practical effect; if a peek beneath someone else’s seal could effect a reconciliation between the colonies and Britain, the sin would be venial and easily forgotten.”⁸⁵ The correspondence to which Franklin was referring in his letter to Cushing consisted of a series of letters between Massachusetts Governor Thomas Hutchinson and his Lieutenant, Andrew Oliver. While their opinions “paralleled the conventional wisdom of officials of the British government,” they also “spoke as Massachusetts men,” which outraged Franklin. The letters were “damning in the eyes of American patriots” and implied “that the troubles in America reflected no broad disaffection but simply the political perversions of a minority.”⁸⁶ Franklin, in turn, forwarded the letters “to show that the oppressive policies lately pursued by the British government were the result of evil counsel from an identifiable source—namely Hutchinson and Oliver—and not the consequences of a general conspiracy in England against American liberty.” Franklin was an intelligent man, and he realized that the situation was volatile. For this reason he included a caveat to Cushing: “I have engaged that it shall not be printed, nor any copies taken of the whole or any part of it; but I am allowed and desired to let it be seen by some men of worth in the province for their satisfaction only.” Franklin regarded Hutchinson and

Oliver as traitors and although he wanted to release the information to the public, he understood that he could not do so. Although Cushing was careful with the letters, others were not and soon countless copies could be found throughout Massachusetts.⁸⁷ The damage had been done, and Franklin's days as a colonial agent were numbered.

It was not until nearly a year later, in December 1773, that Franklin admitted his role in obtaining the mishandled letters. Unfortunately, by admitting his role in the scandal Franklin afforded his enemies in London "the opening they had long sought."⁸⁸ On January 11, 1774, Franklin was summoned by the Privy Council to a hearing based on the Massachusetts House request to remove Hutchinson from his post. Franklin knew trouble was brewing when he realized that the Council had brought legal counsel. Upon being asked to produce the documents as well as to explain his role in obtaining them, Franklin successfully petitioned to delay the hearing for three weeks so that he could engage the necessary legal counsel. In hindsight, his petition to delay the hearing had far-reaching repercussions; if Franklin had not made it, the outcome of the struggle for independence might have been drastically different.

Franklin returned with his legal counselor, John Dunning, to the crowded Cockpit on January 29, 1774. Dunning, as fate would have it, was suffering from a lung ailment, which rendered his voice "nearly inaudible" to the court. Before Dunning could explain Franklin's role in the dispute, Alexander Wedderburn, the solicitor general, sprang into action and "launched into a tirade against Franklin that filled nearly an hour." Wedderburn's words were foul and profane, and "a lesser man would have been humiliated...for humiliation was the purpose of the proceeding."⁸⁹ In between antagonizing and hurling insults at Franklin, Wedderburn repeatedly blamed him for the scandal involving the Hutchinson letters and cast Franklin as Britain's scapegoat for all of its

past troubles with the colonies. Even worse, Wedderburn depicted Franklin as a common thief and traitor. Throughout the entire ordeal Franklin stood motionless and expressionless; he never once uttered so much as a word, "confident that honest men would appreciate the unfairness of the situation into which he had been thrust."⁹⁰

Franklin left enraged as "his two hours in the Cockpit erased what thoughts remained of retiring to England." Two days later he was released from his position as deputy postmaster. In explaining his termination to a colleague, he remarked succinctly and with characteristic aplomb, "I am too much of an American."⁹¹

The Privy Council hearing was a pivotal event in Franklin's life. It enabled him further to distance himself from the Crown and hurl himself into the colonists' struggle for independence. Even now, one cannot begin to imagine Franklin's feelings of outrage and humiliation after the crescendo of events. For a man who had devoted so much of his life to serving the Crown dutifully and without complaint, the Privy Council ordeal marked a bitter end to his illustrious career in England. Of course, the Privy Council did not constitute the basis for his underlying shift of allegiance. Rather, it was the last major factor in a long chain of events over the previous decade that led to his conversion. Franklin gradually reached the conclusion "that the imperial edifice was too decrepit to be patched, too rigid to be refashioned." Thereafter, he was willing "to see it destroyed," for Franklin was a man in pain. This complex transition, described as a "revolution occurring in him" was linked to "his resuming a solely American identity."⁹² Consequently, after the Cockpit excoriation, Franklin's son wrote him from America explaining, "Your popularity in this country, whatever it may be on the other side, is greatly beyond whatever it was."⁹³ William's statement was unnecessary. His father's anguish over the longstanding imperial conflict already had become unbearable.

Franklin had reached his threshold—he could tolerate no more tyranny or resentment from the British. The people who once cherished him as much as he loved them vilified him, and thus, he began preparing to leave England, never to return.

Unlike Edmund S. Morgan, I believe that, by 1774, Franklin *did* abandon all hope of restoring order in the empire. After the Privy Council, Franklin recognized that the colonists had no choice but to resort to military action to gain the freedom they desired. Instead of promoting a stronger union between Britain and America, as he had done for years, Franklin now contemplated how the colonies could break away from the mother country. Civil war, in Franklin's eyes as well as in the colonists', was inevitable. Devoid of any sympathy for the British, the man who once epitomized loyalty to the crown had become an American patriot, and now, his allegiance to the colonies was unwavering.

Franklin, nevertheless, remained in Britain through the spring of 1775. Before leaving England, Franklin told his longtime friend and political ally, Joseph Galloway, “when I consider the extreme Corruption prevalent among all Orders of Men in this old rotten State, and the glorious publick Virtue so predominant in our rising Country, I cannot but apprehend more Mischief than Benefit from a closer union.” “To unite us intimately, will only be to corrupt and poison us also.”⁹⁴ A few weeks later, Franklin set sail for Philadelphia. “For eighteen years he had resisted returning to America...; he resisted no more.”⁹⁵ An end to English rule in the colonies was imminent, as were years of bloodshed.

Franklin received a warm welcome back home in America despite the outbreak of war a few weeks prior. Before the war started in the spring, only two colonies north of Virginia still “retained some semblance of royal government.”⁹⁶ This is an indication that many colonists had repudiated their allegiance to the crown before the events at Lexington and Concord. Any dim hope

Franklin might have had for a swift end and peaceful resolution to the colonial conflict faded when he reached Philadelphia in May 1775. Once there, he realized that the colonists were not willing to concede their demands for the sake of the empire. The British had mistreated them for years, and “the ties of allegiance and affection were not, after all, unconditional.”⁹⁷ Scholars have noted that, by 1775, American newspapers contained many more “symbols of American community” through words such as “American,” “continental,” and “united colonies,” than ones implying a union with the empire. Furthermore, after 1763, colonial newspapers “increasingly implied the existence of an American political community possessing interests different from those of Britain.”⁹⁸ In the years since the Stamp Act, the colonists believed they saw a pattern of deliberate attacks “launched surreptitiously by plotters against liberty both in England and America,” and this popular stance defined the inherent meaning of the colonists' struggle.⁹⁹ The colonists gradually wanted to separate themselves from England until eventually they wanted nothing but their independence, and Franklin's writings reflect this shift in attitude. David McCullough describes how even John Adams, a man who openly discussed Franklin's failings, admitted he “had talents of irony, allegory, and fable that he could adapt with great skill to the promotion of moral and political [my emphasis] truths.”¹⁰⁰ Franklin, unlike any writer from the Revolutionary period—with the exception of Thomas Jefferson—had the ability to explain through his writings what impelled the colonists to rebel.

“Allured by a phantom of absolute authority over the colonies, British governments made war on human freedom.”¹⁰¹ Perhaps no letter conveyed Franklin's feelings of bitterness more lucidly than the one cited at the beginning of this paper, which he wrote but apparently never sent to his onetime friend, William Strahan. Franklin now was a

colonist and American patriot. After 10 years, his political transformation finally was complete. He had repudiated his allegiance to the crown and nothing would change his mind.

Franklin was a busy man during the first phase of the War of Independence in 1776. Antonio Pace notes, "The outbreak of the America Revolution...swept Franklin to the pinnacle of political esteem."¹⁰² He helped Thomas Jefferson pen the Declaration of Independence, which he later signed along with the nation's other founding fathers. He subsequently sailed to France to garner support for the war effort by convincing wary French officials that America had the potential to defeat Britain in a prolonged military campaign. This plea in itself was no easy task, yet while persuading the French government to offer much-needed assistance to the colonies in the form of military armaments, Franklin quickly became a popular sensation throughout the nation. Situated in the context of the 21st century, the French treated Franklin as one might regard a Hollywood celebrity. Even John Adams admitted "French esteem for the 'good doctor' remained of immense importance to the American cause."¹⁰³ Granted, Franklin was an architect of international cultural relations wherever he traveled, but more importantly at 69 years of age, he was an experienced and astute statesman who understood the imperial conflict more clearly than any other American official. Franklin's efforts at gaining French support were nothing less than pivotal to the outcome of the Revolutionary War.

Franklin remained in France throughout the Revolution and he played a key role in peace negotiations with England toward the end of the war. His efforts ultimately culminated in the Treaty of Paris, in 1783. Although the treaty was a significant victory for America, it was not what captured its signers' attention. Ironically, it was Franklin's choice of clothing on the day the treaty was signed that has become somewhat of a legend. Franklin essentially "turned public

humiliation into personal triumph" by dressing in the same suit that he wore six years earlier when the Privy Council excoriated him.¹⁰⁴

With "characteristic equanimity" Franklin once wrote, "Life is a kind of chess in which we have often points to gain, and competitors and adversaries to contend with, and in which there is a vast variety of good and evil events that are, in some degree, the effects of prudence or want of it."¹⁰⁵ Franklin was a dynamic figure out of the political spectrum as much as he was within it. Even those who never met Franklin were fascinated by him. Franklin's contemporaries in Italy considered him "the patriarch of the vital new America [sic] society...who most completely symbolized the American Revolution."¹⁰⁶ Many Europeans envisioned Franklin as the embodiment of American political thought.

Franklin, a man of the world, helped pave the road toward independence, and for that reason, he remains one of America's most honored and recognized founding fathers. Franklin's writings, never pretentious or conceited, allow us to capture the essence of the individual behind the science and statesmanship. They provide insight into his happiest years as a colonial agent and his darkest days as an enemy of the crown. Upon reading his works, we become better acquainted with Franklin, and it is difficult not to chuckle occasionally at his light-hearted humor or to agree with his logic. If granted enough time, Franklin, it seems, could persuade anyone to support his position on a given topic, and we are no exception. Of course, his contributions to our liberty and independence must not be downplayed. While he may be better known today for his inventions and scientific experiments than his political skills, one gains a deeper understanding of Franklin's legacy by analyzing his shift of allegiance in the years preceding the Revolutionary War. Research on Franklin's myriad talents is extensive; work dedicated to explaining how his changing political beliefs reflect the

colonists' evolving views is not. Historians, it seems, rarely examine Franklin's political transformation in significant depth—it is an often overlooked facet of his life. My hope is that this essay will encourage further inquiry into his intriguing transition from loyalist to patriot, along with its far-reaching impact on the birth of the United States.

NOTES

- 1 I. Bernard Cohen, *Benjamin Franklin: His Contribution to the American Tradition*, (New York: The Bobbs-Merrill Company, Inc., 1953), 229.
- 2 L. Jesse Lemisch, ed. *Benjamin Franklin: The Autobiography and Other Writings*, (New York: Penguin Putnam, Inc., 2001), 253.
- 3 H. W. Brands, *The First American: The Life and Times of Benjamin Franklin*, (New York: Doubleday, 2001), 411.
- 4 *Ibid.*, Also see: Susan Dunn, "The Reluctant Revolutionary," *New York Times Book Review*, (October 20, 2002): 20.
- 5 Jack P. Greene, "Pride, Prejudice, and Jealousy: Benjamin Franklin's Explanation for the American Revolution." *Reappraising Benjamin Franklin: A Bicentennial Perspective*. J. A. Leo Lemay, ed. (Newark: University of Delaware Press, 1993), 120.
- 6 Kirk Willis, "The Background of Benjamin Franklin's Imperial Apostasy 1751-1766." *Pennsylvania History*. 40.2 (1973): 123.
- 7 Carl Van Doren, *Benjamin Franklin*, (New York: The Viking Press, 1938). See, also, *A&E Biography: Benjamin Franklin: Citizen of the World*, Video-recorded presentation of the A&E Television Networks.
- 8 Bernard Bailyn and John B. Hench, eds. *The Press and the American Revolution*, (Worcester: American Antiquarian Society, 1980), 18.
- 9 J. A. Leo Lemay, "Benjamin Franklin." *Major Writers of Early American Literature*. Everett Emerson, ed. (Madison: University of Wisconsin Press, 1972), 217-218.
- 10 Moses Coit Tyler, "Franklin in the Literature of the Revolution." *A History of American Literature: 1607-1783*, (Chicago: University of Chicago Press, 1967), 349.
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Testing the Theories of World Power Decline: Case Studies of the Roman and Ottoman Empires

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ABSTRACT

Major empires go through cycles, their power and expanse rising and inevitably falling over time. World system theory and geopolitical theory offer two explanations of the rise and fall of hegemonic world powers. One phenomenon that both theories examine are the factors leading to the decline of world powers. The two theories are similar in that they both attribute decline to high economic and military costs of domination. However, world system theory focuses on economic factors in decline while geopolitical theory focuses on military, geographical, and political factors. The purpose of this paper is to test the two theories using two cases of world powers.

Two cases of major world powers are the Roman and Ottoman Empires. Both once dominated the known world. The Roman Empire controlled Europe from the Rhine to the Danube to the Euphrates rivers, to the deserts in Syria, Arabia, and Africa, and to the surrounding oceans until its decline (Mattern, 1999). The Ottoman Empire was also a great power, reaching to Italy, Austria, mid Russia, the Caspian Sea, and the Gulf of Persia; it included the Middle East, Arabia, the Nile Valley, and North Africa (Gunduz, 2000). After World War I, the sultanate was abolished on November 1, 1922, marking the end of the Ottoman Empire after 600 years of power (McCarthy, 2001). These two empires are good cases of hegemonic world powers because both started out small, expanded to great geographical and political

power and influence, and then declined. The historical nature of these cases lends them to study of decline because the reigns of the empires have already ended.

World system theory is not well supported by either case history. This may be due, however, to the nature of the data used to test the theory. Geopolitical theory, on the other hand, is well supported by both cases.

INTRODUCTION

World System Theory

Immanuel Wallerstein's world system theory explains the decline of world powers in economic terms. Being on top is expensive, and eventually every empire will collapse under the strain and cost of ensuring continued domination. Hegemons, or dominant world powers, must continually take measures to keep ahead. The hegemon must develop new technology to stay ahead of the lesser powers. It must also invest in a strong military to defend itself against rival core states that want to become the next hegemon. While these expenditures lead to great technological and military advances for the empire, they weaken the economy by diverting money away from the marketplace of the common people. Another factor of decline is the great expense of a high cost of living and consumerism. The citizens of the hegemonic empire become accustomed to a high standard of living, which generates demand for expensive products and then high salaries in order to buy these products. Another factor is that rival core states take measures to

undercut the dominant empire so that they can become the next hegemon. A final factor in the decline of hegemons is a loss in production and organizational efficiency. Superior methods decline over time and are copied and improved by rival states. All of these factors weaken the economic advantage of the hegemon, leading to the decline of the empire as a world power. In this paper, I will focus on the factors of the high cost of living and the high cost of maintaining a strong military as contributing to decline in world system theory.

Geopolitical Theory

Randall Collins's geopolitical theory explains the decline of world powers in military, political, and geographical terms. A marchland state has a geopolitical advantage because it has few shared borders that need to be defended from neighboring states. Because of this advantage, marchland states can easily gain power by taking over weaker interior states that have to devote more resources to defending themselves on all sides. This gaining of power and expansion, however, lessens the positional marchland advantage. The empire now has long borders to defend, and conflicts become more frequent with enemies on all sides. This expansion is also expensive because troops and supplies must be transported and sustained across long distances to defend extended borders and conquer more interior states. Military and political leaders must also maintain stability and control in newly acquired satellite states of the empire. This can lead to a great deal of expense, manpower, and effort, especially when the satellite states have a very different culture from the hegemonic state and therefore are resistant to foreign conquest. A final geopolitical factor of the decline of world powers is that, through continued expansion and takeover of buffer interior states, the marchland empire will eventually come into contact with another expanding marchland power. These two strong rivals then come into conflict, resulting in either a showdown war,

with one or both powers becoming completely devastated, or both reaching a stalemate. This stalemate would drain the economy of both states, contributing to the internal instability and disintegration of both powers into smaller states. In this paper I will focus on the problems of overextension, which include difficulties in protecting long borders caused by loss of marchland positional advantage and maintaining control in culturally diverse satellite states.

Methods

In order to test the theories using the two cases, historical data had to be collected. All evidence was in the form of secondary data published in books and journal articles. Whenever possible, multiple sources were used to corroborate evidence. Historical works provided a great deal of evidence. Data to test the world system factors of high cost of living and high cost of military were collected from texts about the economic and general history of the empires. Data to test the geopolitical factors of shared border defense and cultural control were collected from texts about military and general history as well as mathematical sociology journal articles on decline and texts about the specific cultural subpopulations within empires.

Roman Empire

The civilization of the Roman people as a whole has a long and complicated history. The governing body changed forms to include monarchy, republic, and empire. The decline of the Roman Empire arises from factors naturally associated with its lengthy existence.

World system theory is weakly supported in the case of the Roman Empire. There is no evidence of a high cost of living. Evidence of high cost of military is not concrete, but is a definite factor in the decline of the Roman Empire. Geopolitical theory is rather solidly supported by the case of the Roman Empire. There is evidence of conflicts precipitated by long shared borders and cultural rebellions, but little evidence of efforts at homogenization.

World System Theory

In world system theory, two factors of decline are high cost of living and high cost of maintaining a military. The first factor, high cost of living, contributes to decline of world powers through a weakening of the economy. As citizens become accustomed to a higher standard of living, they desire more and better products. To afford these more expensive products, they must have a higher salary. Higher salaries create a burden on employers. Companies can no longer afford to be in business in the country because it is difficult to pay such high salaries. They must either relocate to another country with a lower standard of living and lower wages, or rely on cheaper imports from those countries. This loss of business and capital makes the empire less competitive in comparison to other countries' economies. Finally, decrease in local production leads to a decrease in local wages, local consumerism, and reinvestment of capital. All of these effects of high cost of living weaken the economy and therefore the entire empire.

World system theory is weakly supported in the case of the Roman Empire. Because of lack of concrete, numerical data, there is little direct evidence of either factor. High military cost is found, however, through high military activity and tax burden.

High cost of living can be operationally defined through many aspects of an empire's economy. The first indicator of cost of living are the wages of average citizens. High wages are necessitated by high cost of living in that high wages lead to higher consumption, new consumer needs, and even higher wages. A second indicator of cost of living is population and mortality statistics. If there is a large population with a relatively low mortality rate and high population growth rate, it indicates that the people have enough money to feed themselves and their families. It also indicates that public health and safety are adequate; these must be funded through taxes, so there must be a high standard of living and high wages in order to fund such tax-sponsored projects.

A third way to define high cost of living is to compare an empire's standard of living with other powers of the time.

The case of the Roman Empire does not lend support to the factor of high cost of living. Toward the end of the Roman Empire, average citizens lived in poverty and had very low wages compared to the few wealthy classes. Two social classes in the Roman Empire owned the majority of the wealth. The senators owned property worth at least 250,000 times a laborer's daily wage, and the equestrians owned property worth 125,000 times a laborer's daily wage (Antonio, 1979). The masses "lived in abject poverty in the starkest, most unpleasant and dangerous conditions imaginable" (Antonio, 1979, p. 900). This shows that the Roman population as a whole did not have a high cost of living, but rather wealth was concentrated in the numerically small population of the higher classes. According to one historian, however, the decline of Rome was an inevitable occurrence caused by "immoderate greatness" (Gibbon, 1960, p. 524). The greatness he describes is the extravagance and luxury of the wealthy classes and elite rulers. These expenses could have contributed to the decline of Rome through large public expenditure and debt, but not as a factor of world system theory. The poor standard of living of the masses in the Roman Empire shows that high cost of living was not a factor in its decline.

The second factor of decline in world system theory, high cost of the military, weakens the economy just as high cost of living. When an empire becomes a world power, it must take great measures to ensure that it can defend its power and position. As more and more competing empires wage war to bring down the hegemon, it creates a great deal of pressure is brought to bear on the hegemon's defense system. Money must be invested into the military system to develop new technology and provide troops with resources in order to maintain a competitive edge against opponents. An empire may devote a great portion of the budget to the military as a last-ditch effort to resist foreign invasion. If money is

diverted away from civilian life to support the military, the entire economy suffers. There is less capital to invest in production, weakening the competitiveness of the economy.

The high cost of maintaining a strong and effective military can be operationally defined through statistics as well as cultural effects. One indicator of the high cost of the military is the actual military budget of the empire. This must be viewed in relation to the empire's total product to see what percentage is devoted to the military, as well as in relation to the percentage other empires of the time devoted to their military budget. A second indicator is the level of engagement of the empire's military. A more active military will need more troops, more supplies, and more money. A third indicator is the effect that military spending has on the overall population. If citizens suffer because of heavy spending on the military, it shows that the cost of the military is too high and that the empire suffers because of it.

The case of the Roman Empire lends conflicting support to the factor of high military spending in the decline of world powers. There is evidence that troops were widely and consistently used to defend and control the Empire and that citizens were burdened by high taxes to finance the military. Other evidence, however, shows that the percentage of the Roman budget devoted to the military was relatively small.

The Roman Empire did not originally have a large and expensive military system. In its early stages, the Roman Empire relied on militias with their own equipment to fight in infrequent battles. As Rome grew, however, it had to develop a professional army with better training and weapons to fight seemingly constant wars; this professional army became very expensive compared to the earlier militias (Jones, 2001). A strong military was also necessary to enforce the centralized bureaucracy of the Empire across much territory (Antonio, 1979). This shows that as the Empire expanded, it needed a strong military to fight battles to conquer new lands, defend

its own territory, and maintain control within the Empire. This would require a huge army with a sufficient budget to pay, feed, and clothe troops as well as develop new weaponry and technology.

The main way for a government to finance its military is through taxation. The high cost of military in the Roman Empire was paid for through taxation, creating a burden mostly on the poorer landowners (Antonio, 1979). At one point, the army was so huge that there were more soldiers than taxpayers, creating a very great tax burden on all citizens (Antonio, 1979). The fact that the military was so large and that it is documented that citizens were burdened by taxes to finance it show that the military was too expensive, requiring more tax money than the people could comfortably afford.

