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# Science's Harmful Power

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# **Science's Harmful Power**

**A Project Submitted in Partial Fulfillment**  
*of the Requirements for the Degree of*  
**Master of Liberal Studies**

*by*

*Rochelle Thomas*

*April, 2013*

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*Master of Liberal Studies Program*

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**April, 2013**

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## *Contents*

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Acknowledgements

List of Illustrations 5

Introduction 6 - 12

Chapter I Science: The Olive Tree Branch ..... 13

Chapter II Science: The Leading Cause of Mistaken Identity ..... 36

Chapter III Scientific Creativity and the Destruction of Society ..... 42

Chapter IV Science Goes Bad When Society is Misled ..... 55

Conclusion ..... 69

Illustrations ..... 76

Works Cited ..... 80

## LIST OF ILLUSTRATIONS

Figure 1.....	Herbert Spencer
Figure 2.....	Masters “Three Ways of Knowing”
Figure 3.....	The Voice
Figure 4.....	Mendel’s Peas

## INTRODUCTION

The scientific community influences Western society's ethical decision making by utilizing past and current scientific discoveries. Scientific discoveries began as early as the second century with Claudius Ptolemy, followed by Galileo Galilei, Isaac Newton, and Gregor Mendel, to suggest a few. Some discoveries benefit Western society in the form of progression. The scientific community establishes scientific progression in the form of many different ideals, methods, research, and facts. Western society progresses by utilizing discoveries such as Galileo's theory on how the Earth's rotation revolves around the sun, Newton's study of gravitational pull, and Mendel's later discovery of hereditary cells. Usually, after a scientific discovery or theory has been promoted awareness arises regarding how applied science's impact can harm people in any society.

However, while these theories contributed to the advancement of science stemming from the Scientific Revolution, certain past and current scientific discoveries have not always improved Western society. The advancement of scientific technology can cause a detrimental backlash by the general public. Some examples are the construction and dropping of the atomic bomb, the lack of ample test studies done before prescription medications are dispensed to patients, and fraudulent scientific endeavors some scientist's incorporate during the creation of their theories, research, and writing.

Human values and views on science discuss moral issues raised by science which directly and indirectly affect people. This occurs when the people of Western society turn their humanistic needs over to the scientific community. Scientists can falsely influence

society and gain the public's trust. Alan Petigny is an Associate Professor at the University of Florida who notes Paul Starobin as stating "[T]here was a naive faith that . . . sciences could be a precision tool to solve the world's problems" (10). The reason for this could stem from the general public not understanding science and how the public misinterprets "expertise."

A controversy arises when previous scientific theories plague new scientific discoveries and these two threads convert into new scientific methods. Sometimes when this happens the advancement of technology may cause detrimental effects for human beings. One example is the discovery of radium by Marie Curie in 1898. Curie's radium discovery evolved into a new thread some fifty years later, at the hands of scientists who created the nuclear bomb. The after effects of dropping the atomic bomb on Nagasaki and Hiroshima produced both physically and psychologically detrimental effects on human beings. The dropping of the nuclear bomb harmed and killed around 90,000-140,000 people, and "Truman's decision to use the atomic bomb on Hiroshima and Nagasaki revealed the danger that the products of science could destroy life everywhere removing the illusion of security and progress on which modern society has rested" (Masters 53-54). Today, people across the nation are still suffering from the repercussions from dropping the nuclear bomb named "Little Boy."

Not all scientific discoveries are harmful to human beings however, and while some discoveries negatively affect humans there are scientific discoveries which have contributed to the betterment of human beings. Antibiotics have proven to be a great advancement for Western society. While the overuse of this medication has sometimes

stalled the virus and given strength to its resistance, it has proven overall to have a positive effect on humans for the cure of certain infections (Masters 46).