A final indicator of the cost of the military in the Roman Empire is the military budget. For having such a large military, the government did not devote a large proportion of the budget to military expenditures. At one point near the end of the Empire, the yearly national product of Rome was about 20 billion sesterces, with about 1.1 billion sesterces devoted to the military budget (Mattern, 1999). Although this is just one estimate, it seems that 5 percent is a small proportion going to the military, leaving plenty of capital for other things, such as reinvestment into the economy, public works projects, and other endeavors to uphold civilian life and the economy. According to the budget, high military cost was not a factor of decline in the Roman Empire. However, better to understand this statistic it must be compared to the military budgets of other empires of the time. Perhaps compared to other empires that were in earlier stages of development, 5 percent of the budget was a very high military cost.

Data about the cost of maintaining the military toward the end of the Roman Empire is mixed. In addition, historians describe a large, expansive military constantly engaged in battle, which would require a

great deal of financial support. In addition, historians report heavy tax burdens on the citizens as a direct result of financing the military. However, the military budget of the time does not seem to be disproportional. This evidence, however, needs to be qualified in comparison with other empires of the time. Therefore, based on the evidence, high cost of military was a significant burden on the economy and people of the Roman Empire, contributing to its decline.

The case of the Roman Empire neither entirely supports nor contradicts world system theory based on the two factors of high cost of living and high military cost. There is no evidence to demonstrate a high standard of living among the majority of citizens of the Roman Empire. However, the seemingly low living standards of these citizens can only be understood when compared to the standard of living in other empires of the time. There is evidence that high cost of military was an economic burden on the Empire, but other evidence shows that the military budget was relatively small. However, this must be considered in relation to the budgets of other empires of the time. Therefore, based on the evidence, I conclude that the Roman Empire weakly supports world system theory.

Geopolitical Theory

The geographical, military, and political factors of overextension are the main foci of geopolitical theory. Factors of overextension include difficulties in protecting long borders and loss of marchland positional advantage and maintaining control in culturally diverse satellite states and conquered lands. The first factor of geopolitical theory, difficulty with borders, contributes to decline by leading to wars with neighbors and loss of land. An expanding power usually has a marchland advantage, which means that it has few shared borders that it must defend. This is an advantage because the empire can devote fewer military resources to defense and more to offense. Also, the empire has a lesser chance of being attacked in the first

place because it would involve more work and travel on the part of the invader. As the empire expands, however, it loses the marchland advantage by taking over interior states with many shared borders. The empire now shares borders with many other empires and must defend those long borders against invasion. Hostile neighbors will want to take down the hegemon, attempt to invade the empire, and push back the borders of the empire by taking land.

Geopolitical theory is rather solidly supported by the case of the Roman Empire. There was a great deal of activity in defending shared borders from attack by hostile neighbors. There was little effort at homogenizing different cultures, but the many different rebellions are evidence of problems with cultural control.

The first factor, difficulty with borders and loss of marchland advantage, can be operationally defined through geography and military history. An indicator of difficulty with borders is the number of conflicts that occur along those borders. If there are more conflicts along the borders, this shows that neighboring enemy empires are a problem.

The Roman Empire definitely had problems defending its borders because of loss of marchland positional advantage. Throughout its history, Rome continually fought different rivals on different borders. Because the Roman Empire kept expanding and taking over other states, it did not maintain the marchland advantage of the Italian Peninsula and eventually shared hostile borders with many other states. Having to defend many borders at once meant extensive, and expensive, military presence on multiple fronts. During the Second Punic War, Rome was fighting a major battle with Carthage as well as maintaining military presence on three or four other fronts all over the western Mediterranean (Dyer, 1985). This extensive, simultaneous fighting drained the economy as well as manpower reserves. At any time, the Roman Empire also faced pressure from barbarian Huns in Germany, Denmark,

Sweden, Poland, and Russia (Gibbon, 1960). The many conflicts along many different borders show that long, shared borders were a problem for the Roman Empire.

Not all of the borders of the Roman Empire were shared, and the Romans were not constantly involved in defending borders. Some borders that were not natural barriers such as mountains or oceans were still relatively safe. Extensive military presence was not necessary; instead, the Romans set up posts few and far between to watch for invaders and then notified the interior military, denied the invaders' retreat, and created obstacles (Jones, 2001). This was not as effective as heavy military defense, but was a more economical approach. There were also natural borders of the Roman Empire that did not need defending. The Rhine, Danube, and Euphrates rivers, the desert in Syria, Arabia, and Africa, and oceans are all natural borders that would not require constant military presence to defend (Mattern, 1999). Although many borders did not need heavy defense, there were still many frontiers bordering other rival states.

On a related note, the previous example of high military spending is more evidence that long, shared borders were a problem. The majority of military action involved defending borders against invaders. With more shared borders and more wars, the cost of the military increased, weakening the economy. The many and constant wars with many different neighboring countries are evidence that long, shared borders were a problem for the Roman Empire leading to decline.

The second factor of geopolitical theory, control of culturally different territories within the empire, contributes to decline through civil unrest. When an expanding empire conquers new lands, the people of those lands often become unwilling subjects of the empire. If the conquered land is relatively similar to the empire in culture, ethnicity, and religion, control of, and integration into, the empire should not require great effort. Often, however, empires conquer

lands with very different cultures. These lands may be more resistant to foreign rule, requiring a greater military presence to maintain control. Large homogenization campaigns might be necessary to integrate the territories into the society of the empire. This can require planning, then transporting troops and administrators to implement the plans. This government presence, often far away from the center of the empire, can become very expensive, requiring a large portion of the budget and weakening the economy. If there are rebellions, an even greater number of troops and supplies must be present in the territories, creating an even greater expense. Also, culturally different provinces weaken the nationalism of the empire as a whole. Instead of an ethnically, religiously, and culturally homogeneous empire, conquered lands bring diversity to the empire. These different provinces may not identify with the empire as a whole, and either revolt or push for laws and tax policies that particularly benefit them. All of this can weaken the empire through the cost of military presence needed to integrate and control the culturally different acquisitions.

The second factor, control of culturally different territories within the empire can be operationally defined through the efforts the empire takes to integrate those territories. The presence of homogenization efforts is indicative of a need to control culturally different territories that do not want to cooperate with the empire. A second indicator of cultural control problems is the number of rebellions in different territories. The more rebellions, the more cultural control is a problem and the more money must be spent on military action.

Cultural control was a problem for the Roman Empire. The massive Empire, which covered approximately 4,250,000km² of land at the start of its decline (Gunduz, Bolumu, & Universitesi, 2002), included many conquered states with very different cultures (Antonio, 1979). However, there were minimal homogenization campaigns.

All members of the Empire were encouraged to speak Latin and call themselves Romans instead of speaking their native language and identifying with their territory. Still, there was conflict over domination by a foreign power (Gibbon, 1960). This was not a huge Empire-wide campaign, however, and did not require expensive government presence.

The Roman Empire did have problems with the great number of rebellions both within the contiguous borders of the Empire and in satellite states. When the Romans expanded overseas to England, they had difficulty taking control of the country. It took four years to subdue the English, and 200 years to get the population fully to accept Roman rule (Jones, 2001). Because England was so far away and had a culture so different from Rome's, it was very difficult to gain control over it; 200 years of military occupation so far away overseas presumably was very expensive, weakening the economy. Rome also had to deal with rebellions in different conquered lands such as Cantabria, Pannonia, Thrace, Africa, and Gaul, as well as Britain (Mattern, 1999). Domination by a foreign power created conflict in many provinces (Gibbon, 1960). This is evidence of cultural overextension in that members of the Empire had different fundamental cultural values and did not wish to be under Empire rule, thereby causing disturbances necessitating expensive military action. Although there was little noted effort at homogenization, the many rebellions in conquered territories and the expensive military presence needed to control them are evidence of problems of cultural control within the Roman Empire.

The case of the Roman Empire for the most part supports geopolitical theory based on the two factors of long, shared borders and control of culturally different territories. Both led to many conflicts requiring military action. This military action was expensive, weakening the economy. This made the Empire lose its economic advantage, leading to the decline of the Empire. Border conflicts

and rebellions, when lost by the Roman Empire, contributed to decline through the physical loss of land, people, resources, and tax revenues. Both factors led to great expense and the decline of the Empire.

Geopolitical theory is shown to be more effective in describing the decline of the Roman Empire. World system theory is supported in that the Empire's spending on the military was a burden to the economy. It is not supported in that there is little evidence of a high standard of living, high wages, or even a high military budget. Geopolitical theory is supported in that the many battles over shared border defense and cultural rebellion contributed to decline.

Ottoman Empire

During the first half of the reign of the Ottoman Empire, it expanded greatly. The early 17th century seemed to be the high point of Ottoman geography; since 1300, the Empire had acquired western Anatolia, Thrace, Bulgaria, eastern Macedonia, the Balkan Peninsula, Asia Minor, North Africa, and Hungary. At this peak, the conditions were present to bring about decline. After the early 1600s, the Ottoman Empire slowly lost ground, with accelerated loss brought on by wars in the late 19th and early 20th centuries (Pitcher, 1968). As early as 1918, the Empire was essentially defeated, with only a small part of Asia Minor still free from foreign rule (Swallow, 1973). In the aftermath of World War I, the Ottomans were left with only north and north-central Anatolia. Later, they were given Istanbul, but this was surrounded by Greek forces and they were not allowed to defend the city or any territory with warships or army (McCarthy, 2001).

Again, world system theory is weakly supported by the case study. There is evidence of high military spending, but very little evidence of high cost of living. Geopolitical theory is more solidly supported, with evidence of conflict with hostile neighbors and rebelling cultural groups within the Empire and of homogenization campaigns.

World System Theory

World system theory is weakly supported in the case of the Ottoman Empire. High cost of living was not found except in population growth, but high cost of military is shown through high military budget and civilian suffering as a direct result of military spending.

The first factor of decline in world system theory, high cost of living, is very weakly supported in the end of the Ottoman Empire. A growing population is an indicator of high cost of living. The increase in the Ottoman Empire's population is evidence of a better and safer environment with enough food (McCarthy, 2001). Having enough food depends on adequate wages for workers. A safe environment depends on taxes generated by those workers' wages.

According to historians, there was no comparison between the economies and standard of living of the European powers and those of the Ottomans (McCarthy, 2001). This is evidence of a low cost of living compared to other empires of the time. However, a growing population is evidence of a high standard of living. Therefore, evidence of cost of living is weak and conflicting.

A second factor of decline in world system theory, high cost of military, was also present in the Ottoman Empire. Suffering on the part of civilians is evidence of high military spending in the Ottoman Empire. Beginning around 1912, the Ottomans had to deal with many foreign and domestic problems. The government needed supplies to keep the military strong; since there was no surplus, civilians suffered to allow for military funding. In Aleppo, the rich suffered the most when authorities requisitioned meat, oil, and wheat for military use (Kayali, 1997). Elsewhere in the Empire, many common citizens suffered from increased bread and meat prices as a result of military requisitioning, causing street riots in 1913 (Kayali, 1997). A strong and well-supplied military was necessary for Ottoman success in defending borders and putting down internal rebellions; supplying the military, however, hurt the economy of

the common people. This shows that military spending took too much money, to the detriment of the Empire.

High military budget is another indicator of high cost of military. In the early 20th century, the Ottoman army was entirely reformed, and a new treasury was created to pay for it (McCarthy, 2001). To prepare for World War I and to control domestic disturbances, the Ottoman government decided to reform the military by importing Western military advisors, equipment, tactics, and strategies. They also founded military institutions to make full use of these new reforms (Inalcik, and Quataert, 1996). This undoubtedly was a great expense taken as an attempt to remain strong as a world power. In 1913, the military budget was doubled to fund necessary military reform, including new ships and an air force (McCarthy, 2001). This evidence must be considered in respect to the total budget, but a large increase in military budget shows that money was taken away from the civilian economy and placed in the military. This is detrimental to the economy and could lead to decline.

High military budget and suffering in the civilian world resulting from lack of resources are both indicators that high cost of military was a problem in the Ottoman Empire. Even though there is evidence that the military was not well-equipped in comparison with European armies (McCarthy, 2001), data on spending is more convincing.

The case of the Ottoman Empire somewhat supports the world system theory in that high cost of living was not convincingly found, but high military cost was present toward the end of the Empire. High cost of living was only present as a probable cause of population increase. High military budget and civilian suffering as a direct result of military spending are more direct evidence of high military spending.

Geopolitical Theory

Geopolitical theory is very well supported in the case of the Ottoman Empire. Difficulty defending long, shared borders

and controlling cultural subpopulations was present in the many battles that Ottomans took part in toward the end of the Empire. There is also evidence of homogenization programs preemptively to control cultural rebellion.

The first factor, defense of long, shared borders, was present as battles with hostile neighbors on the other side of those shared borders. The beginning of the 20th century marked the beginning, for the Ottoman Empire, of relatively constant battles. When Italy declared war in 1911, and Libya was invaded, it was a shock for the Empire, where "Ottoman sovereignty had never been disputed" (Kayali, 1997, p. 107). Italy had plans to colonize Libya, and waited until Ottoman military was busy with domestic unrest elsewhere, leaving Libya vulnerable. The Empire shifted priorities, however, and sent the best military resources to Libya, but, in 1912, was distracted by other threats from Balkan countries (Kayali, 1997). In that same year, the Ottoman Empire was attacked from seemingly all sides. With most of their troops in Asia, the Ottomans lost Kumanova, Manastir, and northern Macedonia to the Serbs. At the same time, the Greeks advanced to control Salonica and southern Macedonia with little opposition (McCarthy, 2001). Also in 1912, the French and British took interest in the Arab provinces of Mount Lebanon and Syria (Kayali, 1997). Russia was another powerful, hostile neighbor; it had reached the limits of its expansion and was eager to spill over into Ottoman territory (McCarthy, 2001). During World War I, the Ottomans were overextended on all fronts, and often lacked railroads to get to the borders that they needed to defend (McCarthy, 2001). Because there were constant battles along all fronts, spread out along the vast Empire, the military could not effectively protect the Empire's borders. This weakened the Empire greatly.

Even natural borders such as oceans were not safe from enemy invasion. After 1566, the Ottomans had to use their navy to protect the borders of the Empire from attacks

(Gunduz, Bolumu, and Universitesi, 2002). Provinces in the Red Sea and Persian Gulf were vulnerable to superior British naval attacks in the 20th century (Kayali, 1997). Shared borders needed defense, but even natural borders needed defense, too. Hostile European neighbors also undercut the Ottoman Empire by convincing and supporting nationalist groups in revolting from Ottoman rule, creating internal as well as external conflicts (McCarthy, 2001). Defense of long, shared borders was a great problem for the Ottoman Empire, especially in the early 1900s when so many countries attacked at once to get a slice of the pie.

The second factor of geopolitical theory, cultural control problems, was also present in the Ottoman Empire. As noted in the introduction, the Ottoman Empire expanded to include many culturally different states, and covered 5,800,000km² at the start of its decline (Gunduz, Bolumu, and Universitesi, 2002). Ottoman citizens consisted of nomads, settled tribes, city dwellers, Muslims, and Christians; these very different groups were able to get along, however, and each new province was organized to be able to contribute money and soldiers to the good of the entire Empire (Gunduz, 2000). Through most of its Empire, there was a strong central government and little rebellion because the overlords provided fair and impartial justice and the cultures of conquered provinces were left intact. Over time, however, different religious groups and their different needs and wants contributed to the decline of the Ottoman Empire (Haddad, 1977). Although unified and peaceful for most of its reign, the Ottoman Empire was made up of many very different sectors; as nationalism increased in each sector, loyalty to the Empire as a whole decreased (Davison, 1977).

The introduction of "mass politics, a liberal press, and greater educational opportunities" created opportunities for ethnic groupings to recognize their common situation and create a group consciousness and pockets of subculture nationalism (Kayali, 1997). Armenians,

Greeks, and Arabs pushed to have their languages accepted as state languages within the Ottoman Turkish national language (Kayali, 1997). After 1840, many provinces struggled for independence and autonomy, including Lebanon, Moldavia, Wallachia, Roumania, Serbia, Bosnia, and Montenegro (Swallow, 1973). In an attempt at homogenization, The Committee of Union and Progress (CUP) became a major actor in the "Turkification," or social integration and centralization of the Ottoman Empire (Kayali, 1997). In the 19th century, political, financial, and military power were concentrated in Istanbul in order to centralize authority and stop demands for autonomy from ethnic groups (Kayali, 1997). These efforts required money and resources to implement, taking away from the general economy.

The most prominent pockets of nationalism involved the Arabs. In conquering Arab lands, the Ottomans took a great task; this made them a world power, gave them a role in intercontinental trade routes, and brought them closer to rival powers Portugal and Iran (Kayali, 1997). The Arab provinces were geographically far from Istanbul and the center of the Ottoman Empire and many of their citizens were nomadic. Since it was difficult to implement and enforce centralization policies, troops were sent there to prevent rebellion and facilitate tax collection (Kayali, 1997). Arabs were represented in Parliament, and often worked toward integration instead of particularism. They made demands for administrative regularities, uniform taxes, and security, reinforcing their connection with the centralized government of the Empire (Kayali, 1997). After the Balkan War, reforms were made; Arabic was recognized as an official language of Arab provinces (Kayali, 1997). Although there were problems along the way, Arabs were successfully integrated into Ottoman society and were represented in national government (Kayali 1997).

As with border conflicts, the Ottoman Empire suffered many rebellions in the early

20th century. Although uprisings were common in distant provinces, the Empire had to deal with many simultaneous rebellions in 1910 and 1911 (Kayali, 1997). These uprisings required major financial and military resources (Kayali, 1997). Some uprisings were resolved with compromise; a 1911 Yemen uprising ended positively when the Ottomans agreed to some Yemen autonomy, financial concessions, and use of some local legal practices (Kayali, 1997). Nevertheless, the expense of military involvement and occupation was a great burden, especially within the context of border problems.

Cultural problems might not have been as bad as they seemed, however. Although there were some areas of homogeneous ethnicity that would engender strong nationalism, such as Albania, Anatolia, and Arabia, most of the Empire was ethnically and religiously heterogeneous, with many different groups living in close proximity as a result of migration (McCarthy, 2001). For a decade after 1878, there was very little internal unrest because of heavy centralized authority and security (Kayali, 1997). In the beginning of the 20th century, ethnic, cultural and political clubs such as the Greek Political Club, Armenian Dashnak, Bulgarian Club, Jewish Youth Club, Lovers of Anatolia, and Kurdish Mutual Aid Society were formed; along with these clubs came rumors of secret decentralist and nationalist objectives (Kayali, 1997). This caused increased nationalism and increased homogenization efforts and military presence. In 1911, however, the Libyan war with Italy provided an objective against which the many groups of the Empire, Arabs, Turks, Iraqi, Syrians, Aleppo, Kurdish, Algerians, and Tunisians all joined to fight a common enemy (Kayali, 1997). This was a naturally occurring instance of homogenization.

While cultural uprisings were not necessarily pervasive throughout the Empire and were not always active, cultural control was still present in the Ottoman Empire. "Turkification" committees had to be

formed to foster homogenization. Pockets of nationalist resistance and the rebellions that they started were definite problems for the military and economy of the Empire, contributing to its decline.

Again, geopolitical theory is shown to be more accurate in describing the decline of the Ottoman Empire. Although high military cost was found in the case of the Ottoman Empire, high cost of living was not convincingly shown. Geopolitical is more strongly supported, with evidence of border conflicts, cultural revolution, and efforts at homogenization.

DISCUSSION

World system theory and geopolitical theory both attempt to explain why hegemonic world powers eventually lose power. When tested using the case histories of the Roman and Ottoman Empires, geopolitical theory seemed more accurately to describe the reasons for decline. The factors of world system theory, high cost of living and high cost of military, were not consistently present in either case. High cost of military was only present through interpretation, in that a large and frequently used military must be expensive. This lack of evidence, however, probably results from the type of data used to test the theory. Data about cost of living is best operationalized through use of numerical data, such as average daily wages and population growth and mortality rates that could be found in economics texts. This type of data was not available in the historical sources used for this analysis. Also, standard of living is best understood through comparison with other nations of the time. While historians can say that the standard of living was good or poor, only comparison to other nations not in a state of decline can prove if the factor is present or not.

Data on high cost of military, also, would be best operationalized through numerical data on military budgets. This data also could be found in economics texts as well as military history texts. Additionally, military

budget should be compared to the budgets of other nations of the time. Although world system theory was found to be inaccurate in describing the decline of power in these case studies, further research with different types of data could prove differently.

Geopolitical theory was strongly supported as describing factors of decline in both cases. Constant battles over territory and cultural rebellions were shown to lead to the downfall of these empires. This theory seems to be a very logical explanation of decline in the two cases. Both empires had dominated the known world for many years. It was only a matter of time before other nations attempted to bring them down by attacking their borders and slowly pushing the empires' domains inward. Cultural rebellions are also a logical consequence of a long reign. As the conquered provinces developed and gained strength in their subcultural nationalism, it is only natural that they would attempt to break free of foreign rule.

More evidence besides the number of conflicts the empires were involved in is needed better to support geopolitical theory. Map analysis should be done to compare length of shared borders and the hostility of neighbors with the length of natural, non-threatened borders. Also, the number of conflicts would be better understood in comparison with the number of conflicts other nations of the time that were not in a period of decline were facing.

Finally, it must be noted that testing two factors of each theory does not prove the merit of the entire theory. As noted in the introduction, for each theory there are many more factors involved in the decline of world powers. Factors not tested in this case analysis might have had a great impact on the decline of the empires. Future research should take all of these limitations into consideration more fully to understand how effective these theories are in describing the decline of world power.

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An Analysis of Sexual Harassment: Perceptions of “Greek” Students

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ABSTRACT

Sexual harassment has been widely studied in the workplace and on college campuses, but views among college students have not been adequately explored. Particularly of interest is sexual harassment as viewed from the perspective of fraternities and sororities. In our study we presented an ambiguous situation of possible sexual harassment to 100 “Greek”-life students. Our results indicate that “Greek” students felt the situation presented was representative of sexual harassment and furthermore, there is a strong link between the perception of masculinity with this behavior.

Literature Review

Since the feminist movement in the 1960s, women have been fighting for equal rights and treatment in every facet of society. Sexual harassment has always been one of the main social evils that activists have focused on trying to erase from the social landscape, and the slow battle against harassment is being won as time marches on and new generations of leaders and thinkers take control. Sexual harassment in the workplace or in academic settings has been adequately studied and has seen a fairly dramatic decrease since awareness of the problem has been raised. However, sexual harassment in social situations is harder to determine and harder to eradicate. The equality of individuals in casual social settings such as parties or personal interaction has no way of being regulated and so change comes much slower as social norms of

behavior change to adjust to match the more structured elements of society.