Current media attention often focuses more on the negative aspects of newsworthy material than on presenting the viewers with a balanced view of a situation. The media does not emphasize the “truth.” However, there exists some disagreement over more of an emphasis made on the “untruth” and all the dramas and wrongdoings within those scenarios which affect our society on a daily basis. There are movies, news broadcasts, and reality shows which display all the unreality of our society. This thesis will not uncover the truth, because each individual views the “truth” differently, but rather will concentrate on how Western society overall views the truth. Is the truth always the desirable answer to ethical questions? Yes. In this thesis entitled, *Science’s Harmful Power*, Western society’s humanistic views of understanding science explain and challenge the belief that science only has a positive effect on Western society. Psychologist Carl Rogers explains from a humanistic perspective the question needs to be addressed. Is there “such a thing as truth” to science? (Kirschenbaum and Henderson 29). This difficult question cannot possibly be answered in one thesis paper. However, tackling the subject through understanding of past and current theories, and the interlocking parts of truth and value can possibly lead to a greater understanding of science’s relationship to the truth.

Four problem areas correlate to understanding science’s relationship to the truth; human values and views on science, Western society’s misinterpretation of science, science’s creation of theories which leads to the destruction of societies, and fraud hidden

from the public by the scientific community. The scientific community sometimes manipulates each area of responsibility differently; once manipulated, these areas can negatively affect the general public.

Science can cause misunderstandings, bringing about concern when the public views scientific theories as being indestructible as well as of sound evidence or reasoning. There are times when the scientist's bias or racist views plays a strong role as the source behind the theory and the public, as Susan Haack English Professor at the University of Miami writes, "We admire its theoretical achievements, and welcome technological developments that improve our lives; but we are . . . disillusioned when we read scientific fraud, misconduct, or incompetence" (17). Previously learned beliefs include gender bias which displays generalizations and mis-statements to the public; when this occurs Western society is persuaded by these learned beliefs by the scientist(s) as being carved in stone.

The creative side of scientists' theories can lead to the destruction of societies. The creation of the atomic bomb is a discovery that, on one hand, scientists knew would cause destruction but, on the other hand, the after effects was a mind-boggling sight in the eyes of its own creators. Reflecting on the review of scientific advancement, Carolyn Merchant a historian of science also notes, "So called advances in science, technology, and economy actually accelerates the decline" (qtd. in "Earthcare" 53). What is the scientific rationale behind these creations? Hitler used and reversed the moral and ethical decision making of physicians to advance his plan to eradicate the Jewish community. These physicians made an effort to convince themselves that the choices they were

making were appropriate for the betterment of Western society.

Even the choices made by physicians when dispensing new medications to patients can be misconstrued. Patients assume a certain medication has been thoroughly tested and approved by the Federal Drug Administration; however, sometimes the emphasis on marketing and selling of a drug causes patients to believe the prescription which has been handed to them by their physician is safe to take with only minimal risks. Their belief is implemented by trusting their physician and the scientific community to be experts on research, testing, and development.

Another controversy exists when scientists and or physicians use nuclear technology or medical research as a means to implement their practices deemed unethical by Western societies standards. These scientists surmise that their scientific discoveries do not potentially cause harmful effects onto human beings, when in fact they have detrimental ramifications. One serious instance is Duke University medical researcher Dr. Anil Potti, who five years ago was accused of fraudulently manipulated his research to convince other researchers, his cancer patients, and their families, of his discovery of a “unique genetic make-up” (“60 Minutes, Feb. 12, 2012). This “genetic make-up” could match specific tumor factors using a specific chemotherapy treatment on his patients (“60 Minutes,” Feb. 12, 2012). The chemotherapy would regress the growing cancer tumor “And more than a hundred desperately ill people invested their last hopes in Duke's innovation” (“60 Minutes,” Feb. 12, 2012). However, instead of Dr. Potti saving his patients’ lives, he may have “exposed them to health risks” because of his fraud based discovery, and as journalist Natasha Singer notes, “The American Cancer Society also

requested that Duke outline steps the medical center was taking to assure the accuracy and scientific validity of the research it sponsored, as well as inquiring about Dr. Potti's credentials" (qtd. in Singer "Duke Scientist" 2).

The final problem which occurs within the scientific community is fraud. Pseudoscience is known as a false science which is based upon so-called legitimate scientific findings. Social Darwinism which Herbert Spencer (Figure 1) labeled as the "survival of the fittest," falls under the category of pseudoscience (Gregory 407). As Robert Jay Lifton a psychiatrist and author notes, the Holocaust became a subsequent result of Social Darwinism when "Making widespread use of Darwinian term . . . Nazis sought to take over the functions of nature . . . their own version of human evolution" (17). Lifton mentions, there is a link between eugenics, anthropology, and scientific racism (17). This turned some medical scientists' thinking into what one would construe as the "mad scientists" way of thinking; as Lifton mentioned, "Among the biological authorities called forth to articulate and implement "scientific racism" . . . doctors inevitably found a unique place" (17). The scientists' rationale and the aftermath of their actions regrettably cast a negative shadow upon science, but our society still looks to these scientists as being the foremost expert in their fields of practice.