Sexual harassment is best described as unsolicited nonreciprocal male behavior that asserts a woman’s sex role over her function of a worker (Coeli Meyer 4). Sexual harassment sometimes results from sexually aggressive behavior. This kind of behavior is characterized by “engaging in a sexual activity against one partner’s will” (Brown 28). A definition such as this allows various acts to fall under the category of sexual harassment, including “verbal abuse, sexist remarks regarding a woman’s clothing or body, patting, pinching, or brushing up against a woman’s body, leering, or ogling, demand for sexual favors in return for hiring, promotion or tenure, physical assault, and rape” (Coeli Meyer 4). “Estimates of sexual aggression during dates vary from 15% to 78%, with both sexes inflicting it (men more) and receiving it (women more)” (Brown 28). These behaviors by men all contribute to the fact that sexual harassment is problematic for woman. In one study, 92% of women said that sexual harassment was a serious problem (Coeli Meyer).

Perceiving and interpreting what actually constitutes sexual harassment is a challenge that a victim must experience. Some women see ambiguous behaviors, such as a compliment about physical appearance, as sexual harassment and by others as nothing more than flattery (Pryor 405). “In these ambiguous cases, women typically perceive more harassment than men” (Pryor 405-406).

A factor that women evaluate while deciding whether certain behavior is sexual harassment is the overall impression given by the man from whom the comment or action originated. Negative feelings or attitudes toward such an individual will more likely result in a woman finding his behavior to be sexual harassment (Pryor 406). However, when a woman dresses or acts in a way that portrays her sexuality, the consequent of a male overt response to her sexuality is less likely seen as harassment (Pryor 413).

The law of sexual harassment evolved over time to benefit women. This creation of the law was not from the efforts of legislatures, but instead through judicial decisions rendered by courts (Mackinnon 813-833). The D. C. Circuit Court was instrumental in the crafting of the law. As the cases of women victims came before them, the judges listened intently to the facts and realized that there was a real victim. They understood that they must remedy this issue and thus started to implement sexual equality under the law, contrary to men's social power over women (Mackinnon 813-833). The lawyers who brought these cases to court argued them as "sexual discrimination under Title VII violations, but the establishment of sexual harassment as a legal claim for sex discrimination does not follow from a concerted plan of self-conscious legal elites" (Mackinnon 813-833). Title VII is the portion of the Civil Rights Act of 1964 that makes it, "an unlawful employment practice for an employer...to discriminate against any individual with respect to compensation, terms, conditions, or privileges of employment because of such individuals[']...sex" (Mackinnon 813-833). These landmark cases corresponded to a time when the women's movement had laid a foundation for these claims (Mackinnon 813-833).

In 1976, Diane Williams successfully argued that her supervisor had harassed, humiliated, and terminated her (Mackinnon 813-833). Judge Charles Richy held that the supervisor's actions fell within Title VII

because it is an "artificial barrier to employment...before one gender and not [the] other" (Mackinnon 813-833). This holding is strengthened even more by the 14th

Amendment clause of equal protection.

Under this clause, individuals have to be "similarly situated" under the law in order to be eligible for equal protection and Judge Richy determined that Williams and her supervisor were so situated (Mackinnon 813-833). According to Judge Richy, "Both sexes had sexuality, both had jobs, only the sexuality of one sex...was made into a disadvantage in employment" (Mackinnon 813-833). *Bundy v. Jackson* (1979) expanded the sexual harassment law by holding that "being treated as a sex object at work could be harmful in itself, and that harm was the harm of sex discrimination" (Mackinnon 813-833). Sexual harassment law has developed to the point where the "focus turns away from sex difference and sameness to the real inequality problem: social hierarchy of status on the basis of sex" (Mackinnon 813-833).

Sexual harassment is not limited to the workforce; it also exists within the college community. Sex can be used in a dominating role or to express hostility toward the opposite sex (Committee on the College Student 31). While sexual conduct is usually considered a private matter, it becomes public when individuals have decided to regulate its usage (Committee on the College Student 103). "The socialization process in the United States encourages some attitudes and beliefs that allow sexual harassment to occur and not be recognized" (Weinberg 148). This kind of tolerance can be easily viewed within social groups that are commonly seen portraying such behavior:

Some men will act in groups in ways that they would not act individually, and more serious incidents or peer harassment take place in groups of men. Fraternities are often involved in peer harassment, perhaps as part of pledging and hazing rituals. Examples of group harassment include publicly rating the attractiveness of women; yelling, whistling, and shouting; exhibitionism, such as "mooning"; and physical intimidation (Weinberg 160).

Several studies have concluded that 70% to 92% of women experience some unwanted sexual tension or insult. "Often this behavior is shrugged off or accepted with 'that's what it's like at college' or 'boys will be boys'" (Weinberg 159). Denying that sexual harassment is happening on college campuses may be viewed as an extension of stereotypical male and female roles (Weinberg 149).

Alcohol consumption is generally regarded as a key component of college life. "Alcohol has been suggested to be both a precipitant of and excuse for sexually aggressive behavior by men" (Larimer 297). Fifty-five percent of college men who admit to acting inappropriately on a date or other social situation were under the influence of alcohol (Larimer 297-298). While alcohol can be linked to sexual harassment, studies indicate that membership in a sorority helps protect women from such behavior (Larimer 298).

Race also serves as a significant factor in the determination of sexual harassment. Research indicates that when gender and race are unspecified in cases or fact patterns, the audience will assume that the victim is a Caucasian woman and the perpetrator is a Caucasian man. Therefore, much of what is known about sexual harassment is based on a Caucasian man and woman relationship (Shelton 596). This facet complicates sexual harassment claims by minorities. Black women who argue sexual harassment are questioned whether their discrimination is based on race or sex (Siegel 20). "Instances of race/sex discrimination may be 'manifested either implicitly, so that the woman is unsure whether the harassment is racially or sexually motivated, or explicitly where the harasser expressed his sexual interest in terms of her race'" (Siegel 20). The determination is also largely based on the race of the perpetrator. In a recent study, "Both groups of women (White and Black) perceived the behavior as more appropriate and humorous when the harasser was Black and when the harasser was of equal power level" (Shelton 609). Sexual harassment was more often classified when the harasser

was White or had a higher power level (Shelton 609). Based on the stereotype that Black women and Black men are usually overtly sexual in their interactions, findings have indicated that people perceive sexual harassment between a Black man and Black woman as trivial compared to if the harasser was a White male (Shelton 610).

The verdicts rendered by juries in sexual harassment cases are also distinguished by race. "Guilty verdicts were significantly more frequent (79%) when the plaintiff was White than when she was Black (59%)" (Wuemsch 587-600). This effect seems to be associated with the gender of jurors (Wuemsch 587-600). "Among the male jurors, verdicts were significantly more frequent when the plaintiff was White (80%) than when she was Black (44%); however, among the female jurors the race of the plaintiff has no significant effect on the verdict" (Wuemsch 587-600). The race of the defendant was more likely when the defendant was Black (73%) than when he was White (50%), but race of defendant had no significant effect on female jurors (Wuemsch 587-600). The discrepancy created by these statistics and the perceptions of sexual harassment based on race as discussed earlier can be explained by racism and the bias of the criminal justice system.

Sexual harassment is usually defined from the female's point of view but rarely from the man's. "For men, harassment is a private trouble while the harassment of women is public issue, because it reflects and sustains the objectification and devaluation of women found within male-dominated institutions" (Mazer 17). The rate of male reporting may indicate that men found sexual harassment to encompass more behaviors than women (Mazer 17). Men may admit these experiences, but the way in which they perceive them is different from women (Mazer 16).

The type of woman who is likely to be harassed by a man depends on various factors. Men are most likely to "molest female interaction partners more when they express

egalitarian rather than traditional gender role attitudes; this is particularly true for males with a high propensity to harass, with sexist attitudes, with a strong identification as males, and for low self-monitors" (Dall'Ara 681). Men are more likely to harass women with stronger personalities because these women pose a serious threat to their identity and dominance (Dall'Ara 686). If the setting is one in which groups of males and groups of females are present, harassing behavior is more likely to happen than in a scenario in which one male and one female interact (Dall'Ara 687). In a recent study, 54% of respondents thought egalitarian women would more likely be harassed compared to 37% who thought that traditional women would be harassed (Dall'Ara 700). It should be noted that a "traditional" style woman is one who primarily takes care of the domestic setting, while "egalitarian" implies that woman who is active in the workforce.

Masculinity also has implicit stereotypes of sexual aggression. "Not only is aggression part of the masculine stereotype in our society, in gender schema theory it is featured prominently as part of the male role, and it does, in fact, constitute an item on the masculine sex role scale" (Weisbuch 590-591). This would explain why so many men seem to utilize aggression in conjunction with sexuality, which leads to the acceptance of sexual harassment. Studies have shown that men with high masculinity express their aggression in a subtler, non-exposing form. With this approach comes a fear of retaliation, which may lead to further acts of covert aggression (Weisbuch 591).

While men are usually the perpetrators in sexual harassment, they are sometimes the victims of such behavior. "Thirty-four percent of men report experiencing some form of sexual coercion from female acquaintances since the age of sixteen" (Larimer 296). Research has indicated that in studies where the gender of the victim and perpetrator is not identified, respondents who determined that sexual harassment took place

were just as likely to state that the victim was a male as a female (Larimer 305).

In our study, we propose to study how and in what ways sexual harassment still takes place on the college social scene and what the perceptions of the "Greek" college population are concerning such incidents. We will focus primarily on the following hypothesis:

H1: In a "Greek" society, sexual harassment takes place in order to facilitate and increase the perceptions of masculinity in males.

H2: Sexual harassment is more likely to take place and be accepted within the "Greek" community.

METHODOLOGY

A. Participants

Data for this study were gathered via an anonymous survey completed by 187 undergraduate students at a medium-sized college in New Jersey who were asked to volunteer their participation. Survey respondents were not paid for their participation in this study. Stratified random sampling was utilized in this study. Thus, all of the subjects have an affiliation with a "Greek" organization, either a fraternity or sorority.

B. Research Design

Experimental design was used in this research. All participants were given a one-page fact pattern (see Appendix A) detailing a situation in which sexual harassment may or may not have taken place. The subjects were then asked to complete a short survey (see Appendix B). All participants were given an identical fact pattern and survey. The independent variable that was statistically analyzed was gender.

C. Survey Instrument

The surveys completed by subjects asked a series of several closed-ended questions. Three of these questions sought demographic information: the participant's gender, age, and ethnic background using predefined categories. One closed-ended question explored whether the respondent, a member of the respondent's family, or a close friend of the respondent, had ever been a party to sexual

harassment. Responses were coded on a four-point Lykert scale (0 = not to my knowledge, 1 = no, 2 = yes, as the victim, 3 = yes, as the alleged perpetrator). The remaining questions involved the subject's interpretation of the fact pattern. The question pertaining to how likely the respondent was to agree that the fact pattern represented a scenario depicting sexual harassment was coded with a Lykert scale (0 = very likely, 1 = likely, 2 = somewhat likely, 3 = not likely). One question addressed the respondent's assessment of the masculinity presented by the male character in the fact pattern. Responses were coded on a four-point Lykert scale (0 = very masculine; 3 = not masculine). The remaining two closed-ended questions on the survey asked the respondent to choose a term that best described the actions of the characters in the story. Responses were coded on a four-point scale for both questions (for the male character: 0 = superior, 1 = typical, 2 = indifferent, 3 = pathetic; for the female character: 0 = independent, 1 = typical, 2 = indifferent, 3 = submissive). A final open-ended question asked all participants to explain their reasoning for answering the questions as they did.

D. Ethical Concerns

Conducting research in the area of sexual harassment always poses ethical concerns since many people are not comfortable talking about the subject matter and others have personally experienced sexual harassment. In order to avoid these problems, informed consent was obtained from all the participants before they began to read the fact pattern and answer the survey questions. The informed consent form explained to the subjects that the topic of research was sexual harassment. Furthermore, it stated that participants could withdraw from the study at any time. Participants were also told that they did not have to respond to any questions that made them feel uncomfortable and they could cease participation at any time if they became uncomfortable with any of the questions. The name and phone number of the college psychologist was also listed

on the form in case participants felt uncomfortable after the study and preferred to talk to a professional.

E. Limitations

The small sample size that was taken for this study is a limitation the researchers acknowledge. As a result of the stratified random sample, a simple random sample was not obtained. Additionally, the results will not have a great deal of sample generalizability. You cannot generalize the results from this small sample to the larger population. Cross-population generalizability can be obtained, however, as the results can be generalized to another somewhat similar college with a "Greek" population. Another concern with the sample is that all the participants are associated with a "Greek" organization. Therefore, the results again will not depict the college as a whole. Rather, the results are generalizable to other "Greek" organizations at the same or similar mid-sized college.

RESULTS/DISCUSSION

Sample Characteristics

The study yielded a sample that was 51.9 percent male and 48.1 percent female. Ninety-two percent of respondents were Caucasian, which reflects the demographic of the mid-sized, liberal arts college that was selected. The remaining eight percent of survey respondents' races were evenly distributed through other ethnicities.

Analysis of Results

One hypothesis set forth in this study is that most "Greek" students would find the situation in the fact pattern to be sexual harassment. We also believe that the situation presented would be accurate and common behavior in the lives of the students sampled, making them more aware of what constitutes sexual harassment. Table 1 shows the descriptive statistics pertaining to sexual harassment.

Table 1: Descriptive Statistics for Sexual Harassment

	Frequency	Percent
Very Likely	30	16.0%
Likely	53	28.3%
Somewhat Likely	71	38.0%
Not Likely	33	17.6%

Although only 16 percent of respondents were “very likely” to agree that the fact pattern presented a scene of sexual harassment, 82.3 percent agreed on some level that sexual harassment took place. This can be explained by considering the ambiguous nature of the act, especially as presented in our study. Some confusion was expected, but ultimately, as the data indicates, there was a general feeling that sexual harassment was taking place in some way. Respondents who viewed the situation as “not likely” to be sexual harassment may consider this to be natural behavior in a party environment or perhaps they felt that the actions in the fact pattern were not severe enough to warrant the label of sexual harassment.

Another hypothesis was that the actions of the male in the fact pattern would be viewed as masculine behavior. Table 2 illustrates the descriptive statistics regarding masculinity.

Table 2: Descriptive Statistics for Masculinity

	Frequency	Percent
Very Masculine	29	15.5%
Masculine	90	48.1%
Somewhat Masculine	45	24.1%
Not Masculine	22	11.8%
Missing	1	.5%
Total	186	100%

Table 2 indicates that 87.7 percent of people surveyed found the male in the fact pattern “masculine” on some level. The aggressive behavior of the male is most likely what caused this perception. Whether or not aggressive behavior in such circumstances is acceptable or is in violation of social norms will be discussed later in this paper.

More important than the perception of masculinity in the eyes of the respondents is the link between masculine perception and sexual harassment. When masculinity and sexual harassment were analyzed they resulted in a negative correlation ($r = -0.121, p < 0.099$). While these results don't indicate a relationship between the two, a cross tabulation of these factors shows a strong connection. For the individuals who were “very likely” to agree that the information in the fact pattern was sexual harassment, 76.7

percent also believed that the male character was displaying masculinity on some level. For individuals who were either “somewhat likely” or “likely” to agree that sexual harassment occurred, 16.1 percent believed the male character to be “very masculine,” while 75.8 percent believed that he was either “masculine” or “somewhat masculine.” As our data suggests, 91.9 percent of survey respondents seemed to indicate that there was some connection between the character's masculinity and the act of sexual harassment.

This supports our hypothesis that the two ideas are linked. While causation cannot be proven, certainly the existence of a relationship between the two is illustrated in our statistics. The data indicates that the idea of masculinity in the “Greek” culture is one that is seen as aggressive, overt, and even harassing. The social norms reinforced by the “Greek” lifestyle are cycled, in that because it is a hierarchical system, the old ideals are passed on to the next generation, perpetuating the image of the socially aggressive, conforming male. With this in mind, it seems that acts of sexual harassment are almost encouraged by such a culture or at least accepted as normal behavior. This is interesting because while “Greeks” surveyed identified the situation as sexual harassment they still held up the male character as a masculine individual.

An analysis of variance was performed and revealed that the mean of the ages did not effect sexual harassment ($F = 0.190, p < 0.903$). This supports the idea that even the new members in “Greek” society are either adapting to accept the image of masculinity that “Greek” life already supports, or they already embrace these ideals and find them reinforced by “Greek” life. In order to determine accurately which of these is the case, further studies will be needed.

Table 3 represents the descriptive statistics as to how the male character was perceived.

Table 3: Descriptive Statistics for Male Description

	Frequency	Percent
Superior	15	8.0%
Typical	90	48.1%
Indifferent	25	13.4%
Pathetic	57	30.5%

The most interesting figure presented here is that almost half the people surveyed thought that the male character's actions were "typical." It should be noted that 30.5 percent found the character to be "pathetic." In this case, we believe those surveyed did not interpret the word "pathetic" to mean pitiable or having an element of pathos, but more that the character was "pathetic" in that those surveyed felt that the male character is a "loser."

Despite the male character being described as "typical," he was also considered "masculine" ($r = 0.414, p < 0.000$). Of the 90 respondents who said he was "typical," 16 respondents described him as "very masculine" (17.8 percent), 57 described him as "masculine" (63.3 percent) and 15 respondents characterized him as "somewhat masculine." Of those surveyed, 97.8 percent felt that the character was "masculine" on some level and his behavior was "typical." This seems to indicate that "Greek" society's view of what masculinity means is closely related to acts of sexual harassment, aggression, and conformity. Furthermore, this indicates that a man who does not act in this way would be an outcast in a "Greek" organization because he does not fit into its society's set of norms.

Age did have significance in the perception of the male's behavior ($r = 0.183, p < 0.012$). Fifty percent of 18-year-olds thought the character's behavior was typical, whereas 12.5 percent believed his behavior was pathetic. This indicates the youngest and most impressionable "Greeks" surveyed accept this behavior and believe that the actions in the fact pattern are representative of the reality in which they live. With the 19-year-old respondents, 53.8 percent found the behavior of the male "typical," while 14.3 percent characterized him as "pathetic." Fifty percent of 20-year-olds agreed that his behavior was

"typical," 34.8 percent found his actions to be "pathetic." Lastly, 37.3 percent of 21-year-olds found it "typical," while 43.1 percent found it "pathetic." The shift from "typical" to "pathetic" as the respondents get older may be a reflection of increasing maturity or that their social circles are expanding to include the bar scene and not just fraternity or sorority parties. This seems to indicate that along with maturity there comes a re-evaluation of one's perception of masculinity.

Table 4 shows the descriptive statistics regarding the perception of the female character.

Table 4: Descriptive Statistics for Female Description

	Frequency	Percent
Independent	35	18.7%
Typical	75	40.1%
Indifferent	48	25.7%
Submissive	28	15.0%
Missing	1	.5%
Total	186	100%

When the descriptions of the male and female character are compared, the majority of responses place them both into the "typical" category, which is statistically significant ($r = 20.984, p < 0.013$). This means that 88.2 percent of total respondents placed them in these categories. When this data is compared with the 82.3 percent of respondents who believed it was sexual harassment on some level, the widespread severity and commonality of sexual harassment becomes much more clear. Because the behavior in the fact pattern is considered to be "typical" and is also considered to be sexual harassment in some way, one can only deduce that in "Greek" society sexual harassment is typical.

Table 5 gives the descriptive statistics for respondents who have experienced sexual harassment.

Table 5: Descriptive Statistics for Occurrence of Sexual Harassment

	Frequency	Percent
Not To My Knowledge	59	31.6
No	60	32.1
Yes As The Victim	61	32.6
Yes As The Alleged Perpetrator	6	3.2
Missing	1	.5
Total	186	100%

As evidenced by Table 5, 35.8 percent of respondents had been involved in sexual harassment. This is disturbingly high and reinforces the earlier findings that lead us to believe that sexual harassment is typical among "Greeks." Of note is that of the 61 respondents who were victims, 40 of them (65.6 percent) were female, while 21 (34.4 percent) were male. These statistics indicate that even though respondents felt that they were sexually harassed at a party, they viewed the actions in the fact pattern as fairly representative and normal. This seems to reinforce the masculinity of males because this behavior is not reprimanded; it is tolerated. This empowers the males further to victimize women. The data for males who were harassed is higher than we anticipated. This can be explained by the assertion of female independence in reaction to male aggression causing females to adopt the commonly male behavioral characteristics of harassment. The 35.8 percent who have experienced harassment may account for the 17.7 percent that felt that the actions in the fact pattern were not sexual harassment because the severity of their own experiences made the behavior in the fact pattern appear tame.

This study indicates that the majority of "Greek" students found the information in the fact pattern to depict sexual harassment. The manner in which the survey respondents viewed the male character in the fact pattern was also consistent with our hypothesis. An overwhelming percentage of respondents categorized the male character as masculine. The link between sexual harassment and the presence of masculinity is undeniable. There is clearly a strong relationship—that in order to have one the other is necessary.

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APPENDICES

A.) Fact Pattern

The music was blasting and the new hit from 50 Cent had everyone at the party having a good time. Robert was refilling his cup at the keg when Matt, his best friend, approached him with a big smile. He said, "Hey man, I got good news for you." "What the hell are you talking about?" Robert responded. "You see that girl across the room dancing with her

friends," Matt asked. "The one wearing the red tank top and jeans; I think her name is Julia. I was talking to one of her friends earlier and she let it slip that she has a thing for you."

Robert had noticed Julia earlier that evening. They had made eye contact from across the room. With this news from Matt, he decided to go over and talk to her. Julia's back was turned to Robert as he approached her, so he greeted her with a quick pinch of her ass. "Hey Julia, what are you doing later?" Julia turned immediately and said, "What's up with that?" "Let me know when you're bouncin'?" Robert said. Julia laughed. Robert then leaned in and whispered something into her ear and kissed her neck. She then turned back to dancing with her friends and Robert walked away.

Please answer the following questions on the next page. Thank you for your cooperation in this study.

B.) Survey

1. What is your gender?
 - Male
 - Female
2. What is your main ethnic or racial group?
 - Caucasian
 - African-American/Black
 - Hispanic/Latino/Latina
 - Asian-American/Pacific Islander
 - Other
3. What is your age?
 - 18
 - 19
 - 20
 - 21
 - 22+
4. How likely would you be to agree that the scenario in the fact pattern is sexual harassment?
 - Very Likely
 - Likely
 - Somewhat Likely
 - Not Likely
5. How would you rate the masculinity of Robert?
 - Very masculine
 - Masculine
 - Somewhat Masculine
 - Not Masculine
6. Which of the following words best describes Robert?
 - Superior
 - Typical
 - Indifferent
 - Pathetic
7. How would you rate the actions of Julia in the fact pattern?
 - Independent
 - Typical
 - Indifferent
 - Submissive
8. Have you, a member of your immediate family, or a close friend ever been involved in sexual harassment?
 - Not to my knowledge
 - No
 - Yes, as the victim
 - Yes, as the alleged perpetrator
9. Do you feel that any other information would help you render a better decision? Why?

Please answer Question 9 on the back of this form.