The problem begins with the understanding of human values and the views on science as to whether it is possible to include the values of the people of today and incorporate them into scientific knowledge. We should be able to address any misconceptions we have about science and how different areas of knowledge play a key role in their effect on the public and the scientific community. Does "science" contribute

and demonstrate to Western society only as a positive outcome? Do scientists' discoveries only generate positive results when they are utilizing the effects on the general public? These questions can only be answered when we formulate our own opinion, based upon certain scientific knowledge we receive from the experts.

The purpose of this study is to acknowledge society's perpetual faith in science and scientists' theories. Western society maintains an unrealistic belief in which scientific theories and scientist's knowledge exists without error. Society's belief in this error proof mentality is challenged when fraudulent practices occur on the scientist's part, such as, the misuse of research, unethical practices, and the application of techniques which can either attribute to the harm or death of individuals. Scientist's reasoning behind fraudulent or unethical practices is usually to achieve either profit or fame recognition. We cannot let the stance of scientific communities stay detached from a humane community. As Harris notes, "The scientific community's reluctance to take a stand on moral issues has come at a price. It has made science appear divorced . . . from the most important questions of human life" (6). If the final outcome is to enter a discovery into society to be use for or against something, then scientists need to incorporate values and morals which then could possible have a positive outcome on society.

## CHAPTER I

### SCIENCE: THE OLIVE TREE BRANCH

The nature of science can be difficult for people to understand because it encompasses different branches of knowledge in which the public may not be educated thoroughly. Some say, science began as early as AD 135, with Ptolemy discovering the positions of the planets, and grew even more pronounced later with the development of the Scientific Revolution. However, the word “scientist” was not coined until 1837 by philosopher William Whewell (Bowler and Morus 4). Jacob Bronowski a biologist references his definition of science as “I define science as the organization of our knowledge in such a way that it commands more of the hidden potential in nature” (7). Basic science is formed by applied science and technology. William W. Lowrance Ph.D., description of science details, “Science was portrayed as being a campaign to discover “objective” facts about nature, using The Scientific Method to ferret out “natural” laws” (41). Lowrance explains Michael Polanyi’s viewpoint on science as, “[S]cience is what it is, in virtue of the way in which scientific authority constantly eliminates, or else recognizes at various levels of merit, contributions offered to science” (qtd. 43). Science can be compared metaphorically to an olive branch, which was the symbol of the peace or victory for the Ancient Greeks. Science extends outward to many different areas of philosophy of knowledge.

Carolyn Merchant a philosopher and historian of science references that technology does have the potential to solve environmental issues, such as the clean up of

hazardous wastes and the control of the use of pesticides and herbicides (“Earthcare” 151). In addition it can commence the next Scientific Revolution. Alternatively some scientists look to harness or change the power of nature. There are scientists who construct science as a mechanism for silencing potential destruction. Science breaks down into different areas of study, and these portions are contained under an umbrella which is the overall nature of science. Even with the breakdown of science into different components, there is a widespread misconception about how science is the answer to future scientific advancements. Science is not easily deciphered by terminology or descriptions. Society can understand the nature of science by obtaining knowledge about the individual scientist’s claim and the area of study included in their field of work.

Science basically consists of past and current ideas that explain how the world functions. It has been argued on behalf of the scientists concerning which form of science leads the underlying structure of Western society. There is applied science, technology, basic science (which is natural science), which branches off into sociology, anthropology, psychology, physiology, just to name a few. Within these disciplines are values and within the scope of these disciplines is where scientists should incorporate the values within their theories. These theories are derived from applied science, technology, and basic science. The scientific community warrants the need to categorize and organize ideas, theories, and discoveries. To understand the characteristics of science “The benefits of accurately understanding the characteristics of science include a more scientifically literate society, a public more supportive of science, a more informed use of scientific knowledge . . . out of science career tracks” (Clough and Kruse 1). Modern

day scientists explain how basic science is based within a circumference; basic science is yielded from applied science and technology and is a direct reflection from understanding the natural world. (Clough and Kruse 1-2). Applied science addresses society's issues and technology using knowledge developed by basic and applied science (Clough and Kruse 2). Western society's understanding of science is fundamentally basic and extends forward from elementary school years (Clough and Kruse 1). Society should have a more thorough understanding of basic science and how it extends into scientific knowledge.

In the past elementary school students learned how scientists follow a step-by-step method to discover a scientific method, but are these steps actually correct? (Clough and Kruse 1-2). There is reason to question this belief. There are diverse methods for gaining insight into the formulation of a scientific method. The first two steps include exploring ideas and acknowledging the scientific issue (Clough and Kruse 2). This process involves "exploring the specific problem at hand" (Clough and Kruse 2). The next steps include the use of "existing scientific knowledge" and thinking along with "available resources" (Clough and Kruse 2). This process can reflect to include previous theories which have been threaded to open up new avenues of thinking for the scientist to create and use their imagination.

However, these steps are a misconception to defining science and or the characteristics of science (Clough and Kruse 1). In comparison, Bronowski does mention, a creative mind is a leap of imagination (12). Would this creative imagination be utilizing a method for a positive outcome on Western society? Some scientists believe in their own process. Should we believe all scientific methods are created with good

intentions? No. Or is the outcome of a theory only utilized negatively when in the hands of a monstrous mind? Journalist Marcelo Gleiser opines in the article “Virus Engineering and the Fear of Science” if scientists do not disclose the negative aspects of an experiment the repercussions could have damaging effects on society and we “can never go back” (Gleiser, “Virus Engineering”). Maybe it is too early to ask the question; however, the question needs to be addressed if science as a whole is or is not for the betterment of Western society.

The steps of a scientific theory noted could be better broken-down if the following is applied as Bronowski observes “All science is the search for unity in hidden likeness” and “The scientist looks for order in the appearances of nature by exploring such likeness” (13). However, when Bronowski wrote *Science and Human Values* in 1954, the basic understanding was defining how a theory is created and connected to the concept as taught in elementary school by the collection of data, exploring likeness, and to create a concept (Bronowski 33). These steps also define a theory. Bronowski explains Japanese physicist Hideki Yukawa’s discovery which waves of light can resemble separate pellets, however, forces around the nucleus of an atom might make it appear as solid pellets (13). The concept of a theory explained in grammar school is the basic understanding which society may hold true today; Bronowski’s scientific method explains a wide range of concepts which formulates a scientific method. Gerald Holton notes Hermann F. Mark’s encounter with Einstein in his lab, Hermann states Einstein remark to him was “[Y]ou make experiments and I make theories. Do you know the difference? A theory . . . nobody believes except the person who made it, while an experiment . . . everybody believes

except the person who made it” (13). Holton also discusses the relationship between science and facts as, “Science is the attempt to make chaotic diversity of our sense-experience correspond to a logically uniform [unified] system of thought” (32). Science is the foundation for people to understand how the world operates.

As according to Holton, “But scientific understanding is human understanding, after all, differing only insofar as research scientists may reasonably hope to be able to converge on the same conceptions” (168). An idea or thought extends from rational and reasonable absolute truths of science and the value of truth, is relayed by the scientist to society. However, Clough and Kruse note, “Because science is a human endeavor, subjectivity or preconceived notions cannot be eliminated” (3). However, let us understand this aspect of thinking from a different point of perspective as Peter Dear notes, “Science is also about power over matter, and indirectly, power over people” (2). Deciphering how science can manipulate an outcome of a theory which could negatively reflect on society is a necessary step in the process of scientific knowledge.

When referring to a ‘scientist’ people have images of a scientist in a white laboratory coat who invents things for society’s advancement (Dear 2). Scientific theories reflect how nature works and has power over society. The knowledge to decipher the understanding of applying science is how the people respond to and address these theories. Masters discusses “The criterion for accepting an idea or an interpretation becomes an intuition or a feeling of what is, at best, utility and, at worst, ideology and political correctness” (53).