A New Code of Ethics: Meeting the Information Technology Challenge

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ABSTRACT

Information Technology (IT), like many other fields, has in place a Code of Ethics that guides IT professionals toward ethical decision making. However, this loosely defined set of guidelines differs from those guidelines established in other fields that were not developed in today's "Network Era." The dynamic nature of technology, and therefore the Information Technology field itself, creates the need for an elastic set of guidelines. With a professional code that will never remain static, how will the Information Technology Code of Ethics ever be as effective as codes of other professions? This paper addresses the means by which the Information Technology Code of Ethics can meet the demands of its changing environment and thus attain the efficacy of older, time-tested professional codes.

INTRODUCTION

Ethics in IT

Any project that an Information Technology (IT) professional undertakes has a set of specifications to heed. Specifications may include server configuration protocols, maximum cable length, software GUI requirements, or any number of other provisions that may be involved. The IT professional has a set of rules to follow while working toward the completion of his/her goal. Technically, the IT professional knows what he/she has to do and applies his/her knowledge correctly to complete the required task. However, is just getting the

job done all that the IT professional is responsible for?

He/she has instructions on how to complete the project at hand, but once completed, what other responsibilities does the IT professional have? Is he or she responsible for the protection of information that goes onto a server or over the Internet? Who has access to this potentially privacy-invading information? In today's world of cyber crimes and identity theft, this information is extremely vulnerable.

Because the IT profession is the first in the "new wave" of professions in the Network Age, its ethical standards are somewhat immature in comparison to standards of older professions [1]. Professionals of other disciplines, such as doctors and lawyers, have had ethical standards in place for years. They have been abiding by these rules in order to provide the most humane service to their clients [2].

The IT field has recently developed a Code of Ethics, but how effective will it be? Is it sufficient to provide services that protect the end users from harm? Can it be compared to the codes of ethics of other professions? The gray area of ethics becomes even grayer in the new professional wave because, "traditions for understanding professions are still rooted in the Industrial Age and do not adequately inform us about coping with the new realities of the Network Age" [1].

Addressing any issue for the first time is more complex than redefining already existing standards. The dynamic nature that is

characteristic of IT also makes setting ethical standards more difficult than in static fields. Perhaps the Information Technology field's new Code of Ethics will be successful on its own, or maybe it will require the support of additional, supplemental aids. Whichever the case, the ultimate goal of the IT Code of Ethics is to reach a level of effectiveness and professionalism comparable to other professional codes. The major challenge resides in determining how to reach that level.

Research Methods

The facts and opinions presented in this paper come from industry-leading journals and magazines such as *Computerworld* and *Communications of the ACM*, as well as IEEE issued documentations. We have also interviewed IT professionals to get insight into real-life, IT ethical situations. As fourth-year IT students, we present our opinions based on the instruction we have received throughout our educational careers. Many of us have had the opportunity to work in fields that handle sensitive information, such as network design, e-mail post mastering, database management, insurance claim filing, and e-commerce. These areas deal with customer information that could potentially be used for unethical or illegal purposes. The information and analysis presented in this paper are in conjunction with the aforementioned sources.

Organization

The following sections of this paper explore whether a code of ethics is enough to ensure that sensitive information is handled in a proper manner. The first section addresses whether an ethical code is sufficient alone. The second section delves into alternatives that could be used either in place of, or alongside, the Code of Ethics. Exploring these two scenarios allows us to form our own opinion, which will be discussed in the third section. Conclusions are then drawn and supported from points within the paper.

A Code of Ethics

Scenario 1—A Code of Ethics Will Be Effective Alone

To begin this discussion, we will first explore implementing the Code of Ethics by itself. It is important to consider that the effectiveness of an unaccompanied Code of Ethics can be examined by studying the current ethical effectiveness of the IT field. In other words, is the Code of Ethics playing an effective part in Information Technology today?

Currently there are no laws enforcing or dictating that one must adhere to this code; rather, it is simply a set of guidelines that *suggests* appropriate behavior. In addition, we must consider the personal nature of ethical decision making and how this may impact the code's usefulness [3]. For example, a majority of people would agree that identity fraud is unethical, while a significantly smaller number of people would consider management's access to employee e-mail unethical [4].

To demonstrate these two points, we first consider a simple example of an ethical decision: identity fraud. In such a case, whether or not the professional behaves in an ethical manner is a personal decision. If the professional behaves in an unethical manner, he or she is aware that the decision is not in accordance with the Code of Ethics (and thus is morally wrong), but chooses to ignore society's moral code. The fact that the Code of Ethics exists is irrelevant to this person.

On the other hand, a good-intentioned person will not commit such a crime, regardless of the Code of Ethics. This example demonstrates the degree to which ethical decisions are personal and therefore implies that, in certain circumstances, the Code of Ethics is ineffective. It also implies, however, that good-intentioned people desire to do what is right, and therefore would look for a set of guidelines on ethical behavior, thereby making the code effective.

The above was a simple example. However, can the Code of Ethics be a sufficient tool in a field where the majority of ethical dilemmas are not as black and white? Can the

code be effective when ethics is not considered in all decision making? For example, many employees do not consider the ethics of using company resources to check their personal e-mail accounts.

In a study done by 300 students at a large university, it was found that, "When a person feels the ethical issue in a situation is not especially important, that person is more likely to act based on what company standards say is acceptable or unacceptable to company standards" [5]. This demonstrates that by emphasizing the importance of the Code of Ethics in a company, employees are more apt to make good ethical choices when they are unsure of what is right and wrong.

Scenario 2—A Code of Ethics Will Not Be Effective Alone

Since we have already discussed the effectiveness of an unaccompanied Code of Ethics, we will now consider its effectiveness when implemented with other tools that aid in its regulation. Although it is obvious that a Code of Ethics is needed, it is unclear if other practices should be employed alongside it, and which practices would be most effective. Supplementary practices may include providing employees with ethical training, requiring employees to sign a contract, and spending greater resources toward advertising the code, among others.

We will first focus on providing employees with ethical training in the corporate environment. Ethical training can be an effective tool, because it introduces employees to various ethical situations that they may be faced with in the workplace. Training can be used to help explain the Code of Ethics and/or corporate guidelines, and provide employees with an opportunity to ask questions [7].

For example, Towers Perrin, a global benefits administration organization, focuses heavily on ethics training in the workplace. All new employees are required to attend five training sessions focusing on the work and history of the company, striving toward quality, and behaving ethically in the workplace. In addition, employees are provided with a study

guide and are required to interview their supervisor regarding ethics-related questions [8]. By implementing such a training program, employees are aware of the code's existence, its importance, and its benefits.

Yet another technique that can be used in enforcing the Code of Ethics is requiring employees to sign a contract, stating that they have read and understood the code. In many organizations, employees sign a Code of Ethics developed and maintained by their company after completing required ethical training. Likewise, the Software Engineering Code of Ethics can be signed after completing coursework developed for it.

The act of signing a contract ensures that employees are aware of the code, have read it, and will follow it to the best of their abilities. However, it is important that companies keep the Code of Ethics fresh in the mind of their employees. If companies fail to do so, employees may forget about the code after having worked there for some time.

Additionally, the company must ensure that employees have read the Code of Ethics and did not just sign the paper stating that they have read it. Often, when beginning employment with an organization, one must fill out a significant amount of paperwork, and it becomes difficult to have thoroughly read all documentation. Therefore, to maximize the effectiveness of the Code of Ethics, managers must ensure that employees have thoroughly read the Code of Ethics and remind employees of the Code of Ethics at regular intervals.

Managers can effectively remind employees of the code by requiring ethics refresher courses every two to three years [8]. Not only will refresher courses stress the importance of ethics in technology, but also, because IT is a dynamic and fast-growing field, ethical issues that did not previously exist may be addressed during these courses. In addition, the courses will discuss how ethics benefits both the employee and their company.

One example of how the code benefits both the employer and the individual is

Principle 7 from the Software Engineering Code of Ethics. It states that, "Software engineers shall be fair and supportive to their colleagues"[6]. Maintaining good relationships with colleagues creates a more comfortable and pleasant work environment for employees. Increased employee satisfaction will improve individual productivity and teamwork, which will benefit the organization as a whole.

An evident problem with the supplementary practices just mentioned is that all individuals utilizing IT will not be employees of organizations that sufficiently promote the Code of Ethics. Consider that for the code to be effective, it must be well known and visible. If people do not know that there is a Code of Ethics, then they surely cannot follow it. We can begin to fix this problem through increased awareness in schools, organizations, training programs, and IT professional organizations. In addition, organizations must view the Information Technology Code of Ethics as being equal in priority to their own guidelines, since it is commonplace for IT professionals to change their employer frequently.

The Authors' Position

In the real world, ethics comes second for many people, right after profit. But does that make an ethical code irrelevant? It is clear that the Code of Ethics is needed, but the Code of Ethics alone is not enough. It is important to remember that if a company has a *laissez-faire* attitude toward the code, no one will take it seriously. A code needs to be supplemented with training, signing of contracts, and publicity to ensure that it is followed by IT professionals. In addition, some organizations employ a manager of ethics whose primary responsibility is to ensure that the business and everyday operations of an organization are in agreement with the posted code [9]. We feel that employing a manager who is solely responsible for ethics would be a successful idea in controlling ethical issues.

We feel that ACM and IEEE, two of the largest international computing societies

supporting the Code of Ethics, intend for the code to be supplemented. For example, they have created the Professional Ethics Project, which aims at "publishing case studies, supporting further corporate adoption of the code, developing curriculum material, running workshops, and collaborating with licensing bodies and professional societies"[6].

We also believe that the Code of Ethics in technology is not sufficient, because it is not comparable to codes found in other disciplines such as law or medicine in which codes are adequate alone. The IT field evolves at a faster rate, and since new ethical issues turn over quickly, the Code of Ethics cannot remain static and will have to be modified. In addition, IT professionals may not abide by an honor code if there is no enforcement. If there is a risk of consequences for violating the code, employees will be less willing to stray from it. Therefore, it is essential that there be some regulation involved with enforcing the code, for example, through the aforementioned ethics manager.

CONCLUSION

It is obvious that the field of Information Technology should have a Code of Ethics. But is a Code of Ethics enough? A code may be effective alone for simple ethical decisions, such as identity fraud. For more difficult ethical decisions, however, the choices are not as black and white. As previously stated, if an IT professional is unsure as to how he/she should act, he/she will most likely follow the Code of Ethics in making a decision. However, having just a Code of Ethics by itself will prove effective only if the employee is both 1) assumed to be good-natured and willing to abide by an honor code and 2) is aware of and has read the Code of Ethics. Therefore, the Code of Ethics cannot be considered alone without supplementary tools.

In order to increase the awareness, and for the Code of Ethics to become an effective guide, companies must demonstrate to their employees that they take ethics seriously. For example, organizations must have ethics

training classes, in which employees are introduced to ethical issues that occur in the workplace. The training sessions must also be repeated every two to three years to help remind employees of the importance and benefits of ethics and to discuss any new ethical issues that need to be addressed.

Employees of different ages and levels of experience have different ideas concerning ethical behavior. Therefore, ethics courses, themselves, need to be diverse. Employees should be required to sign a contract stating that they have read and understood the Code of Ethics. In addition, because all technology professionals cannot be employees of organizations that sufficiently promote the code, it should be well promoted. Most importantly, however, the Code of Ethics needs to be enforced in some manner. Hiring an ethics manager to oversee ethical decision making, and awareness of potential consequences for violation, will go a long way toward making IT decisions less gray, and more black and white.

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Trace Fossils from the Cruziana Ichnofacies of the Upper Fox Hills Formation, Badlands National Park Vicinity, Southwest South Dakota

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ABSTRACT

The late Cretaceous Fox Hills Formation in southwest South Dakota preserves an ichnofossils assemblage assignable to the *Cruziana* ichnofacies. This ichnofacies represents outer shoreface conditions occasionally influenced by storms. Representative members include: *Asterosoma* sp.; *Asteriacites* sp.; *Cruziana* sp.; *Ophiomorpha* sp.; *Palaeophycus* sp.; *Planolites* sp.; and *Skolithos* sp. This assemblage indicates marine conditions predominated well into the late Cretaceous in southwest South Dakota and possibly right up to the well-documented bolide impact off the Yucatan Peninsula in Chicxulub, Mexico. Marine trace fossils are not evident in overlaying Tertiary strata suggesting a significant role in bolide-driven extinction. The search is under way for additional specimens accurately to assess the mode and tempo of this marine ichnofossil's extinction in southwest South Dakota.

INTRODUCTION

During the late Cretaceous, the Western Interior Seaway covered much of the mid-continent region of North America, extending from the Gulf of Mexico to central North Dakota (Fig. 1). This fully marine seaway was estimated to be less than 200 meters deep and had irregular shorelines consisting of deltaic complexes created by erosion and river transportation of sediment from the Black Hills region. The absence of marine sections that can be unequivocally dated to the Cretaceous/Tertiary transition

(e.g. Obradovich 1993), has generally been interpreted to indicate that this seaway had retreated from the northern plains region of the United States by the end of the Cretaceous (Chamberlain et al. 2001). Although upper Cretaceous marine fossils are ubiquitous in the northern plains region, limited documentation exists from the Badlands region of southwest South Dakota. This is primarily related to the fact that the majority of outcrop exposures in this region are Oligocene and preserve an extensive record of terrestrial deposition.

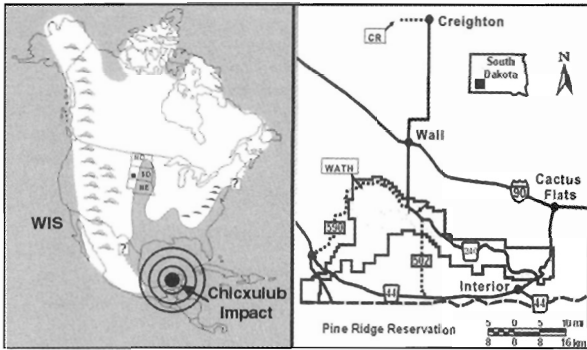
The first comprehensive report on upper Cretaceous marine fossils from Badlands National Park and surrounding regions in South Dakota was presented by Chamberlain et al. (2001). Marine fossils identified in this report included pelecypods, scaphites, ammonites, chondrichthyans, and trace fossils from a single ichnospecies. This paper is a follow-up report and focuses on recently recovered marine trace fossils from the Chamberlain et al. (2001) localities.

Location and Geology of Trace Fossil Recovery Sites: Wilderness Access Trailhead (WATH) in Badlands National Park and Creighton (CR)

Trace fossils were collected over three field seasons from two of the Chamberlain et al. (2001) localities: Wilderness Access Trailhead (WATH) in Badlands National Park and Creighton (CR), 50 km north of the Park (Fig. 1). Both locales occur in the upper Fox Hills Formation and have been recently dated using diatom biostratigraphy

to the late Maastrichtian of the upper Cretaceous, approximately 67 million years old (Palamarczak et al. 2003).

Figure 1: Distribution of the Cretaceous Interior Seaway and location map of WATH and CR localities in southwest South Dakota.



The WATH fossil site is located in Section 3, T2S, R15E, about 0.5 km south of the Wilderness Access Trailhead parking area on Sage Rim Road. This site can be accessed by a bison trail that leads southwest from the parking area. The CR fossil site is located on Section 27, T3N, R15E, on a gravel road about 10 km west of its intersection with Creighton Road, lying at the head of a gully just below the crest of the Cheyenne River Breaks.

In both the WATH and CR locales, the upper Fox Hills Formation consists of light tan, cross-bedded sandstones and siltstones with ripple lamination and herring-bone cross stratification. Daly (1997) interpreted these sedimentological characteristics to represent marginal marine deposits, such as deltaic, beach, and shoreface conditions, laid down during the withdrawal of the Western Interior Seaway.

Description and Discussion of Recovered Trace Fossils

Asterosoma sp. (Fig. 2a)

Description: Star-shaped burrow consisting of radial, bulbous arms that move inward toward an elevated center. Arms tend to be circular in cross-section and consist of concentric lamination of silt and clay, packed around a sand-filled central shaft.

Discussion: Pemberton et al. (1992) interpreted the *Asterosoma* trace as the feeding burrow of a worm, since the organism probed vertically and laterally into the sediment. *Asterosoma* is commonly associated with fully marine conditions, and is interpreted as an indicator of low-energy shoreface conditions with low rates of sediment deposition and a fairly stable substrate, allowing for intensive bioturbation.

Asteriacites sp. (Fig. 2b)

Description: Horizontal, five-pointed, star-shaped imprint with radial symmetry, spiny arms and tube feet.

Discussion: *Asteriacites* is interpreted as a resting trace made by an asterozoan or starfish-type creature. Typically, the animal made the impression when temporarily interrupting its locomotion in search of rest or refuge. Dorjes and Hertweck (1975) noted that the trace is indicative of shallow, nearshore marine environments and decreased wave energy conditions from the shoreface through the lower offshore.

Cruziana sp. (Fig. 2c)

Description: Crawling traces that display bilobed or chevron-like ridges with a defining medial groove podial imprint. The bilobed character is also a result of two parallel furrows that are, in many cases, formed in fine-grained sediment and preserved as casts on the base of an overlying bed. Ridges within the trail are preserved as scratch marks.

Discussion: *Cruziana* is interpreted as a locomotion trace made by a trilobite-like animal as it crawled along a sediment surface. In many instances, these trackways terminate in vertical burrows indicative of escape structures. Pemberton (1992) noted that *Cruziana* traces are representative of subtidal, poorly sorted and unconsolidated substrates that range from moderate energy levels in shallow waters to low energy levels in deeper water.

Ophiomorpha sp. (Fig. 2d)

Description: Simple to complex burrow system distinctly lined with agglutinated sediment. Burrow lining is typically near-smooth on the

interior and densely noded on the exterior, but varies with the specimen. Characteristics of the fill may vary but usually have a similar composition to the host rock. Branching is irregular and typically Y-shaped.

Discussion: Ophiomorpha traces were once thought by early Western Interior Seaway geologic investigators to be a type of seaweed, but later studies found it to be a trace fossil (Daly 1997). Today the trace is interpreted as dwelling or feeding structures that are similar to modern-day traces of ghost shrimp. Ophiomorpha traces are typically found in shoreface or brackish water environments (Pemberton 1992).

Palaeophycus sp. (Fig. 2e)

Description: Infrequently branched, distinctly lined, cylindrical, horizontal to inclined burrows in which the sediment fill is typically of the same lithology as the host stratum. Wall linings may be smooth or longitudinally stratified, and range from very thin to relatively thick.

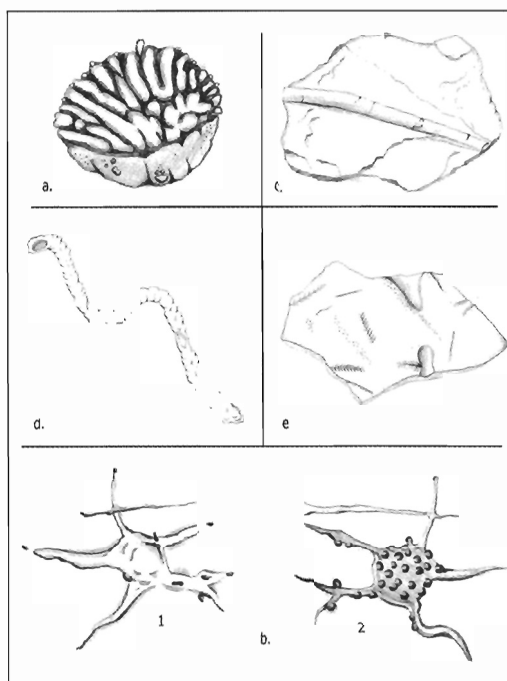
Discussion: The trace is interpreted as dwelling structures of predaceous vermiform animals and has been found in a variety of marine and brackish-water environments. The predaceous polychaete, *Glycera*, is considered a modern analogy to the *Palaeophycus* organism (Pemberton and Frey 1982). The elaborate interconnecting network of burrows produced by *Glycera* have durable, mucus-coated walls and represent permanent domiciles that have offshoots for foraging (Frey and Howard 1972). Frey and Pemberton (1984) noted that *Palaeophycus* is distinguished from the morphologically similar ichnogenus *Planolites* primarily by the presence of wall linings and character of the burrow fill.

Planolites sp.

Description: Unlined, rarely branched, straight to contorted burrows in which the structureless fill is different from the host rock. Burrow walls are smooth to irregular, and are circular to elliptical in cross section.

Discussion: Pemberton et al. (1992) noted that *Planolites* is distinguished from *Palaeophycus* primarily by having unlined walls and burrow fills that differ in texture from that of

Figure 2: Sketches of trace fossils recovered from WATH and CR locales: (a) *Asterosoma* sp., 1X; (b) *Asteriacites* sp., 0.5X; 1) cast; 2) mold; (c) *Palaeophycus* sp., 0.5X; (d) *Ophiomorpha* sp., 0.25X; (e) *Cruziana* sp., 0.5X.



the adjacent rock. *Planolites* traces represent deposit-feeding activities of mobile infaunal worm-like organisms, and have been found in almost every environment, from fluvial-overbank to deep sea. According to Frey and Pemberton (1984), *Heteromastus filiformis*, a deposit-feeding polychaete, is a possible modern analog to a *Planolites*.

Skolithos sp.

Description: Vertical burrow with a single cylindrical, entrance that never branches, crosses, or interpenetrates. Burrow shafts generally have smooth walls that are typically unlined.

Discussion: *Skolithos* is interpreted as dwelling structures of vermiform animals, particularly suspension feeders or passive carnivores. Pemberton et al. (1992) noted

that the probable originators were polychaetes, phoronids, or insect larvae. Generally associated with brackish environments, *Skolithos* can be found in almost every type of environment from marine to non-marine.

DISCUSSION AND CONCLUSIONS

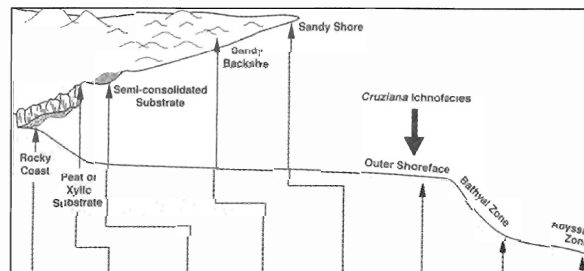
As demonstrated by numerous studies in the upper Cretaceous of the Western Interior Seaway, (e.g., Howard and Frey 1972; Frey and Pemberton 1984; Pemberton et al. 1992; Beynon and Pemberton 1992; Savrda and Bottjer 1993), trace fossils are both sedimentological and paleontological entities that represent a unique blending of potential environmental indicators in the stratigraphic record. Moreover, they are closely linked with the environmental conditions that prevailed at the time of their activity, and are useful in determining the original biological, ethno-logical and sedimentological conditions of that environment (Pemberton 1992).

The moderately diverse trace fossil assemblage recovered from WATH and CR described above is predominated by horizontally constructed burrows preserved as surface traces on host beds and sole casts on overlaying beds. Most burrows indicate grazing and feeding activities, although a single resting trace was recovered from the assemblage that currently consists of over 200 specimens. The majority of this assemblage comprises *Asteriacites* sp., *Asterosoma* sp., *Cruziana* sp., *Palaeophycus* sp., and *Planolites* sp. According to Pemberton (1984; 1992), these ichnospecies belong to the *Cruziana* ichnofacies and are indicative of moderate energy, subtidal, poorly sorted, unconsolidated substrates associated with outer shoreface conditions (Fig. 3). Also included in this assemblage are *Ophiomorpha* sp. and *Skolithos* sp. that have been previously suggested to indicate occasional increased energy and storm conditions along the outer shoreface substrate (Frey and Pemberton 1984; 1992).

The current trace fossil assemblage indicates outer shoreface marine conditions pre-

dominated well into the late Cretaceous in southwest South Dakota and possibly right up to the well-documented bolide impact off the Yucatan Peninsula in Chicxulub, Mexico (Alvarez and Alvarez 1980; Chamberlain et al. 2001). This terminal Cretaceous event has been linked to global mass extinction that included the last appearance on earth of dinosaurs 65.5 million years ago. In overlying Tertiary strata, members of the *Cruziana* ichnofacies are not observed, suggesting a significant role of bolide impact in extinction of the recovered trace makers in a retreating upper Cretaceous seaway. It will be necessary to recover and study additional trace fossil specimens from the WATH and CR locales accurately to assess the mode and tempo of bolide-driven extinction in marine ichnofossils of southwest South Dakota.

Figure 3: Location of the outer shoreface *Cruziana* ichnofacies with respect to bathymetric zonation. Recurring marine ichnofacies can include: *Asteriacites*, *Asterosoma*, *Cruziana*, *Planolites* and *Palaeophycus* as well as storm-introduced *Ophiomorpha* and *Skolithos*.



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B-type Natriuretic Peptide and Its Role in Diagnosing Congestive Heart Failure

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ABSTRACT

B-type natriuretic peptide (BNP) is secreted from the ventricular myocardium in response to increased wall tension as a result of volume expansion and is commonly associated with congestive heart failure (CHF). BNP concentrations serve as a distinguishing factor between CHF and Chronic Obstructive Pulmonary Disorder (COPD) and may provide a practical means to monitor CHF patients' management. The research project examined the correlation between BNP concentration and the classification of CHF as determined by the New York Heart Association (NYHA). The goal of this research was to affirm the correlation between BNP and the NYHA classification system as well as establishing mean values for each of the four NYHA classes. The medical records of 158 patients whose BNP levels were assayed at Southern Ocean County Hospital (SOCH) were used as a part of a utilization review. NYHA class was determined according to patient symptoms and physician reports. BNP values were blinded prior to class determination. A direct correlation between BNP concentrations and CHF classification was affirmed along with establishing a mean for each class. Additionally, the effects of medical treatment on BNP levels were studied in a single patient and confirmed the correlation between BNP and NYHA class.

INTRODUCTION

B-type natriuretic peptide (BNP) is a 32 amino acid peptide that is primarily secreted

from the ventricular myocardium in response to increased heart wall tension. BNP is one of the three main natriuretic peptides produced by the heart and vasculature and is commonly associated with elevated end-diastolic pressure and volume expansion, which are common symptoms of congestive heart failure (CHF). A-type natriuretic peptide (ANP) is secreted by the atrial myocardium due to dilatation. C-type natriuretic peptide (CNP) is produced by the endothelial cells and is secreted in response to shear stress but does not have natriuretic properties (Baughman, 2002). BNP is secreted in conjunction with ANP in patients with hypertension, volume overload, and hyponatremia. ANP is primarily stored in the atrial and ventricular myocardium while BNP is primarily stored in the ventricular myocardium. Thus, BNP serves as a more specific identifier for ventricular disease than other natriuretic peptides (Maisel, 2001). In addition, since ANP is stored in granules, minor stimuli such as exercise can cause a large release of ANP into the bloodstream (Maisel, 2001). Conversely, BNP is not found in storage granules but is derived from preproBNP, a 134 amino acid peptide. When preproBNP is cleaved, the resulting fragments are proBNP, a 108 amino acid chain, and a signal peptide consisting of 26 amino acids. When the ventricles are overloaded and expanded, proBNP is released into the bloodstream where it is cleaved into BNP and N-terminal proBNP, an inactive metabolite (Wu, 2001). As a physiologically activated hormone, BNP then serves to decrease sodium

concentrations in the blood as well as inducing vasodilation. The result is a decrease in blood pressure and water loss. The effects of BNP are contradictory to the renin-angiotensin-aldosterone system (RAAS). The RAAS increases blood pressure by releasing renin and aldosterone thereby inducing water retention as well as vasoconstriction (Wu, 2001).

Even with recent advances in pathophysiology, the initial diagnosis of congestive heart failure continues to be a major challenge for physicians. More than five million people in the United States are believed to have CHF and 400,000 new cases are diagnosed each year driving costs well above 38 billion dollars (Maisel, 2001). CHF is a clinical condition in which the heart is unable to supply the body with enough oxygen-rich blood to accommodate the body's needs during exercise and at rest (Wu, 2001). Common symptoms of CHF include hypertension, edema of the lungs and extremities, cardiomegaly (enlarged heart), and dyspnea (shortness of breath). The difficulty associated with diagnosing CHF lies in the fact that these symptoms are also common to other diseases such as Chronic Obstructive Pulmonary Disorder (COPD). Studies have shown that the severity of symptoms associated with CHF correlate with elevated BNP levels (Maisel, 2002). Therefore, a low concentration of BNP as determined by a rapid assay will definitively rule out CHF as a cause of patients' symptoms. It is the purpose of this study to affirm the correlation between BNP and the NYHA classification system for CHF as well as establishing mean values for each of the four NYHA classes.

METHODS

The patient study was conducted as a part of Southern Ocean County Hospital's (SOCH) utilization review. The medical records of 158 patients who had a BNP test done at SOCH were selected and reviewed. Various data was recorded from each record including previous medical history, physician diagnosis of CHF (prior to or during admission),

results of BNP test, result of chest x-ray, presence of pedal edema, and presence of dyspnea. Using the history and physical as well as physician notes, patients were classified according to the New York Heart Association (NYHA) guidelines:

Class I: Cardiac disease, but without resulting limitations of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea, or anginal pain.

Class II: Cardiac disease resulting in slight limitation of physical activity. They are comfortable at rest. Ordinary physical activity results in fatigue, palpitations, dyspnea, or anginal pain.

Class III: Marked limitation physical activity. They are comfortable at rest. Less than ordinary activity causes fatigue, palpitation, dyspnea, or anginal pain.

Class IV: Cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms of heart disease or the anginal syndrome may be present even at rest. If any physical activity is undertaken, discomfort is increased. (Criteria, 1994).

In order to ensure unbiased classification, BNP results were unavailable until after NYHA class was determined. A cut off value of 100pg/ml for dyspnea was used as a positive indicator for further tests to be performed confirming CHF.

RESULTS

Patients were grouped into three categories as shown in Table 1.

Table 1: A cut off BNP value of 100pg/ml was used to sort out positive and negative diagnoses of CHF.

No. of Patients	BNP level (pg/ml)	Confirmed CHF
25	<100	No
93	>100	Yes
40	>100	No

The BNP values of patients diagnosed with CHF were used in calculating a mean value for classes I, II, III, and IV of the NYHA (Figure 1). The mean values were as follows:

Class I—86.5pg/ml + 21.74

Class II—310.27pg/ml + 39.29

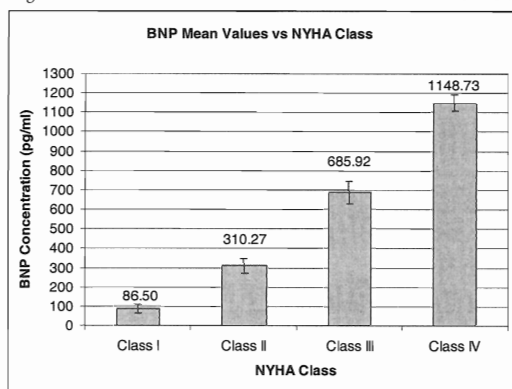
Class III—685.92pg/ml + 59.76

Class IV—1148.73pg/ml + 41.42

A majority of the 93 patients with confirmed CHF and elevated BNP levels were classified

as III or IV simply because they exhibit more severe symptoms that warrant medical attention. Class I and Class II patients fail to exhibit or exhibit mild symptoms of dyspnea or anginal pain and subsequently do not seek medical attention. A distinct correlation between BNP levels and each of the four NYHA classes was established.

Figure 1: BNP mean values of the four NYHA classes + standard error.

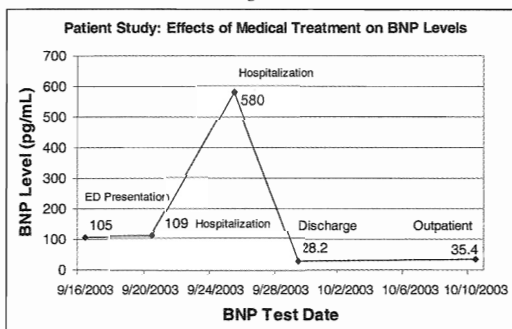


To extend this investigation, a detailed study of the effects of medical treatment was conducted for a single patient. The BNP values measured at respective times during admission and outpatient treatment are shown in Table 2. Figure 2 represents a visual timeline of the patient's treatment at SOCH.

Table 2: Dates and results of BNP assays from a 69-year-old female.

Date	BNP (pg/ml)	Comment
9/16/02	105	Patient presented to ED
9/20/02	109	Evaluation during hospitalization
9/25/02	580	Continued evaluation during hospitalization
9/29/02	28.2	Discharge
10/10/02	35.4	Outpatient re-evaluation

Figure 2: BNP values reflecting medical treatment of a 69-year-old female found to be in CHF during admission at SOCH.



DISCUSSION

Of the three most common natriuretic peptides, B-type natriuretic peptide (BNP) holds the most promise for aiding the diagnosis of CHF. A-type natriuretic peptide (ANP) is secreted by the atrial myocardium due to dilatation. C-type natriuretic peptide (CNP) is produced by the endothelial cells and is secreted in response to shear stress but does not have natriuretic properties. BNP is secreted in conjunction with ANP in patients with hypertension, volume overload, and hyponatremia. However, BNP serves as a specific indicator for ventricular disease since it is stored in the ventricular myocardium.

CHF is a clinical condition in which the heart cannot supply the body with a sufficient amount of oxygen-rich blood. The resulting symptoms include hypertension, edema of the lungs and extremities, cardiomegaly, and dyspnea. CHF is difficult to diagnose since these symptoms can be associated with COPD. Studies have shown that the severity of symptoms associated with CHF correlate with elevated BNP levels. Therefore, BNP serves as an indicator for whether or not a patient's symptoms are due to CHF.

The study established the existence of a direct correlation between BNP and NYHA class. In addition, the BNP mean values provide a relative range for each NYHA class. Therefore, a physician is able to adjust treatment according to BNP levels. A patient with elevated BNP levels of 1000pg/ml, for example, will be treated more aggressively than a patient with a level of 300pg/ml.

Of the 40 patients in Table 1 with elevated BNP levels but with unconfirmed CHF, most were found to have renal disease. Further investigation concluded that those patients with renal disease would have fluid retention due to malfunctioning kidneys. As a result, the cardiac ventricles release BNP in order to rid the body of the excess fluid.

An elevated level of BNP is not diagnostic of CHF. Patients with abnormally high BNP levels should undergo other diagnostic tests that will confirm a diagnosis of CHF.

Conversely, normal BNP levels exclude a diagnosis of CHF in patients with dyspnea or edema of the lower extremities.

The patient study seen in Figure 2 shows how medical treatment affects BNP levels. The patient, a 69-year-old white female, was admitted to SOCH due to her increasing shortness of breath and general weakness. Upon admission, her BNP levels were borderline at 105pg/ml thereby making CHF as a possible reason for the patient's dyspnea. During the admission, further tests were conducted to rule out various medical conditions. Her BNP levels were found to reach a peak of 580pg/ml thereby guiding the physician to a diagnosis of CHF. After treatment, the BNP level dropped to 28.2pg/ml upon discharge, which is well within the normal range. The patient continued her medication and was re-evaluated 11 days later at which time her BNP level was found to be normal at 35.4pg/ml. The short history of this patient's illness shows how BNP levels aid physicians in their diagnosis of CHF as well as the effects of medical treatment on BNP levels.

The rapid assay of BNP is a relatively inexpensive yet effective method of screening patients for CHF. In a matter of minutes, physicians will have results showing whether or not a patient's symptoms are due to CHF. When used in conjunction with other tests such as a cardiogram (EKG) and/or chest x-ray, physicians are able to treat patients diagnosed with CHF quickly and aggressively. Additionally, patients will be treated while further tests such as an echocardiogram can be completed, thereby reducing the severity of the symptoms while other procedures are used to verify heart failure.

ACKNOWLEDGEMENTS

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Computational and Structural Analysis of Botulinum Neurotoxin

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ABSTRACT

Botulinum neurotoxin (BoNT) is synthesized by *Clostridium botulinum*, an anaerobic bacterium. When ingested, the toxin disrupts the communication at neuromuscular junctions through an elaborate, yet not completely understood mechanism (Lacy and Stevens, 1999). BoNT consists of three functional domains: binding, translocation, and catalytic. The binding domain facilitates the entry into a neuron through receptor-mediated endocytosis. A significant pH decrease in the vesicle then triggers the translocation domain to form a pore in the membrane and transfer the catalytic domain into the cytosol. Thus positioned, the catalytic domain cleaves a SNARE protein responsible for acetylcholine secretion, ultimately causing paralysis.

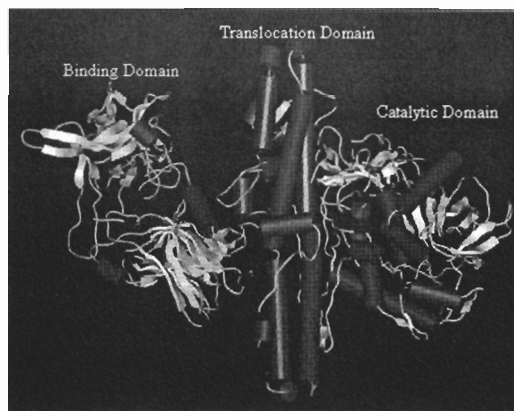
pK_a values of amino acids change as they are transferred from water into a protein environment, due to desolvation and interactions with other nearby residues. The new or intrinsic pK_a values were calculated for all ionizable residues of BoNT/B translocation domain. At pH 7.0 the domain has an overall negative charge of -20, which changes to a positive charge of 11 at pH 4.0. In the second part of the study chemical compound databases were searched for possible inhibitors of BoNT/B active site located in the catalytic domain. A four-site pharmacophore model was developed based on the binding sites of the substrate. A number of compounds which fit the model were identified. Their study may be useful in developing an inhibitor against BoNT/B.

INTRODUCTION

Clostridium botulinum is an anaerobic bacterium which causes botulism in humans through the release of botulinum neurotoxin (BoNT) (Hanson and Stevens, 2000; Lacy and Stevens, 1998; Lacy et al., 1999; Swaminathan and Eswaramoorthy, 2000). Because of its extreme potency, the bacteria are potential biological weapons. There are seven different serotypes of the neurotoxin (BoNT/A-G). All serotypes inhibit the release of neurotransmitter acetylcholine from neurons at the neuromuscular junction through an elaborate mechanism. The structure of the toxin contains a heavy chain with receptor-binding and translocation domains and a light chain which is functionally composed of a catalytic domain (Figure 1). The binding domain binds to the cell surface and facilitates receptor-mediated endocytosis. As the next step, there is evidence that a substantial decrease in pH of the endosome produces conformational changes in the translocation domain (Lacy et al., 1999). These changes trigger the transport of the catalytic domain through the endosome membrane and its subsequent discharge into the cytoplasm. The catalytic domain in the cytoplasm acts as an endopeptidase and cleaves a specific peptide bond in one of three N-ethylmaleimide-sensitive factor attachment protein receptors, SNARE proteins, which are vesicle-trafficking proteins in cellular secretion pathways. All serotypes cut a different peptide bond. Cleaved SNARE proteins cannot assemble together, thus hindering fusion of acetylcholine vesicles with plasma membrane.

Ultimate muscle paralysis, including that of the diaphragm, can lead to death.

Figure 1. Secondary structure of BoNT/B. α -helices are cylinders, β -sheets are arrows and lines are turns and random coil. Figure prepared by InsightII.



One of the least understood portions of the mechanism is the translocation domain-facilitated transfer of the catalytic domain into the cytosol. In this study the intrinsic or real pK_a values of the translocation domain ionizable values of BoNT/B were calculated using the Poisson-Boltzmann equation, and based on them, the electrostatic environment of the translocation domain was determined. The structure used (1EPW) is the most complete and best resolved structure so far and it is analyzed in a paper by Swaminathan and Eswaramoorthy (2000). The computational method applied has been used numerous times previously successfully to characterize the ionization state of a protein (Briggs and Antosiewicz, 1999). This approach permits the study of the electrostatic change in translocation domain upon alteration of pH.

Currently there are no drugs which target the neurotoxin specifically and a preventive vaccine is still in experimental stages (Eswaramoorthy et al., 2002). The catalysis of the peptidase reaction is zinc dependent thus directing the focus of a few of the drug design studies on removal of the ion. Because non-specific Zn^{2+} chelation would disrupt essential processes at the neuromuscular junction, some effort has been made to identify active-site specific inhibitors for BoNT. However,

additional attempts to identify new possible inhibitors are needed. In this study a pharmacophore model was developed based on the specific binding sites of the substrate, synaptobrevin-II, to BoNT/B. The model or hypothesis was then used to search chemical databases for potential matches.

METHODS AND MATERIALS

Theoretical basis for pK_a /electrostatics calculations

Transferring a residue from a water solution into a protein changes its pK_a value (Antosiewicz et al., 1996; Briggs and Antosiewicz, 1999). pK_a is defined as the pH at which weak acids and their conjugate bases in a solution are in equilibrium. The difference in pK_a values is referred to as pK_a shift and the new pK_a is called intrinsic pK_a . pK_a shift is due to the desolvation and the electrostatic interactions of that residue with other nearby amino acids. For example, if a residue in a protein makes a favorable interaction, it will become more charged and its pK_a will reflect the change of electrostatic environment. The procedure assumes that the model or experimental values of pK_a s in water solution are known. The following experimental pK_a values were used: 12.0 for Arg, 4.0 for Asp, 3.8 for C-terminus, 4.4 for Glu, 6.3 for His, 10.4 for Lys, 7.5 for N-terminus and 9.6 for Tyr. The following equation is used to calculate intrinsic pK_a :

$$pK_{a,i,\text{intrinsic}} = pK_{a,\text{model},i} - \gamma_i \frac{\Delta\Delta G_i}{2.303RT}$$

(Briggs and Antosiewicz, 1999), where γ_i is +1 for bases and -1 for acids and $\Delta\Delta G_i$ is defined as the difference between free energy of group i in a protein and in the model environment. To obtain the free energy of the protein at every ionization state the following equation has to be solved:

$$\Delta G(pH, x_1, \dots, x_M) = 2.303RT \sum_{i=1}^M x_i \gamma_i$$

$$(pH - pK_{a,i,\text{intrinsic}}) + \sum_{i=1}^{M-1} \sum_{j=i+1}^M x_i x_j \gamma_i \gamma_j \psi_{ij}$$

(Briggs and Antosiewicz, 1999) where ψ_{ij} is the interaction energy between groups i and j and M is the number of ionizable residues

in the protein. Only ionizable groups which are in close special proximity to each other are considered. It is assumed that there are no interactions between ionizable residues far apart.

pKa and electrostatic potential calculations

The PDB-format file (1EPW; resolution 1.90 Å) of BoNT/B is as of right now the best available crystal structure of any botulinum neurotoxin (Swaminathan and Eswaramorthy, 2000). As the first step, the file was modified to contain only the coordinates of the pertinent atoms. Residues 443-830 (388 total residues) were selected as the translocation domain. Hydrogen atoms were added to the heavy atoms of the protein. Finite difference Poisson-Boltzmann algorithm was performed to calculate free energies of the ionizable residues in the protein. Monte Carlo procedure was then run to calculate the ionization constants or pK_a values at every pH. All these computational procedures were implemented on UH Brownian Dynamics (UHBD) program. A grid of 65 units each 2.5 Å long (162.5 Å long grid) was initially used. Subsequently, three sets of electrostatic focusing decreased the grid spacing to 0.25 Å. Temperature was set to 293K, ionic strength to 150.0, and radius of ions to 2.0 Å. Dielectric constant, the medium's polarization of the solvent, was set to 80.0 and of protein to 20.0. An electrostatic map was then created representing the charged protein surface at a particular pH. Program GRASP was used to visualize the protein surface.

Pharmacophore model development and database searching

PDB-format file number 1F83 (2.0 Å resolution) with the crystal structure of BoNT/B, a portion of its substrate (residues 53-88), synaptobrevinII/VAMP, non-covalently bound and after cleavage of the scissile bond (between Q76 and F77) was used to develop the Pharmacophore model for the second part of the study (Hanson and Stevens, 2000). The active site was viewed and the distances between pertinent functional

groups were measured using the software InsightII (version 98.0) using the above mentioned coordinates file. The Pharmacophore model or hypothesis was developed with Catalyst (version 4.6) and all searches were done through the Best Flexible Search Databases/Spreadsheets algorithm which matches the model against all 9.5 kcal/mol or more energetically stable conformers of all the compounds available in the database. Two databases were used, Maybridge2001 and NCI2000, together containing approximately 202,000 molecules.

RESULTS

pKa and electrostatic environment calculations

The intrinsic pK_a values of all the ionizable residues in the translocation domain were calculated. Of the 1,290 residues in the structure of BoNT/B, 388 were identified as the translocation domain (443-830). One hundred sixteen of translocation domain residues have ionizable side chains. Along with ionizable N and C termini, there are 118 ionizable groups in the domain. Table 1 displays a sample of the ionizable groups, their model or experimental pK_a values, their intrinsic pK_a values and the difference between them in the form of pK_a shift. The difference between experimental and intrinsic pK_a values demonstrates that all ionization constants of side chains changed with the transfer into the protein environment. N-terminus glycine is ionized at pH 7.0 and so is C-terminus carboxylic acid group of tyrosine. The table also shows charges of all the ionizable groups at pH 7.0 and 4.0. It has been observed by various studies that pH 5.0 or lower triggers membrane pore formation for translocation of the catalytic domain (Lacy and Stevens, 1999). Charges at pH 4.0 would represent the electrostatic environment at the time of translocation. The lowered pH neutralized the negative charge of the protein at pH 7 (-20.03) to the positive charge (11.27) at pH 4. The last column, which shows the difference in charges between the two significant pH states, indicates that glutamic and aspartic

acids (**bold**) are the residues most heavily affected by this pH change. The evident neutralization of negative charges might play a role in the pore formation mechanism. The two lowest free energies of the protein were $-0.379615068246D+03$ kcal/mol and $-0.379555218324D+03$ kcal/mol.