What happens after these theories are put into place? Peter J. Bowler and Iwan Rhys Morus note, “The scientists themselves are relatively comfortable with the fact that some of the great discoveries had consequences that forced everyone to rethink their religious, moral, and philosophical values” (1). Before and during the Scientific Revolution people were forced to contend with the knowledge of how Galileo and Newton’s theories influenced Western society today. One example would be is within the last sixty years, and how Szilard was forced to contend with his idea of nuclear chain reaction and the creation of the atomic bomb. The after effects brought on by his idea led to the partial destruction of Hiroshima and Nagasaki. Our culture will rarely question whether science is challenging our views on our “religion, moral, and philosophical values,” unless either environmental or pharmaceutical catastrophes occur (Bowler and Morus 1).

Roger D. Masters is a research professor and Professor of Government, Emeritus at Dartmouth College who shows how the “Three Ways of Knowing” are each broken down into three perspectives (6). The main source is a triangular effect (Figure 2). These sources are ancient science, revealed religion, and modern science. Under each of these headings is a category defining the reasoning behind the justification as to how we understand science, “Both ancient and modern science rely on human reason; revealed religion relies primarily on faith” (Masters 6). The graph depicts modern science as losing the result of the effects of virtue, replacing it with human reason as the end result. This end result occurs when human values are mistakenly withheld by scientists’ at the time when scientists implement scientific evidence to form a theory.

The issue of human values and science together is a debatable one because science governs the technological and economical aspect of “applied knowledge,” which cannot be easily avoided. The distinctive aspect of science is when it affects people indirectly or directly by either environmental, economical, technological, or pharmaceutical consequences. Science’s development of a theory or discovery directly affects the general public within Western society, as Bronowski comments, “In the essays as I have written . . . the practice of science compels the practitioner to form for himself a fundamental set of universal values” (xiii). The reasoning behind Western society giving its permission, or “choice” over to the scientists is because scientists have become our misguided heroes. As a result of people’s own lack of expertise, they hand over their humanistic needs to be fulfilled by scientists or physicians, as Richard Feynman notes, “The applied sciences, for a while, were thought to free men of material difficulties . . . there is some good . . . in medicine” (31 - 32). Society interprets the obligation of scientists and physicians as the reason behind societies need to relinquish their decision making; because the scientific profession is above all the expertise in their field.

In understanding Bronowski’s perspective, people will need to separate themselves from scientific theories by analyzing their own values. People form opinions based upon their values and others based them upon scientists’ theories only. People take into consideration that the viewpoint of the scientist is looking for what a “perfect life” might contain. What will be discussed in this chapter will reinforce the complex yet necessary understanding of how science works, and when scientists ignore the consequences from the equation there can be negative side effects on society.

Critics charge that Western society is known to succumb to the materialistic aspect of the ideals of living longer, looking younger, and feeling better about oneself. Merchant argues, "The society is geared to the production of use values (food, clothing, heating, shelter, etc.) as the material basis for sustaining life" ("Earthcare" 145). But when the "intellect of a person" chooses to defy the "scientist" they can then separate themselves from society and form logical opinions of their own. When people of Western society challenge scientific technology, they will have an opportunity to choose whether or not to utilize past or present forms of technology and/or medicine which may or may not be good for individuals or society as a whole. One example is Rachel Carson who wrote in 1962 *Silent Spring*, Gregory confirms "Carson and others had long been concerned about the negative effects the widely used pesticide DDT was having on the environment" (519). Carson rejected acceptance of this form of science which inevitably destroys nature.

How and where do scientific aspects of technology fit into our society? Bronowski contends that the basis of the work becomes the focus to the scientist and confirms Peter Avelard statement "By doubting we are led to inquire, and by inquiry we perceive the truth" (45). From Bronowski's viewpoint, "A society holds together by the respect which man gives to man; it fails in fact, it falls apart into groups of fear and power, when its concepts of man is false" (44 - 45). Bronowski uses the example "The trial of Galileo in 1633 was a spectacular display of strength by the forces of tradition in the Holy Office, and they kept his *Dialogue* on the Index of forbidden books for another two hundred years" (xii). Science can manipulate an outcome of a theory which could

negatively reflect on Western society when; a scientist lacks the truth in his or her theory, but gains people's trust, leading people to false pretenses. In such a circumstances science has failed to protect nature and people from harm.