Table 1. Model and intrinsic pKa values and charges of ionizable residues of BoNT/B. Two different residues of each ionizable side group amino acid and the termini are shown. Glutamic and aspartic acids (**bold**) have the greatest difference in charge between pH 7.0 and 4.0.

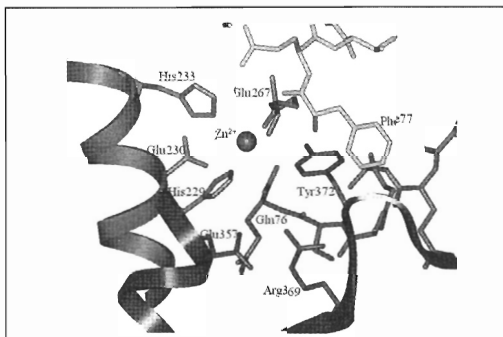
Residue	Residue	pKa	pKa	pKa	Charges	pH	
7.0-							
Number	Name	model	intrinsic	shift	pH 7.0	pH 4.0	pH 4.0
1	GLYN-term	7.5	7.891	0.391	0.88	1	-0.12
47	GLU	4.4	5.264	0.864	-0.98	-0.12	-0.86
59	GLU	4.4	4.456	0.056	-1	-0.27	-0.73
57	LYS	10.4	11.026	0.626	1	1	0
80	LYS	10.4	10.635	0.235	1	1	0
97	TYR	9.6	12.521	2.921	0	0	0
99	TYR	9.6	11.547	1.947	0	0	0
108	ARG	12	13.511	1.511	1	1	0
246	ARG	12	9.99	9.87	1	1	0
157	ASP	4	4.993	0.993	-0.98	-0.22	-0.76
173	ASP	4	3.984	-0.016	-1	-0.51	-0.49
388	TYRC-term	3.8	3.352	-0.448	-1	-0.71	-0.29
Total Charge					-20.03	11.27	-31.3

Active site environment and hypothesis development

The goal of the inhibitor search performed in this study was to look for possible active-site specific compounds, which would make at least two favorable interactions with BoNT active-site residues. The structure of BoNT/B and synaptobrevin-II complex after the cleavage of Q76-F77 bond has been analyzed in detail in the paper by Hanson and Stevens (2000). Figure 2 is a graphical illustration of the neurotoxin's active site. The structure of the active site was used to design a hypothesis comprising chemical characteristics a potential inhibitor should contain. Even though the active site environment in the structure is not right before the bond cleavage and a ~ 4.6 Å separation was observed between the cleaved residues, the conformation of the protease and substrate is assumed to be stable, energetically favorable, and therefore suitable as a model.

Scissile bond residues' side chains make two favorable interactions with the active-site BoNT residues. More specifically, glutamine (Q76) is a hydrogen bond donor to glutamic acid (E357), a toxin residue, which is the

Figure 2. BoNT/B active site after catalysis of the synaptobrevin-II peptide bond Gln76 and Phe77. His 233, Glu230, His229, Glu357, Arg369, Tyr372, and Glu267 are BoNT/B residues. Picture was made using InsightII.

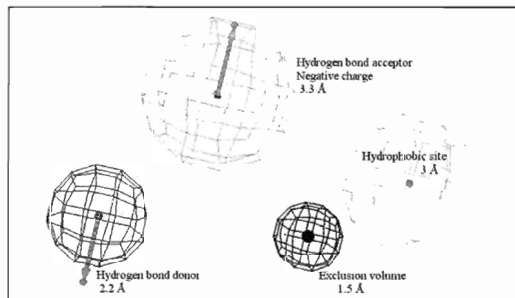


hydrogen bond acceptor. Phenylalanine (F77) is in close proximity (~ 4 Å) to tyrosine (Y372) with which it makes a favorable hydrophobic interaction. Tyrosine 372 is also one of the two catalytic residues, which are responsible for cleaving the peptide bond. Its hydroxyl group protrudes into the active site and is located almost directly between glutamine's and phenylalanine's side chains. For this reason, in the development of the hypothesis, an exclusion volume was placed at the position occupied by tyrosine 372. The excluded volume prevented the database from choosing compounds which would be obstructed by the presence of the tyrosine in the active site. The second catalytic residue, arginine 369, did not appear to be very close to any of the important interaction sites being considered in this study. Even though glutamine contains a potential hydrogen bond donor and a hydrogen bond acceptor, only its amino group hydrogen atoms were considered because its oxygen does not interact with the active site. The distance between glutamine's amino group hydrogen atoms and the center of phenylalanine's aromatic ring is 10.8 Å. The center of the exclusion volume was set to tyrosine's carbon atom 4 in the aromatic ring (hydroxyl group carbon) and a 1.5 Å radius was set around it. The distance from hydrogen bond donor site (glutamine) to the center of exclusion volume is 8.01 Å, whereas the distance from the hydrophobic site (phenylalanine) to exclusion volume is 3.98 Å.

A vital characteristic of the protease under study is its zinc dependence. One zinc ion is located at the active site, coordinated by His233, His229, and with the help of two water molecules (not shown on active site diagram) through Glu267 and Glu230. The ion is directly involved in the catalysis mechanism. Zinc chelation using a hydrogen bond acceptor or a negatively charged group would inhibit the catalysis. To enhance the inhibitory potency of the searched compounds, a Zn^{2+} chelating group site was added to the hypothesis. Its radius was set to 3.3 Å and its distance from the hydrogen bond donor and hydrophobic site was kept variable in order to allow much flexibility in the placement of the chelating group.

Figure 3 shows the four-site hypothesis. The initial search had the distances between the hydrogen bond donor, hydrophobic, and exclusion sites fixed precisely to match the real gap, but no hits were reported. The constraints were thus made less stringent allowing some flexibility even between these three fixed positions. The distances were thus set in the following fashion: 7.81-8.21 Å between hydrogen bond donor and exclusion volume, 3.78-4.18 Å between exclusion body and hydrophobic site, 10.6-11.0 Å between hydrogen bond donor and hydrophobic site, 6.23-7.23 Å between hydrogen bond donor and hydrogen bond acceptor, 2.82-3.82 Å between exclusion volume and hydrogen bond acceptor and, 5.04-6.04 Å between hydrophobic site and hydrogen bond acceptor.

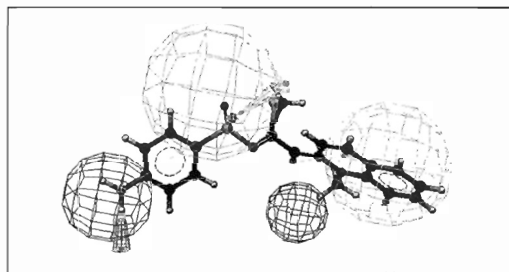
Figure 3. Hypothesis or pharmacophore model with all the constraints set. This hypothesis was used to search the databases. Hydrogen bond donor site corresponds to Gln76 amino group, hydrophobic site to Phe77 aromatic ring, and hydrogen bond acceptor/negatively charged site fulfills the role of Zn^{2+} chelation. The exclusion volume is Tyr372's hydroxyl group carbon atom. Picture was prepared by Catalyst.



Database search results

One hundred ninety-seven compounds matched the hypothesis. Molecular weight is one of the characteristics used to rate compounds as potential inhibitor leads (Lipinski et al., 1997). A molecular weight under 500 Da is preferred, but molecular weight around 200 Da is ideal, because it leaves much room for further manipulation of the compound. The structures of all the compounds along with their molecular formulas and weight were sorted according to their molecular weight. Most of the compounds have a hydrogen bond acceptor as the Zn^{2+} chelating site. None of the molecules has a negatively charged group and only five have a negatively ionizable group at the site. To illustrate how the hypothesis fits the compounds, Figure 4 shows a compound identified by the database search. It is superimposed on top of the hypothesis. Its amino group matches Gln76's amino group, two oxygen atoms can serve as zinc chelators, and an aromatic ring is located in the hydrophobic site and would interact with Tyr372.

Figure 4. An example of a molecule from the database search, NC10327958/C19H19N3O2S2, superimposed on top of the hypothesis.



DISCUSSION

pKa and electrostatic calculations

Botulinum neurotoxins (A-G) are synthesized by gram-positive, spore-producing *Clostridium botulinum* bacteria. Only types A, B, E, and rarely F, are harmful to humans. There are four different types of botulism based on the acquisition means of the bacteria. The first type is foodborne botulism, where *C. botulinum* spores are found in food especially home-canned products. Infant botulism results when the bacteria colonize in the

intestines of infants. The third type, wound botulism, occurs when a wound is contaminated with the bacteria. The fourth type is child or adult botulism due to intestinal colonization. The incubation period is usually between 18 and 36 hours (CDC, 1998).

Botulinum neurotoxin is one of the most dangerous toxins known to humans, yet the mechanism of intoxication is not completely understood. Translocation of the catalytic domain into the cytoplasm is one of the least understood but crucial steps of the mechanism. Many studies have confirmed that a pH of 5.0 or lower induces a structural change in the BoNT protein (Hanson and Stevens, 2000; Lacy and Stevens, 1998; Lacy et al., 1999; Swaminathan and Eswaramoorthy, 2000). An experiment which examined the secondary structure at pH 7 and 4, confirmed structural changes of the translocation domain on the secondary level (Fu et al., 2002). It has been reported that a 12-16 Å in diameter pore or channel forms across the membrane. The same study also reported significant changes in the composition of the secondary structure of light/catalytic domain under low pH conditions. It was hypothesized that the hydrogen ion gradient is used to make the transfer energetically possible. However, some results suggest that an ion channel does not form. It has been further conjectured that the low pH partially denatures the catalytic domain which forms a complex with the heavy chain and ultimately refolds itself once in the cytoplasm.

This study has shown that the charge of the translocation domain changes dramatically between the cytosolic/neutral pH of 7 and the translocation-triggering pH of 4. This is primarily due to the great number of aspartic acid and glutamic acid residues, whose pK_a values fall into the studied pH range. The new overall charge of the domain can cause formation of new interactions between different residues or destruction of pre-existing ones. Either one of the scenarios could possibly cause significant structural changes. Further to study the interactions between electrostatic properties and the structure of the protein, the

ionization constants can be used in molecular dynamic studies which investigate the movement of the protein based on free energies. These free energies are in turn dependent on electrostatic interactions. Molecular dynamics studies might provide some insight into the mechanism behind the translocation of the catalytic domain.

BoNT inhibitor search

Inter-compartment vesicle trafficking in secretory pathways is a highly regulated process in the eukaryotes. The group of proteins responsible for directing vesicles by recognizing the target is called SNARE family of proteins. SNAREs contain three different and very large families: synaptobrevin/VAMP, syntaxin, and SNAP-25 (Gerst, 1999). All BoNT serotypes cleave a different peptide bond in one of the three SNARE family proteins. Previous studies have been performed to investigate the specificity of different serotypes for different bonds. Two copies of a region on SNARE proteins were found which all the serotypes must bind in order to cleave the protein (Pellizzari et al., 1996). This nine residue motif comprises three negatively charged and three hydrophobic residues. The sequence is referred to as the SNARE secondary recognition (SSR) sequence. It is believed that specificity of the catalysis is dependent on the alignment of the SSR with the active site. Binding of BoNT to SSR might also structurally alter the arrangement of active-site residues so as to place them in catalysis-ready positions (Hanson and Stevens, 2000).

Previous studies have tried to design or discover inhibitors of the active site on the catalytic domain (Adler et al., 1999; Eswaramoorthy et al., 2002; Garcia et al., 1999). Most of them have focused on the substrate binding sites and zinc ion chelation. One of these studies designed a substrate-like dipeptide with a phosphonate functional group (Adler et al., 1999). Another one tested a naturally occurring peptide, buforin I (Garcia et al., 1999). None of the studies yielded a strong inhibitor which could be developed into a drug against botulism.

The inhibitory search has yielded 197 compounds which could be tested as potential inhibitors of the toxin. As the next step, activity assays could be performed to test the inhibitory ability of the compounds. They could further be chemically analyzed and their more inhibitory derivatives could be developed. A good inhibitor will have high specificity for BoNT active site and bind to it before the substrate does. If a compound with high inhibitory potency is found, it could be manufactured into a drug against botulism.

Because all serotypes cleave a different peptide bond, it is therefore inherently difficult to create an active-site specific inhibitor which would inhibit all the serotypes of the neurotoxin. On the other hand, the SSR binding region is more universal and the toxin must bind to it before it can cleave the peptide bond. The sequence should therefore be attempted to be utilized in some inhibitory fashion. It has been hypothesized that the active-site inhibitors do not contain high inhibitory activity because the structure of the active site is different from that when the substrate binds (Adler et al., 1999). This variation may result because the substrate binds the SSR region, whereas an inhibitor does not. An inhibitor which would bind the SSR sequence and change the conformation of the active site could possibly, if assayed together, increase the inhibition rate of the active-site specific inhibitors.

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The Role of Competition and Light Level in the Ecology of Two Co-occurring Invasive Woodland Plant Species

ABSTRACT

Two species rapidly invading North American forests are *Alliaria petiolata*, a biennial herb with C3 photosynthesis, and *Microstegium vimineum*, an annual grass with C4 photosynthesis. In North American forest patches, the intensity of light can be variable throughout, ranging from intense light resulting from canopy gaps to deep shade under closed canopies. Each invasive species can be found in a range of light environments in forest patches. The problem, then, is to understand how two different species utilize different photosynthetic pathways to promote invasion in similar light environments. To understand how each invasive is able to colonize a wide range of light environments and the implications their invasion has for the native flora, a field study at Washington Crossing State Park in New Jersey and a greenhouse competition experiment at The College of New Jersey were performed over the course of two years, to allow for the biennial nature of *A. petiolata*. The field study investigated light intensity, percent cover of each species, and photosynthesis rates in the study forest. The greenhouse competition experiment was used to evaluate how each invasive performed in different light levels when grown against a common native competitor. Photosynthesis survey data was performed using the Li-Cor 6400 IRGA portable photosynthesis system. The combined results of the field study and the greenhouse study revealed that each invasive utilizes a different life history strategy to

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promote colonization. Both species proved to be equal competitors against the native species, *Eupatorium rugosum*, indicating that when proposing management strategies, the combined effects of both invasives need to be considered.

INTRODUCTION

An important area of study within plant community ecology is the problematic issue of plant invasions and their effect on plant community structure. Invasions occur when an alien, or non-indigenous, species increases its population in a plant community to the point where the original community structure becomes compromised. Theoretically, any plant community is susceptible to an invasion. The problems are to understand how an invasive plant promotes itself when rare in a population, and what makes one plant community more invulnerable than another. In northeastern deciduous forests, two invasive species of concern are *Alliaria petiolata* and *Microstegium vimineum*. These herbaceous non-natives co-occur and utilize a range of light levels in areas that they invade. Understanding how these two species are able successfully to invade is critical for understanding the effect that invasive species have on native forest communities in the northeast United States.

The research presented here investigates these two co-occurring species' distribution and photosynthesis in a forest relative to light, and their competitive and photosynthetic ability under different experimental

light regimes in a greenhouse competition experiment. While many studies have investigated the impact of non-native invasive species on native plant communities (Hobbs & Humphries 1995; Stohlgren et al. 1999; Wisser et al. 1999; Callaway & Aschehoug 2000), there is a general lack of studies which focus on competition between two coexisting non-native species, even though invaded forest patches often are dominated by a group of non-native species. The combined interactions of a group of co-occurring non-native species could have a different effect on native plant community structure than a single invasive may have.

Light, water, and nutrient levels are particularly important resources in terrestrial ecosystems and can have strong effects on plant community structure. While all plants are dependent on these resources for survival, different plants have different minimum requirements with respect to the lowest tolerable amount of a resource that is required for survival of the plants (Tilman 1997). Invasive species typically can withstand lower amounts of limiting resources than native species. Therefore, they may be able to survive under low concentrations of resources that native species cannot tolerate.

Alliaria petiolata, with C3 photosynthesis, and *Microstegium vimineum*, with C4 photosynthesis, utilize different photosynthetic pathways and therefore are predicted to perform differently under different light levels. Light levels are intimately associated with photosynthesis rates in plants. Plants provide themselves with energy for growth by generating simple sugars from atmospheric CO₂, using energy from sunlight (Mooney & Ehleringer 1997). The most common, more ancestral pathway that plants use to incorporate CO₂ is the C3 pathway. In the C3 pathway, CO₂ is taken into the leaf and fixed into carbohydrate in the Calvin cycle, using the enzyme ribulose-1,5-bisphosphate carboxylase/oxygenase (rubisco), in the same spatial area within the leaf. The problem with this pathway lies in the enzyme rubisco, which

also has an affinity for oxygen. As concentrations of oxygen increase when the stomates are closed, rubisco binds oxygen in a phenomenon called photorespiration, which yields no useable products and is energetically expensive to the plant (Ehleringer and Monson 1993).

Several times throughout the course of plant family evolution the C4 photosynthesis pathway has independently evolved in the hot, dry climates where photorespiration can become problematic. The C4 pathway effectively eliminates photorespiration by spatially separating the initial CO₂ fixation reactions from the Calvin cycle reactions. Phosphoenolpyruvate (PEP) carboxylase fixes CO₂ into oxaloacetate (OAA), a four-carbon acid. The OAA is stored as malate until it is needed, at which time the OAA moves across the cell membrane to the bundle sheath cells (BSC) where the CO₂ is cleaved off and the typical C3 pathway proceeds. The concentration of CO₂ in the BSC is maintained at a high enough level that photorespiration is avoided (Ehleringer & Monson 1993).

The C3 and C4 carbon fixation pathways each have benefits and drawbacks when it comes to light-use efficiency. In general, photosynthesis rates increase as photosynthetically active radiation (PAR; between 400-700 nm) levels increase. However, at some point, temperature, a variable closely tied to light, becomes more limiting and causes photorespiration to occur in C3 plants. As temperatures increase, plants experience stomatal closure to prevent leaf moisture loss. If the stomates remain closed for an extended period of time, photorespiration becomes a problem because the air supply, and therefore the corresponding CO₂ supply, is also limited (Mooney & Ehleringer 1997).

At ambient light levels, it is expected that C3 plants would have a higher light-use efficiency (be more productive at a given light level) because C4 is a more costly pathway, requiring two more ATP molecules per each CO₂ molecule fixed, compared to C3.

However, this advantage is not gained unless temperatures are 25-30°C because photorespiration increases with temperature in C3 plants (Ehleringer and Monson 1993). Therefore, in warmer, more light-intense environments, the prediction can be made that C4 plants should be able to be more productive and out-compete C3 plants. Although the cool, shaded environment of the forest floor may favor C3 plants, C4 plants may have the ability rapidly to utilize bright sun flecks, which in disturbed habitats have been shown to give C4 plants a competitive edge over C3 plants, especially in areas where their growing seasons overlap (Ehleringer & Monson 1993).

The research presented here focused on how two non-native species, *Alliaria petiolata*, a biennial herb with C3 photosynthesis, and *Microstegium vimineum*, an annual grass with C4 photosynthesis, are able to co-occur and invade forest patches with wide ranges of light level. There were two major components in this study, a field study and a greenhouse competition study. The main goals of the field study were to assess the range of light level in the field study plot, to compare the percent cover of each non-native species in the study area to light level, and finally, to follow the photosynthesis rates for a population of each non-native species over the course of a growing season. It was expected that as light levels increased, the percent cover of *Microstegium vimineum*, the C4 grass, would also increase. Conversely, it was expected that percent cover of *A. petiolata* would increase with decreasing light levels. *Microstegium vimineum* was expected to have correspondingly higher photosynthesis rates in the higher light levels. *Alliaria petiolata*, on the other hand, was expected to have a more constant photosynthesis rate over a range of light levels, mainly because the C3 pathway cannot take advantage of sun flecks and because C3 plants have a lower light saturation point.

The main goal of the greenhouse competition study was to assess how each non-native species was able to compete under varying

light levels against a third species used to measure the effects of competition (a phytometer). The greenhouse competition study was necessary to understand the role of light level while controlling for other variables such as soil moisture and nutrient level.

SPECIES BIOLOGY

Alliaria petiolata was introduced from Europe and first recorded in North America in 1868. By 1991, it had spread to 28 midwestern and northeastern states in the U.S. and parts of adjacent Canada (Nuzzo 1993). This species is a strict biennial which flowers in the second year of growth and spreads via seed dispersal. The dark green leaves of *A. petiolata* can be seen growing in rosette form throughout the winter. The mature plant bolts in the early spring and can reach a height of up to 1.2 meters (Cavers et al. 1979). The breeding system of *A. petiolata* contributes to its success as an aggressive invader by allowing rapid local adaptation. Almost every flower sets fruit and fruit set can be up to 90 percent efficient (Cruden & McClain 1996). Usually cross-pollination occurs via bees but self-pollination can occur in the absence of pollinators (Anderson et al. 1996; Cruden & McClain 1996). Age of the individual plant appears to be the only requirement for seed set (Meekins & McCarthy 2000).

Upland and lowland forests with open or closed canopies have experienced invasions by *A. petiolata* (Nuzzo 1993; McCarthy 1997). It has been documented growing in a range of conditions from dry to mesic to floodplain forests (Cavers et al. 1979; Nuzzo 1993). Forested roadsides, trails, and railroad beds represent shaded, disturbance-prone environments where *A. petiolata* populations have been established. Similarly, this species can be found growing in open, high light environments such as sunny roadsides, abandoned roadbeds and gardens (Nuzzo 1993). Mesic forests with open canopy structures and moderate disturbance have been shown to be the most vulnerable to invasions by *A. petiolata* (Meekins & McCarthy 2001).

There are many factors that contribute to the invasive success of *A. petiolata*. First, germination has been documented to take place in most moist soil types, regardless of the presence or type of leaf litter (Meekins & McCarthy 2001). Sandy soils have been the only soils in which seeds failed to germinate (Baskin & Baskin 1992). Seed germination requires cold stratification to break dormancy. A seed bank persists for up to four years with the most viability being lost after the first year (Baskin & Baskin 1992; McCarthy 1997). Second, an entire stand can be established based on the reproductive success of only one individual (Anderson et al. 1996). Third, the cover of this species seasonally fluxes, allowing *A. petiolata* to make use of available light most efficiently across the entire growing season. Fourth, rosettes are vigorous and can resprout from the base if leaves are lost (McCarthy 1997). Finally, *A. petiolata* has been observed in a wide range of light levels and expresses a wide range of phenotypes in each environment (Cavers et al. 1979). Other sun-adapted species may out-compete *A. petiolata*, but this effect disappears in the second year of growth (Dhillion & Anderson 1999).