We can take the evidence and how it affects others, ourselves, and our surroundings, and re-evaluate our responsibilities to ourselves and the world in which we live. One organization which protects individuals when the scientific community lacks resolve is the World Health Organization (WHO). In a recent disclosure scientists in various countries around the world decided it was best to conclude genetic experiments that deal with the H5N1 bird virus, as noted in Gleiser's article "Virus Engineering and the Fear of Science." The virus killed 250 out of 500 people who were case studies; and the reason for stopping further research and testing occurred because scientists disclosed the virus is transferrable from bird to ferrets and is generally fatal (Gleiser, "Virus Engineering"). The Dutch scientists disclosed the fact that a mere slip could change the disease from being somewhat contained to a pandemic (Gleiser, "Virus Engineering"). Disclosure of negative research should be discussed with other scientists. Scientists should acknowledge from other scientists' past mistakes how technology could have negative ramifications on the future of our society, "We should learn from the history of the atomic bomb and remember that scientific research can never go back" (Gleiser "Virus Engineering"). If scientists acknowledge those past mistakes when implementing new theories, this could prevent the repeat of previous mistakes. The vast majority of scientific theories and the testing which follows, whether good or bad should be

disclosed. When “bad” theories are at the forefront of fraud these theories can be well hidden by the scientist(s) but should be exposed to society.

Within the last few years, people have taken on a new regard for public awareness in understanding how healthcare providers and their decisions influence our lives. One of the new debates which has formed, as Stein discusses in the article titled *Birth Control: Latest Collision Between Individual Conscience and Society*, is how the technology of science influences our daily decisions. The debate became controversial when a law implemented by Congress required religious based employers to provide contraception for their employees (Stein, “Birth Control”). Some critics charge that this debate arises when a form of government takes control over a person’s religious freedom to choose. The question arises when does a person have the right to make their own choice and not to surrender to demands of our society or the government? A person who can implement one’s own ethical behavior for one’s own personal use became an important issue during the Vietnam War, *Roe vs. Wade*, and implementation of the Church Amendment, Coats Amendment, and The Weldon Amendment (Stein, “Birth Control”). These amendments were implemented by Congress to protect doctors and nurses who refused to perform abortions or sterilizations (Stein, “Birth Control”). The “conscience clause” also enforces protection as to the rights of doctors and nurses who choose not to perform abortions (Stein, “Birth Control”). The humanistic debate protects individuals and the medical professionals who incorporate their morals and values when exercising their profession. As Merchant notes, “New social concerns generate new intellectual and historical problems” (“Earthcare” 75).

These new moral distinctions are being encompassed within organizations to provide relief in moral decision making. ACLU's Reproductive Freedom Project has been put into place to contest against the government. However, there are times when research goes beyond the scope of humanistic values and turns to more scientific expertise through research and development and, "Research once accomplished, must be considered in the long run ambi-potent, usable for either good or evil" (Lowrance 5). The reasoning behind this view is supported when research and development explores the use of chemicals as a evil weapon against the enemy and "The anticholinesterase chemicals developed as nerve gases between the World Wars later turned out to be elegant research weapons . . . led to the development of the military defoliant Agent Orange" (qtd. in Lowrance 5). What is "good" and what is "evil" is not a distinction that can always be easily pinpointed. There are different interpretations by different sources in Western society; as Bronowski points out, "The power of science for good and for evil has troubled other minds than ours" (4). In order to evaluate an issue there is not always an easy answer and sometimes issues are not either black or white. Lowrance quotes Norbert Wiener, the MIT mathematician expert as saying, "The interchange of ideas which is one of the great traditions of science must of course receive certain limitations when the scientist becomes an arbiter of life and death" (71). If issues were easily distinguishable then we would not have to defend our moral standards and beliefs at times.

Psychologist Carl Rogers seem to distinguish easily between black and white. Biographer's Kirschenbaum and Henderson note that Rogers argues his individual view

of the truth is what really matters and “It seemed to me it would be a horrible thing to have to profess a set of beliefs, in order to remain in one’s profession” (10). Rogers became a scientist not to see his name written on the pages of journals, but to obtain the understanding of truth through his scientific work. When Rogers made this choice it felt right to him, as did the choices he made thereafter.