While density and fertility may play important roles in the invasive ability of *A. petiolata*, light availability has been demonstrated to be the most important variable (Meekins & McCarthy 2000). Although noticeable phenotypic variation has been displayed in different habitats (Cavers et al. 1979), in general, habitat irradiance affects plant size (Anderson et al. 1996). Maximum photosynthesis rates have been recorded for plants placed under high irradiance levels. Similarly, plants growing in high light performed better than plants grown in low light (Dhillion & Anderson 1999). *Alliaria petiolata*'s reproductive phenology also allows for this shade-adapted species to take advantage of light levels. Seedlings emerge in early March before other species and are able to make use of high light levels early in the season (Meekins & McCarthy 2000). In general, high light, high nutrient situations combined

with moderate canopy disturbance are optimal for *A. petiolata* invasions (Meekins & McCarthy 2000).

Microstegium vimineum is an annual C₄ grass (Merhoff 2000) that has been in the United States since 1919 (Horton & Nuefeld 1998). Fruiting and flowering in this species occurs over a 10-day to a two-week period in the late fall (Redman 1995). *M. vimineum* has been shown to establish a persistent seed bank in the upper 5-10 cm of surface soil (Gibson et al. 2002).

M. vimineum has been found growing primarily in partially shaded road banks, in fire-disturbed areas, along logging trails, and in mesic floodplains of woodlands. Other habitats which have been reported for this species include utility rights-of-way, thickets, ditches and even in wetlands, gardens (Redman 1995) and lawns (J. Morrison, *personal communication*). Although *M. vimineum* is considered a shade-adapted species, the variable performance of this species in different light levels has been well documented. Horton & Neufeld (1998) showed that *M. vimineum* plants grown in the shade were able rapidly to make use of simulated sun flecks to boost photosynthesis rates. Although light saturation occurs at 25% of direct sunlight, there exists a linear relationship between biomass and light level in forest stands (Barden 1996a).

The combined effect of efficient sun fleck use and the relationship between light level and biomass can cause populations of *M. vimineum* in different areas of the same forest to be phenotypically different. The difference in performance may have a dissimilar effect on native plant community structure throughout different areas of a forest patch depending upon how light is distributed throughout the patch (Barden 1996b). Altering community structure may also occur as a result of induced changes in soil nutrient composition and pH based on evidence that *M. vimineum* preferentially uptakes nitrates, although the mechanism by which this happens is unclear (Ehrenfeld et al. 2001).

METHODS—FIELD STUDY

Study Area. The field research component was conducted with permission in the Natural Areas section of Washington's Crossing State Park in Mercer County, New Jersey. The study area was 150 meters in length and 200 meters in depth into the forest. Plots were established in the study area in early July 2001. Seven transects were made by walking 240° N for 200 meters at a distance of 15 meters apart. Each point along a transect where both *A. petiolata* and *M. vimineum* were observed growing together was recorded and a 1 m² plot was established.

Forest Light Levels. Photosynthetically Active Radiation (PAR) (mmol/m²/s) readings were made in early October 2001 under green forest canopy. A Decagon AccuPAR meter was used over a period of two days to obtain mid-morning (10 a.m.–12:30 p.m.) and mid-afternoon (1–3 p.m.) readings. To include the widest possible range of light levels, the two highest average PAR plots and the two lowest average PAR plots from each transect were used for a focused study of percent cover of each species in relation to PAR.

Fall Plant Cover vs. PAR Levels. In late October 2001, the percent coverage for both *A. petiolata* and *M. vimineum* was recorded in plots labeled high and low on all transects. Each plot was divided into four quadrants and the percent cover of each species in each quadrant was visually estimated using a modified relevé scale. The values for all four quadrants were added together to obtain a percent cover value for the entire 1 m² plot.

Photosynthesis Rate Survey—*A. petiolata*. A Li-Cor 6400 IRGA portable photosynthesis system was used to record the active photosynthesis rates of *A. petiolata* in all plots. The Li-Cor was set to monitor ambient PAR in the microsite (detected with an external PAR sensor on the system), humidity was set at a level close to ambient, air flow at 400 μmol/s, CO₂ concentration at 400 μmol, stomatal ratio 0.5, and leaf area as measured per plant.

Stomatal ratio was determined by the average ratio of abaxial to adaxial stomata counted on leaf peels of several *A. petiolata* leaves.

In each plot, the largest rosette was selected and marked. On two leaves on each plant, two survey measurements were recorded after the ΔCO₂ remained stable (%CV < 1) for over one minute. Survey measurements were recorded about 30 seconds apart. Data were collected on mostly sunny days (little or no cloud cover) so that PAR in the sample chamber could be maintained at ambient full sun conditions in the forest.

Data were collected for all plots during April 2001 (between 4/24/01 and 4/25/01), July 2002 (between 7/7/02 and 7/31/02), September 2002 (between 9/7/02 and 9/12/02) and November 2002 (on 11/19/02). Efforts were made to make as many measurements in as close temporal proximity as was feasible. In the event that a marked plant was missing, the plant closest to the previously marked plant was used.

Photosynthesis Rate Survey—*M. vimineum*. The Li-Cor 6400 was used with the same protocol, with the exception of stomatal ratio, which was set at 0.17. Data were collected for all plots only during July 2002, and September 2002, since *M. vimineum* had only just germinated in April and had senesced by November. In July, a summer drought caused excessive wilting and therefore some plants were eliminated from the sample.

METHODS—GREENHOUSE COMPETITION EXPERIMENT

Alliaria petiolata seeds were collected in mid-July 2001, from two separate stands, one under a closed canopy and one under a light gap, from Washington Crossing State Park (WCR). In late November 2001, *A. petiolata* seeds were cold stratified in the dark at 5°C for three months. Seeds were contained in sealed Petri dishes filled with moist Pro-Mix potting medium. Seeds of *M. vimineum* were collected in late September 2001, from 10 different stands, five under closed canopy

and five under a light gap, from WCR. In early February 2002, these seeds were stratified for three weeks using the same protocol. Also in late November 2001, seeds of *Eupatorium rugosum* were collected from WCR for use as the phytometer in the experiment. In early February 2002, *E. rugosum* seeds were stratified with the same protocol as *M. vimineum*.

In early March 2002, all seeds were potted into 3" x 5" black plastic pots filled with Pro-Mix. In each pot there was either one *A. petiolata* and one *E. rugosum* or one *M. vimineum* and one *E. rugosum* planted so that all seeds from both light levels were equally represented. The pots were grouped into seven blocks of 40 randomly arranged pots. In each block there were 20 shaded pots (S) and 20 unshaded pots (L). Shaded pots were covered with cylindrical screen cage with a piece of dark fabric over the top. In each block there were five replicates of each treatment, which are outlined in Table A.

Table A. Outline of replicates for planted pots in the greenhouse competition experiment.

Species	Origin	Light treatment
<i>A. petiolata</i> (G)	Open canopy (O)	Shaded (S)
		Unshaded (L)
	Closed canopy (C)	Shaded (S)
		Unshaded (L)
<i>M. vimineum</i> (M)	Open canopy (O)	Shaded (S)
		Unshaded (L)
	Closed canopy (C)	Shaded (S)
		Unshaded (L)

The pots were placed in solid trays on heating mats and were sub-irrigated until all seedlings had germinated. After all pots had one phytometer and one treatment germinated, the pots were taken off the heating mats and moved apart so that there were about three cm of open space between each pot. All pots were watered equally every two to three days.

All pots were allowed to grow until the beginning of June 2002. The Li-Cor 6400 was used to measure photosynthesis rates for the invasive plant in each pot in the first four blocks. Air flow was set at 400 $\mu\text{mol/s}$, humidity was adjusted manually so that H_2O

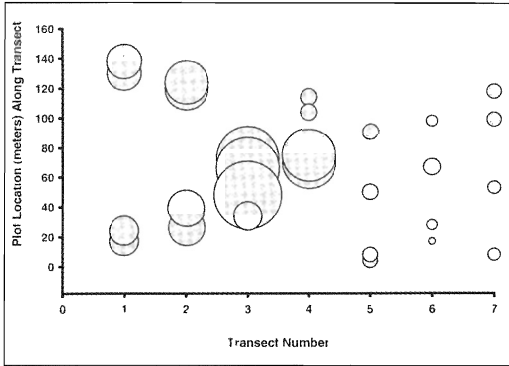
of the sample was kept around 16 μmol . CO_2 concentrations were maintained in the sample at 350 μmol . Stomatal ratio for *A. petiolata* was 0.5 and for *M. vimineum* was 0.17. Leaf area was measured and entered in for each new leaf. Data were logged when the CO_2 sample had reached 350 μmol (± 1) and readings were constant for about one minute. Three data logs were made five seconds apart for each leaf. The two healthiest, youngest, fully expanded leaves were chosen for each invasive. A leaf was placed under high PAR in the chamber (1000 $\mu\text{mol/m}^2/\text{s}$) for three readings and then was placed under low PAR (84 $\mu\text{mol/m}^2/\text{s}$). The PAR values chosen were ambient PAR conditions experienced under each light treatment in the greenhouse.

After the photosynthesis survey rates were collected for all invasive plants in blocks one through four, all pots in all seven blocks were harvested (only blocks 1-4 were used for photosynthesis data due to time constraints because *M. vimineum* plants were beginning to grow out of the shade cages). The invasive plant and the phytometer were separated by gently washing and disentangling the roots. Each plant was placed individually in a paper bag and dried at 60°C until a steady dry biomass could be obtained. The root, shoot and total dry mass of both the invasive plant and the phytometer were recorded for all plants by the end of June 2002.

RESULTS—FIELD STUDY

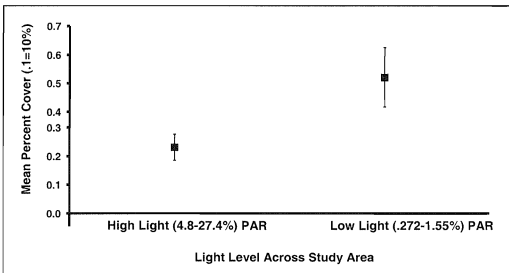
Forest Light Levels. PAR in the field ranged over three orders of magnitude, from 0.00272 to 0.27418 $\mu\text{mol/m}^2/\text{s}$ in the A.M. (Figure 1). Half of the plots were considered low light (LL) and ranged from 0.00272 to 0.01556 $\mu\text{mol/m}^2/\text{s}$. Half of the plots were considered high light (HL) and ranged from 0.04830 to 0.27418 $\mu\text{mol/m}^2/\text{s}$. The PAR in the LL plots was significantly lower than the PAR in the HL plots (t-test for unequal variances $t = 5.36$, $df = 13$, $P = 0.0001$).

Figure 1. Intensity of A.M. PAR values in the field at WCR for the two highest and lowest PAR plots along each transect as measured with the AccuPAR meter in early October 2001. Size of circle shows relative intensity of light ($\mu\text{mol}/\text{m}^2/\text{s}$).



Fall Plant Cover vs. PAR. *Microstegium vimineum* percent cover in LL plots was more than twice that in HL plots, on average (Figure 2; t-test for unequal variances $t = -2.79, df = 18, P = 0.012$). *A. petiolata* percent cover did not differ between LL and HL plots (t-test for unequal variances $t = -1.58, df = 14, P = 0.1359$).

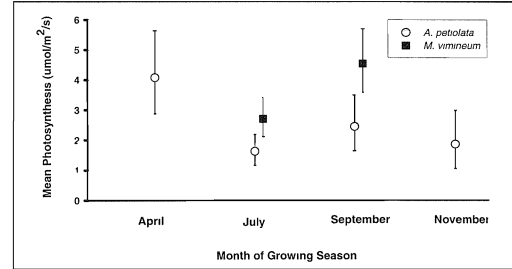
Figure 2. Percent cover of *M. vimineum* in high light (HL) and low light (LL) plots at WCR in late October 2001 (Mean (SE); t-test for unequal variances $t = -2.79, P = 0.012, n = 14$).



Photosynthesis Rate Survey. Month of measurement significantly affected the mean photosynthesis rate of *A. petiolata* in the forest (Figure 3, ANOVA $F = 9.39; P < 0.0001$). Mean photosynthesis rate was significantly higher in April (by a posteriori pairwise comparison in the ANOVA), but there was no significant difference between the means of the other three months. Average PAR was also significantly higher in the month of April than in the other three months (ANOVA $F = 20.47; P < 0.0001$). There was no significant difference between

the PAR values in the field in the months of July and November.

Figure 3. Photosynthesis rate for each species during each month of the growing season at WCR measured with the Li-Cor 6400 portable photosynthesis machine (mean \pm 95% CL).



Mean photosynthesis rate for *M. vimineum* was greater in September than in July (Figure 3), but the pattern was influenced by which transect a plot was on, as shown by a significant date by transect interaction in the analysis of variance ($F = 10.13; P < 0.0001$). On transects 1, 2, 3, 4, and 6 the mean photosynthesis rate increased from July to September, but on transects 5 and 7 it decreased slightly (Table 1). PAR did not change in intensity from July to September (ANOVA $F = 0.17; P = 0.6825$). However, the intensity of light increased overall from transect 1 to transect 7 across the study area (Table 1).

Table 1. Differences in mean photosynthesis rate for *M. vimineum* in study plots at WCR along each transect in July and September (ANOVA - $F_{\text{date} \times \text{transect}} = 10.13, P < 0.0001$).

Transect	July N	July Mean (SD) ^a	Sept. N	Sept. Mean (SD) ^a
1	8	2.35 (0.224)	7	2.78 (0.269)
2	7	2.35 (0.132)	7	2.94 (0.168)
3	2	2.62 (0.100)	2	2.86 (0.332)
4	3	2.69 (0.045)	3	2.89 (0.239)
5	3	2.73 (0.066)	7	2.64 (0.171)
6	7	2.73 (0.071)	7	2.76 (0.172)
7	6	2.75 (0.099)	5	2.39 (0.1334)

^a Means and SD transformed ($\text{Log}_{10}(100 \times (\text{photo} + 1))$).

M. vimineum had a higher mean photosynthesis rate than *A. petiolata* in July (Figure 3, ANOVA $F = 24.45; P < 0.0001$). Along each transect, the mean photosynthesis rate of both species combined increased from transect 1 to transect 7 (ANOVA $F = 17.40; P < 0.0001$). The increase in mean photosynthesis rate occurred as a gradient, where adjacent groups of transects did not have significantly different means (Table 2). In July, the PAR in

the field along each transect was on average lower in transects 2, 3, and 4 than in transects 1, 5, 6, and 7 (Table 2, ANOVA $F = 5.67$; $P = 0.0002$). Overall, *A. petiolata* and *M. vimineum* received the same mean intensity PAR across the entire study area (ANOVA $F = 0.01$; $P = 0.9370$).

Table 2. Mean photosynthesis rate and PAR for both species in July and September along transects 1-7 at WCR.

Transect	N	Mean Photo (S.E.) ^a	Mean PAR (S.E.) ^a
1	15	1.29 (0.300) ^b	37.82 (1.284) ^d
2	12	1.13 (0.190) ^b	14.86 (1.286) ^c
3	4	1.97 (0.803) ^{a,b}	7.32 (1.194) ^b
4	6	3.13 (0.472) ^{b,c}	9.19 (1.462) ^b
5	7	3.65 (0.427) ^{c,d}	25.43 (1.061) ^d
6	11	4.21 (0.270) ^d	29.12 (1.136) ^d
7	8	4.24 (0.515) ^d	45.75 (1.211) ^d

^aMeans with the same letter or symbol are not significantly different.

In September, only transects 1, 2, 4, and 5 were used to compare mean photosynthesis rate and PAR because on transects 3, 6, and 7 no *A. petiolata* rosettes were present during this month (the previous plants had gone to seed). As in July, the mean photosynthesis rate of *M. vimineum* was greater than the mean photosynthesis rate of *A. petiolata* (Figure 3, ANOVA $F = 7.37$; $P = 0.0106$). However, there was no clear transect gradient for either photosynthesis rate or PAR for either species in the month of September (ANOVA_{photosynthesis} $F = 2.15$ $P = 0.1132$; ANOVA_{PAR} $F = 1.58$; $P = 0.2130$).

RESULTS—GREENHOUSE COMPETITION

Invasive and Phytometer—Mass Analysis.

For each non-native species, the mean total mass of plants grown in the unshaded treatment was heavier than the mean total mass of plants grown in the shaded treatment (ANOVA $F = 105.0$; $P < 0.001$). The mean total shoot mass of both plants was heavier in unshaded treatments (ANOVA $F = 5.40$; $P < 0.10$) as was the mean total root mass (ANOVA $F = 4.05$; $P < 0.10$). There was no significant difference between the mean total mass of *A. petiolata* and the mean total mass of *M. vimineum* (ANOVA $F = 0.005$; ns). *A. petiolata* had a significantly larger mean root mass than *M. vimineum* (ANOVA $F = 69.05$; $P < 0.001$) in both shaded and

unshaded treatments (Figure 4, ANOVA $F = 4.05$; $P < 0.10$). Conversely, *M. vimineum* had a marginally heavier shoot mass than *A. petiolata* (ANOVA $F = 3.90$; $P < 0.10$) in both shaded and unshaded treatments (Figure 5, ANOVA $F = 5.40$; $P < 0.10$).

Figure 4. Root mass for both species in unshaded and shaded treatments from the greenhouse competition experiment, post-harvest (mean \pm 05% CL).

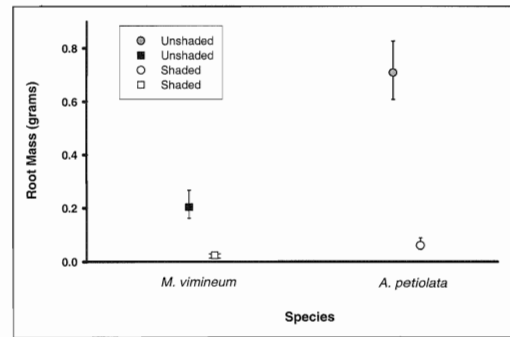
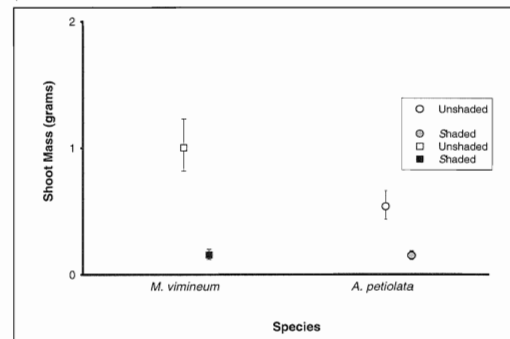


Figure 5. Shoot mass for both species in unshaded and shaded treatments from the greenhouse competition experiment, post-harvest (mean \pm 05% CL).



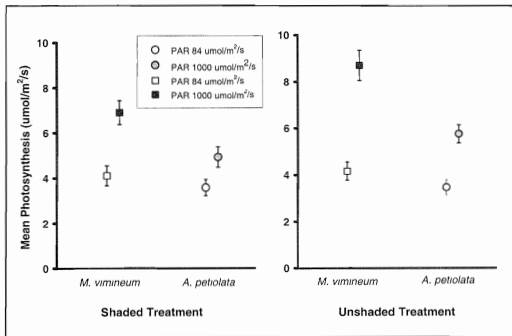
The phytometer, which was used to measure the negative effects of competition from the two non-native species, had a heavier mean total mass (ANOVA $F = 21.15$; $P < 0.001$), shoot mass (ANOVA $F = 15.16$; $P < 0.01$) and root mass (ANOVA $F = 28.89$; $P < 0.005$) in the unshaded treatment than in the shaded treatment. There was no difference in mean total mass of *E. rugosum* regardless of whether the phytometer was grown with *A. petiolata* or *M. vimineum* (ANOVA $F = 1.05$; ns).

Photosynthesis Rate Survey—Blocks 1-4.

Overall, *M. vimineum* had a higher mean photosynthesis rate than *A. petiolata*

(Figure 6, ANOVA $F = 26.21$; $P < 0.025$). Plants given a high PAR ($1000 \mu\text{mol}/\text{m}^2/\text{s}$) showed a higher mean photosynthesis rate than plants given a low PAR ($84 \mu\text{mol}/\text{m}^2/\text{s}$) (Figure 6, ANOVA $F = 61.76$; $P < 0.005$). *M. vimineum* was able to increase its photosynthesis to a higher mean rate than *A. petiolata* at both the high and low PAR (Figure 6, ANOVA $F = 27.35$; $P < 0.025$). Plants that were grown in the unshaded treatment generally had a higher overall mean photosynthesis rate than plants grown in the shaded treatment (Figure 6, ANOVA $F = 2.65$; ns). There was significant variation in mean photosynthesis rate observed among blocks 1-4 (Table 3, ANOVA $F = 40.83$; $P < 0.0001$).

Figure 6. Photosynthesis rate in high or low PAR for both species in unshaded and shaded treatments, measured with the Li-Cor 6400 portable photosynthesis system for the greenhouse competition experiment (mean \pm 95% CL).



The value FPHOTO, or fraction of photosynthesis, was calculated as the mean photosynthesis rate at 1000 PAR divided by the mean photosynthesis rate at 84 PAR. The resulting value is a measure of the percent at which the species in question increases its photosynthesis rate as the PAR increased from $84 \mu\text{mol}/\text{m}^2/\text{s}$ to $1000 \mu\text{mol}/\text{m}^2/\text{s}$. *M. vimineum* was able to increase its mean photosynthesis to a greater percentage ($1.855 \pm 1.3486 \text{ sd}$) when the PAR was increased from 84 to $1000 \mu\text{mol}/\text{m}^2/\text{s}$ than was *A. petiolata* ($1.553 \pm 1.3486 \text{ sd}$) (ANOVA $F = 39.71$; $P < 0.005$). Both non-natives were able to increase their mean photosynthesis rate to a higher percentage when grown in the unshaded treatment (ANOVA $F = 12.45$;

$P < 0.025$). Analysis of FPHOTO also revealed a significant block effect; there was significant variation in the average rate at which each species was able to increase its photosynthesis among blocks 1-4 (Table 4, ANOVA $F = 8.83$; $P < 0.0001$).

Table 3. Variation of photosynthesis rate by block in the greenhouse competition experiment (Fblock = 40.83, $P < 0.0001$).

Block	N	Mean Photosynthesis rate (S.E.) ^a
1	64	5.07 (0.385) ^b
2	58	7.72 (0.454) ^b
3	66	3.92 (0.206) ^c
4	66	4.66 (0.298) ^c

^a Means with the same letter are not significantly different.

Table 4. Variation of Photo1000/Photo84 (FPhoto) by block in the greenhouse competition experiment (Fblock = 8.83, $p < 0.0001$).

Block	N	FPhoto (S.E.) ^a
1	32	2.08 (0.271) ^b
2	29	1.46 (0.231) ^b
3	33	1.57 (0.231) ^{bc}
4	33	1.74 (0.226) ^c

^a Means with the same letter are not significantly different.

DISCUSSION

Field Study. The results of the field study show how each non-native is behaving in situ in an invaded woodlot. The results of the greenhouse competition study offer insight as to how each invasive responds photosynthetically to changes in light level and how each species allocates resources to roots and shoots. A synthesis of both the field study and the greenhouse competition study reveals how each species uses a unique life history to promote invasion in a similar niche. Finally, the competitive effect of each invasive on the phytometer in the greenhouse competition study can be related to the impact each non-native may have had on native species in forest communities.

Light levels in the field were highly variable across the study area. Both *A. petiolata* and *M. vimineum* were observed growing in each light level, but contrary to expectations, percent cover of *M. vimineum* increased as PAR levels decreased across the study plot whereas percent cover of *A. petiolata* was unrelated to light level. Perhaps this result should not be altogether unexpected. Temperature and soil moisture are two variables closely tied to light level (Mooney & Ehleringer

1997). As light levels increase across the study area, it is possible that soil moisture decreases, which would inhibit growth for *M. vimineum*, a species that prefers moist soils (Gibson et al. 2002). The topography of the study plot gradually slopes downward from transect 1-7, with transect 1 being the highest on the slope. The soil moisture in the first few transects, which experience more intense PAR levels in the morning, may therefore also be drier, which could cause the percent cover of *M. vimineum* to decrease with increased light. In future studies, soil moisture levels should be monitored in study plots to test this hypothesis. The lack of effect of light on *A. petiolata* percent cover may be explained by our understanding that it is a species with high phenotypic plasticity, able to grow in and colonize a wide range of light levels and soil moistures (Byers & Quinn 1998).

The monthly photosynthesis rates of *A. petiolata* observed in this study match the life history pattern previously observed for this species. Seedling growth begins in late February to early March and most of the major growth for the rosette occurs during the months of April through June (Cavers et al. 1979). Leaf area increases until the end of June, after which the leaf area declines slightly and then remains the same until the following year, before the rosette bolts (Anderson et al. 1996). The photosynthesis rates observed for *A. petiolata* in the field study were highest during April, during rosette growth, and then leveled off for the remaining months of observation. PAR values in April were highest as well, before the canopy leafed out; thus, *A. petiolata* experienced the highest photosynthesis rates during the month with the highest PAR.

In contrast, the monthly photosynthesis rates of *M. vimineum* were greatest in September, which is the month seed set takes place (Redman 1995). There was an interesting transect effect for *M. vimineum* whereby photosynthesis increased along all but two transects from July to September. The plots in these two transects may have had more

variable differences in micro-site conditions than the other five transects. In other words, if there was a large tree that happened to cast a shadow over the plots in transects five or seven during the time of measurement, a much lower photosynthesis rate may have been recorded, which could cause the overall rate on those transects to seem lower. The distribution of light in the field increased overall from transects 1-7, although the intensity of light in the field overall did not change from July to September. The light distribution pattern indicated that the increased photosynthesis rate is most likely caused by a physiological change in *M. vimineum* based on life history, more so than on environmental variables.

When the growing season of the two invasives overlapped, the photosynthesis rate for *M. vimineum* was greater than the photosynthesis rate for *A. petiolata*. The performance of each species during July and September is reflected in the life cycle stage that each species was in during each month. During the months of July and September, *A. petiolata* is not actively growing (Anderson et al. 1996), whereas *M. vimineum* is in an active phase of fruit and seed set. The April photosynthesis rate for *A. petiolata* was comparable to the growing rates of *M. vimineum* during July and September, indicating that the higher rates reflect average photosynthesis when each species is actively growing.

Greenhouse Competition Study.

Unsurprisingly, both non-native invasives and the phytometer had a greater total mass, shoot mass, and root mass in the unshaded treatment. Additionally, the plants grown in the unshaded treatment also had a higher mean photosynthesis rate than those plants grown in the shaded treatment. Plants that are actively photosynthesizing will fix more carbon per unit leaf area than those that are not actively photosynthesizing, and therefore will have more biomass (Crawley 1997). Both *M. vimineum* (Barden 1996a & b) and *A. petiolata* have been reported to be more massive in more intense light environments.

While there was no difference in total mass between the two invasive species, interesting patterns emerged with respect to the root mass and shoot mass of each species.

Alliaria petiolata had a heavier root mass than *M. vimineum* in both shaded and unshaded treatments due primarily to the fact that *A. petiolata* has a large tap-root, whereas *M. vimineum* produces shallow, fibrous roots. Conversely, *M. vimineum* produced a heavier shoot mass than *A. petiolata*, indicating that while one species allocates more resources to roots, the other allocates more resources to shoots. *Microstegium vimineum* is an annual and must produce viable seed in one growing season, which explains why most of its resources would be allocated to shoots. Further support for the heavier shoot mass in *M. vimineum* is that the photosynthesis rate of this species was greater than the photosynthesis rate for *A. petiolata* in all treatments and light levels. As mentioned previously, plants with higher photosynthesis rates are expected to be fixing carbon at a greater rate and manufacturing simple sugars at a greater rate and therefore will be more massive.

The fraction of photosynthesis ratio, or FPHOTO, was calculated to assess the percent at which each species was able to increase its photosynthesis rate as the PAR increased from 84 $\mu\text{mol}/\text{m}^2/\text{s}$ to 1000 $\mu\text{mol}/\text{m}^2/\text{s}$. Both non-natives were able to increase their photosynthesis rate to a greater percent when grown in the unshaded treatment than when grown in the shaded treatment. Plants that are grown in more light-intense environments from seedling germination through to maturity are expected to be able to tolerate higher PAR values and can utilize higher light levels more quickly than plants that germinated and were grown in the shade. Shadier plants may experience a delay in productivity when given a higher intensity light and will maximize photosynthesis at a lower-light compensation point than sun plants (Mooney & Ehleringer 1997). Therefore,

plants grown in the shaded treatment may have been unable to increase photosynthesis rates to the same rate as were plants grown in the unshaded treatment.

Microstegium vimineum was able to increase its photosynthesis rate to a greater percent than was *A. petiolata*, especially in the unshaded treatment. The ability of *M. vimineum* to increase its photosynthesis rate to a greater degree is reflected in this species' ability rapidly to utilize sun flecks in the field to increase photosynthesis rate quickly (Horton & Neufeld 1998). The ability of *M. vimineum* rapidly to utilize sunflecks in an understory environment may give this species an edge against the C3 *A. petiolata*, which takes longer to respond to the increased light level. *M. vimineum* may therefore be able to allocate biomass more quickly, which could give this species a competitive edge in understory situations that are evenly moist.

A significant block effect was noticed for both the photosynthesis and FPHOTO means. This block effect can be attributed to the physical conditions in the greenhouse, since all blocks were wholly randomized and individuals from every canopy type and every treatment were present in each block, eliminating the possibility of a parental effect. The combination of excessive temperatures (in excess of 100° F at times) and uneven air currents in the new greenhouse, combined with a solar unevenness most likely contributed to this block effect, as opposed to a phenotypic difference between individuals.

The Field Study and Competition

Experiment—A Synthesis. Taken together, the field study and the greenhouse competition experiment reveal that *M. vimineum* and *A. petiolata* utilize two separate life history strategies to promote simultaneous invasion in non-indigenous areas. *Alliaria petiolata*, the C3 biennial herb, germinates early in the season, taking advantage of the abundant light in the understory before the canopy unfolds. This species becomes established before other understory herbs emerge. After a few active months of photosynthesis and growth,

A. petiolata enters a period of low growth until the following year when the rosettes bolt and set seed. During the low activity phase, *A. petiolata* invests resources into a large tap-root, which is necessary for obtaining moisture during the hot months of the summer and to provide a winter root stock from which new leaves can sprout the following season after winter damage. *Microstegium vimineum*, the C4 annual grass, germinates in April and becomes active immediately, increasing its photosynthesis rate over the summer months. At the end of the summer, the species continues to allocate resources to shoots to prepare for flowering and seed set in the early to late fall. This species therefore prefers moist soils since it does not allocate as many resources to root growth.

The performance of each species is closely tied to its type of photosynthetic pathway. The C3 species would be limited by photorespiration in the hot, dry summer months and so avoids the summer stress by remaining largely inactive in the summer months. In competition with *A. petiolata*, *M. vimineum* can remain active in the summer months when temperatures are limiting to the C3 species. However, in lower temperature, *A. petiolata* would be expected to have an edge over the more expensive C4 pathway. Ultimately, however, *M. vimineum* can rapidly make efficient use of sun flecks and therefore still may have an advantage over *A. petiolata* throughout the summer growing season even if temperatures remain low.

In greenhouse competition, the mass of the native species *Eupatorium rugosum* was the same regardless of whether it was grown in competition with *A. petiolata* or *M. vimineum*, showing that both non-native invasives had an equal competitive effect on this native species, which is one of the only other herbaceous understory species present in the WCR study forest. Clearly, it is imperative that when considering strategies for managing invasive species in the forest, the effects of both *A. petiolata* and *M. vimineum* must be considered together.

Although both invasives had an equal effect on *E. rugosum*, it remains unclear if the results can be extended to other native species in the understory. *Eupatorium rugosum* appears to be surviving well in the forest (despite intense herbivory from a large deer herd in the state park). Therefore, the conclusion can not be made that *A. petiolata* and *M. vimineum* invade by pushing out all other native species. Other disturbances that could open up colonization space for invasives should also be considered, such as intense herbivory, or the presence of hikers.

In conclusion, management plans to protect native biodiversity in similar woodland forest patches would do well to consider the collective impact of co-occurring invasive plant species on the native flora. Such analyses will be greatly aided by paying explicit attention to the life history strategy and photosynthetic pathways of the invasive species.

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Gravitational Lensing of a Reissner- Nordström Black Hole

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INTRODUCTION

Gravitational lensing in the weak-field regime is a well-developed field of study, which has served as an experimental test for the general theory of relativity. Lensing by a non-compact Schwarzschild lens in the weak-field limit is developed in Schneider et al. (1992), Weinberg (1972) and Wembsganss (2003) using a quasi-Newtonian approximation, which is based on assumptions of a weak gravitational field and small deflection angles. Others (e.g. Virbhadra and Ellis, 1999, Bozza et al., 2001, Eiroa et al., 2002, and Perlick, 2003) have gone on to investigate a Schwarzschild black hole as a lens, which requires consideration of lensing in the strong-field limit. Lensing in the strong-field limit requires that the assumptions of weak gravitational fields and small angles be dropped. We treat here lensing of a charged Schwarzschild black hole in the weak-field limit, so we are assuming a weak gravitational field and small bending angles. After introducing the basic equations relevant to lensing in the Schwarzschild spacetime, we obtain by analytical methods the deflection angle. Our starting point is the geodesic equations for a photon in the Reissner-Nordström metric. We then derive the lens equation in order to find the image positions. Finally, we consider a physical example.

THEORY AND CALCULATIONS

The metric for a charged, non-rotation massive object is that of the Reissner-Nordström spacetime.

$$ds^2 = c^2 d\tau^2 = -\left(1 - \frac{2M}{r} - \frac{Q^2}{r^2}\right) dt^2 + \left(1 - \frac{2M}{r} - \frac{Q^2}{r^2}\right)^{-1} dr^2 + r^2(d\theta^2 + \sin^2\theta d\phi^2) \quad (1.1)$$

using geometrized units, $G = c = 1$. This corresponds to an isotropic spherical mass with charge Q .

To obtain the deflection angle, we must determine the equations of motion for a photon in the given spacetime, which requires that we solve the geodesic equation,

$$\ddot{x}^\mu + \Gamma^\mu_{\alpha\beta} \dot{x}^\alpha \dot{x}^\beta = 0 \quad (1.2)$$

where $\dot{x}^\alpha = dx^\alpha/d\tau$. Since the spacetime is spherically symmetric, there is no loss in generality by confining the photon's motion to the equatorial plane, $\theta = \pi/2$. The geodesic equations reduce in the Reissner-Nordström spacetime to,

$$\mu=0: \quad 0 = \dot{t} \left(\frac{m}{r^2} + \frac{Q^2}{r^3} \right) \left(1 - \frac{2m}{r} - \frac{Q^2}{r^2} \right)^{-1} \dot{r} \quad (1.3)$$

$$\mu=1: \quad 0 = \dot{r} \left(1 - \frac{2m}{r} - \frac{Q^2}{r^2} \right)^{-1} - \dot{r}^2 \left(\frac{m}{r^2} + \frac{Q^2}{r^3} \right) \left(1 - \frac{2m}{r} - \frac{Q^2}{r^2} \right)^{-2} + c^2 \dot{t}^2 \left(\frac{m}{r^2} + \frac{Q^2}{r^3} \right) + r \dot{\phi}^2$$

$$\mu=3: \quad 0 = \dot{\phi} + \frac{2}{r} \dot{\phi} \dot{r} \quad (1.4)$$

$$(1.5)$$

where $m = \left(\frac{G}{c^2} \right) M$ and $Q = \left(\frac{G}{c^4} \right) q$.

Since t and ϕ are cyclic coordinates we define constants h and k such that,

$$h = r^2 \dot{\phi} \quad (1.6)$$

$$k = \left(1 - \frac{2m}{r} - \frac{Q^2}{r^2} \right) \dot{t} \quad (1.7)$$

Let $u = 1/r$, so the equation of motion for a photon in the Reissner-Nordström spacetime is,

$$\left(\frac{du}{d\phi} \right)^2 + u^2 = F + 2mu^3 + Q^2 u^4 \quad (1.8)$$

$$F \equiv \frac{c^2 k^2}{h^2}$$

Differentiating (1.8) with respect to ϕ we get,

$$\frac{d^2u}{d\phi^2} + u = 3mu^2 + 2Q^2u^3 \quad (1.9)$$

If we let $Q \rightarrow 0$, the charge term drops out leaving a differential equation to which we know a particular solution, $u_c = u_o \sin \phi + 2mu_o^2/2(1 + \cos^2\phi - \sin\phi) - 2mu_o^2\cos\phi$, where u_o is the closest approach. Let u_p be a particular solution to

$$\frac{d^2u}{d\phi^2} + u = 2Q^2u^3 \quad (1.10)$$

Since Q and m are decoupled in (1.8) we can construct a solution out of a superposition of solutions, i.e. $u = u_c + u_p$. If we consider the term $2Q^2u^3$ to be a small correction to the solution in flat spacetime, then u_p should deviate only slightly from the solution of (1.8) in flat spacetime (i.e. $m \rightarrow 0, Q \rightarrow 0$), which is $u = u_o \sin \phi$. By solving (1.10), we get the general solution,

$$u = u_o \sin \phi + 2m \frac{u_o^2}{2} (1 + \cos^2 \phi - \sin \phi) - 2mu_o^2 \cos \phi + \frac{Q^2 u_o^3}{4} \left(\frac{1}{4} \sin 3\phi - 3\phi \cos \phi \right) \quad (1.11)$$

In the weak-field limit, $\alpha \rightarrow 0$, we can make the following approximations:

$$\begin{aligned} \sin \phi &\approx -\alpha \\ \cos \phi &\approx -1 \\ \sin 3\phi &\approx -3\alpha \end{aligned}$$

also, as $\phi \rightarrow \pi + \alpha, u \rightarrow 0$. Finally, by substituting these approximations into (1.11), one gets the equation for the deflection angle.

The resulting angle of deflection is

$$\tilde{\alpha} = \frac{4mu_o + 4m^2u_o^2 \left(\frac{15\pi}{16} - 1 \right) + \frac{3\pi Q^2 u_o^2}{4}}{1 - \frac{9Q^2 u_o^2}{16}} \quad (2.1)$$

expanding to $O(m^2)$. Since u_o is very small, we can expand the term in the denominator to $O(m^2)$,

$$\left(1 - \frac{9Q^2 u_o^2}{16} \right) \approx 1 + \frac{9Q^2 u_o^2}{16}$$

which gives the deflection angle

$$\tilde{\alpha} = 4mu_o + 4m^2u_o^2 \left(\frac{15\pi}{16} - 1 \right) + \frac{3\pi Q^2 u_o^2}{4} \quad (2.2)$$

The charge then contributes a small correction to the second order term of the deflection angle.

In order to get the image positions we solve for θ in terms of α . From Figure 1, we obtain the lens equation, assuming $D_S = D_L + D_{LS}$,

$$\theta D_S = \beta D_S + \alpha D_{LS} \quad (2.3)$$

By defining, $\alpha \equiv \frac{D_{LS}}{D_S} \tilde{\alpha}$, we may solve for θ

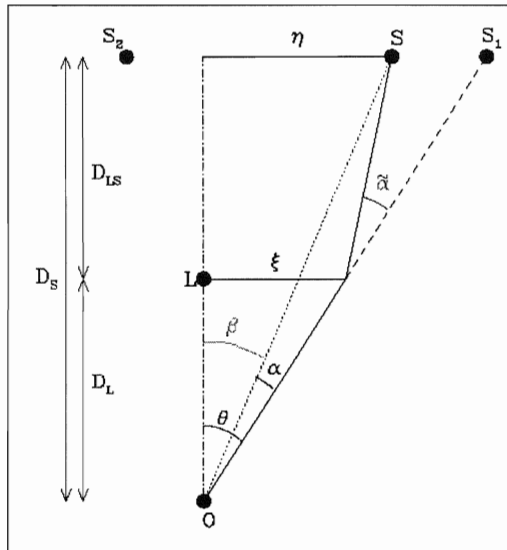
in terms of α ,

$$\theta = \beta + \alpha \quad (2.4)$$

Making the approximation $\xi \approx 1/u = D_L \theta$, (2.4) becomes

$$\begin{aligned} \gamma &\equiv -\frac{D_{LS}}{D_S} \frac{4m}{D_L} \\ \lambda &\equiv -\frac{D_{LS}}{D_S} \left(\frac{4m^2 \left(\frac{15\pi}{16} - 1 \right) + \frac{3\pi Q^2}{4}}{D_L^2} \right) \end{aligned} \quad (2.5)$$

Figure 1. The relationships between distances that may be used to formulate the lens equation. L is the lensing object, O the observer, S the source, and S1, the image (Wembsganss 1998).



AN EXAMPLE

We use the example cited in (Eiroa et al. 2002) to provide an example of the real physical effects of lensing by a charged compact object such as a black hole. The lens is the Galactic supermassive black hole with mass $M = 2.8 \times 10^6 M_{sun}$ ($M_{sun} = 1.99 \times 10^{30}$ kg = 1477m) and charge Q at distance $D_L = 8.5$ kpc, and we consider the lens to be halfway between the source and the observer, i.e. $D_{LS} / D_S = 1/2$.

Table 1. The primary, secondary, and tertiary images produced by the given charges Q . We have set $\beta = 0.2$ arcseconds. Image positions are expressed in arc seconds. Positive and negative image positions lie to the right and left of the lens, respectively.

0	0.2M	0.5M	1M	1.5M
-0.851129	-0.851129	-0.851128	-0.851128	-0.851126
-6.32787×10^{-6}	-6.40426×10^{-6}	-6.80702×10^{-6}	-8.24418×10^{-6}	-1.06394×10^{-5}
1.05113	1.05113	1.05114	1.05114	1.05114

Table 2. β and θ are expressed in arcseconds. We have set $Q = 0.5M$. θ_3 is the position of the image arising due to the charge on the black hole. θ_1 and θ_2 arise due to light bending in the traditional case where $Q \rightarrow 0$.

β	θ_1	θ_2	θ_3
0	-0.945857	-6.80701×10^{-6}	0.945864
0.2	-0.851128	-6.80702×10^{-6}	1.051140
0.4	-0.766770	-6.80703×10^{-6}	1.166780
0.6	-0.692292	-6.80704×10^{-6}	1.292300
0.8	-0.626958	-6.80705×10^{-6}	1.426960
1	0.569879	-6.80706×10^{-6}	1.569890

CONCLUSIONS

We have presented in this paper the equation for the deflection angle of incident light rays on a charged black hole. By starting from the geodesic equations for a photon in the Reissner-Nordström metric, we have obtained the deflection angle analytically. The cubic equation for the image positions produces three real images. Both θ_1 and θ_2 correspond to images in the case $Q \rightarrow 0$ while θ_3 is the position of the image arising due to the charge on the black hole.

We note from the tables that the additional image due to the charge occurs very close to the optic axis that joins the lens to the observer. Upon inspection of the positions of the images in Figure 1, we note that this image always occurs in the opposite side of the optic axis from the source. A preliminary analysis indicates that both θ_3 and θ_1 (occurring at the

same side of the optic axis) are fainter than the one at θ_2 . Among all of them, the faintest is at θ_2 , which is the third image formed due to charge on the black hole.

Clearly, even though the charge term introduces a small correction into the deflection angle, its value is still non-negligible at approach distances governed by the weak-field limit. The upper bound of the strong-field limit has been shown (Virbhadra and Ellis, 1999) to be at $1/u_0 = 3.21M$, which demonstrates adequate need for development of black hole lensing in the weak-field limit.

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Conference Proceedings

Listed below are abstracts of student-faculty collaborative work presented at regional, national, and international conferences.

Jane Marchetti

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Graduate English Program

Druids on the Delaware, Chapter 1,

"Off the Beaten Path"

Presented as a poster session at the American Conference for Irish Studies, Mid-Atlantic Regional, at the University of Maryland, October 25, 2003

The late Stephen Jay Gould, renowned author, evolutionary biologist, and Harvard Professor, spoke with great enthusiasm of "the continuity of life." "I believe," he said, "in the grandeur of this view of life...the poignancy of our stories,...the sense of belonging gained from contemplating family genealogies and the feeling of understanding achieved by locating our tiny little twig on the great tree of life."

It is this universal human yearning that is the underlying theme of *Druids on the Delaware*. A work of fiction, it is about a woman who has just turned 50 and, upset by her husband's plans to retire and move, takes a walk along the towpath of the Delaware and Raritan canal where she meets an ancient and amiable sea serpent. He tells her three tales of women faced with leaving their homes—from ancient Crete, from old Spain, and from late 18th-century Ireland—who all turn out to be notches on her own particular "tree of life."

Though as yet unpublished, it has been reviewed and described by popular author Hilma Wolitzer as "lyrical and lovely," and by author/journalist Bill Kent as "an amazing

duplication of an Irish Schannachie," "an absolute, one-two, knock-down delight!"

Michael Massimi and Ursula Wolz

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(Ursula Wolz, Faculty Sponsor)

Peer-To-Peer Policy Management System for Wearable Mobile Devices

Presented at: The 7th Annual IEEE International Symposium on Wearable Computing, White Plains, NY, October 22, 2003

Wearable computing devices have great potential thanks to their mobility. Because of this mobility, spontaneous peer-to-peer networks may emerge amongst several users wearing individualized devices. Although security of wireless networks in general has been explored, we propose a system wherein users are protected from one another and from abuse of communally owned resources through the use of a peer-to-peer policy management system called PPPM.

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