A younger Rogers understood scientists who conduct experiments where the procedures are controlled learned how it was not easy to test a hypothesis (Kirschenbaum and Henderson 8). Although a scientific method is to discover the truth, sometimes scientists may manipulate procedures to achieve the results of a certain outcome. This “controlled truth” may be achieved by the scientist manipulating mathematical numbers of his or her scientific theory or hypothesis in such a way for the outcome to be repeated as the scientist believes it should be. This, then is a controlled truth. Even Carl Rogers admits he has done this; “So I have come to recognize that the reason I devote myself to research, and to the building of theory, is to satisfy a need for perceiving order and meaning, a subjective need which exists in me” (Kirschenbaum and Henderson 26). Rogers only need was to satisfy the urge within himself to have a better understanding as to why he questioned certain aspects of things. Rogers also stated, “I have, at times, carried on research for other reasons—to satisfy others, to convince opponents and skeptics, to get ahead professionally, to gain prestige, and for other unsavory reasons” (Kirschenbaum and Henderson 26). However, first and foremost Rogers learned to extrapolate his own yearning for knowledge.

Rogers’ inquisitive need to gain order and meaning in his work also led him to

acquire prestige. This “prestige” is something most scientists wish to obtain, the satisfaction of stature within the scientific community. Rogers also claims, “These errors in judgment . . . have only served to convince me . . . that there is only one sound reason for pursuing scientific activities, and that is to satisfy a need for meaning which is in me” (Kirschenbaum and Henderson 26). Rogers explains there may be changes ahead in behavioral sciences and one area of concern is the field of science as he notes, “It would keep the scientist as a human being . . . recognize that science is but the lengthened shadow of dedicated human beings” (Kirschenbaum and Henderson 278). However, the question to ask is whether the scientist is dedicated to science or human beings?

Scientific theories can have a huge impact on individual lives and the public community. Many scientific theories have had a negative effect on Western society from the atomic bomb, recalled prescription medications, and fraud. The public should question the relationship between scientific theories and the truth of science. If we begin to question new theories and technology before they become part of and replace our traditional views and values, then we may possibly have control over negative impact(s) which may occur within our society such as environmental pesticides, deadly prescription medication, and nuclear warfare.

Individuals in Western society have a respect based on faith for honest experts by allowing the scientists the opportunity to generate and incorporate these theories even when it maybe hazardous to our society. Why have we become so lethargic when it comes to making decisions based upon the good of our society? Alan Petigny believes, “The government led the way in reshaping popular attitudes” (9). For example, the after

effects of the atomic bomb were not known to civilians. However, it was understood that the military was protecting our society from possible future enemy threats. The harm done to other human beings may not have been considered in depth by the individuals and the government of the United States; what did matter was the fact that a possible attack from the enemy would not occur if we bombed the enemy first. One issue is, why was this a political decision backed by the government and President Truman to choose our ideals rather than choosing for ourselves? Scientists may have objected to the use of the atomic bomb but they still implemented the creation of the bomb.

Scientists take advantage of Western society in different ways, based upon different scientific agendas. The first way is that individuals place scientists in the role of heroes. We give our scientists the status of heroism when the end result is in Western society's favor. The public pleads for the scientist to perform heroic measures, such as finding a cure for cancer or to finding a new medication to relieve our anxieties; however, there is no perfect result, and our society can never reach ideal of perfection as Petigny cites "Emboldened by wartime success in developing the atomic bomb, perfecting radar, and mass-producing penicillin, federal authorities became . . . peacetime patron of the sciences for the first time" (9). Scientists and the government took on the role of a heroism of authority.

How do we as a society ascertain if scientists have an answer for all our dilemmas or issues? The strange fact is that our world's problems are brought on by our society's own doing and this is because society hands over the decision-making of what is best for the people up to the scientists. Society's decision-making is in question at least some of

the time. Who is responsible for this dilemma or who is responsible for this issue? The questions and answers seem to rest with who is willing to take responsibility as Petigny states:

In earlier times, when seeking moral guidance many Americans would have turned to the faith of their fathers and asked, “What does the Bible say?” Alternatively, others might have turned to the authority of tradition and asked, “What would my parents say?” Now, more Americans were apt to inquire, “What do the experts say?” (13).

However, there are experts and there are cranks. Cranks take the form of experts in pseudoscience. Even some of the experts commit fraud and position themselves in a manner of being a hero.

Dr. Anil Potti’s case is an example of such a fraud. Dr. Potti believed or at least convinced himself and his colleagues that he had a distinguishable chemotherapy to match cancer tumor factors. However, Potti maneuvered his test results to make it look as if he had discovered a genetic match between a cancer tumor and chemotherapy, when in fact he had not. (“60 Minutes,” Feb. 12, 2012) After Duke’s uncovering of Potti’s alleged fraud, Dr. Potti resigned from Duke University. Potti’s heroism turned out to be an alleged fraud.

Individuals in Western culture can never really have an understanding or knowledge of what is concluded to be the best for us, if we keep giving our power of decision making to scientists. Western society has put its faith in the hands of the scientist, from Herbert Spencer’s “survival of the fittest” to Stephen Morton’s belief that

race somehow affects science. Petigny cites Paul Starobin who stated “There was a naive faith that . . . sciences could be a precision tool to solve the world’s problems” (10). Our need to have a perfect world, a perfect life, and a perfect society is due to the fact that our scientists believe they know what is best for people. However, just to state two examples, our scientists have contributed to the destruction of Western culture through the development of nuclear bombs and prescription medication. Some people have given their responsibility of decision making over to scientists, and we have become mentally lethargic when it comes time to make the best logical decision for ourselves and others. One example would be in the 1960s the use of the drug Thalidomide, taken by pregnant women as a general sedative resulted in 8,000 handicapped children in 46 different countries (Kohn 187).

The difficult part is trying to make a logical decision as to whether scientists are correct in taking values out of science or whether people are correct in trying to incorporate values and morals as an underlying factor in science. One issue Holton acknowledges is “The intellectual brilliance of our sciences, the ingenuity of our technologies, may be characteristic of our culture, but from the point of view of the public and most intellectuals . . . both have moved behind a dark curtain” (293). Deciding whether a prescription medication is potentially harmful or the dropping of “Little Boy” would have been the correct choice is known only after these methods are put to the test. However, Bronowski is correct when he states, “We live in a world which is penetrated through and through by science, and which is both whole and real. We cannot turn it into a game simply by taking sides” (5). It is not the point which side is

correct. The point is whether values can play a strong role in helping formulate scientific theories. If so, would the outcome of past scenarios have been different? Could our future be different if scientists incorporate values within applied science?

Bronowski explains that scientists use the “Creative Mind” to seek the basics of truth and “The Habit of Truth” of influences, and the “Sense of Human Dignity” is the overall success of science (6). Bronowski also believes, “The world today is made, it is powered by science; and for any man to abdicate an interest in science is to walk with open eyes towards slavery” (6). We are slaves to our own beliefs if we do not investigate the truth behind these beliefs and scientists reasoning for their scientific theories. Questioning whether the scientist is postulating a “name” for himself to obtain grant money, or is it to be able to say he or she invented the next best discovery? (Broad and Wade 19). People are naive if they do not question the motives and reasoning behind the scientist’s theories.

The relationship between science and society is the subject of great debate when it entails how “truth and values” plays a role in science. Should scientists incorporate their ethical values when it comes to scientific theories and research which depends on the construction of nuclear bombs? From past to present as Bronowski states, “If, as many think, science only compiles an endless dictionary of facts, . . . it must be neutral (and neuter) as a machine is; it cannot bear on human values” (51). These ethical values are only distinguishable because people respond to tragedy. Our values and morals erupt when circumstances change and affect our status quo. People learn to move in a forward direction when the pressure comes from fear based feelings. There are also times when

fear immobilizes people as Bronowski notes if we seek the truth, “It follows that we must be able to rely on other people; we must be able to trust their word.” (57). Most people will be in agreement with the general public and as Agassi states “We tend to be highly critical of this conduct, since public opinion is no substitute for one’s own” (185). Also knowing if a group of individuals or scientists recommend this act or thing, then it must be for the betterment of society as Agassi states “Nor is public opinion any guarantee, especially since it usually is behind history: it takes time for the public to learn about what the avant-garde is doing” (185). Very rarely do we seek change but we respond to change when it affects our lives, because we leave our decision-making to often in the hands of the scientists and as Agassi confers “And when one is quite ignorant one takes public opinion as an initial guide” (185).

Why “must” we trust the scientist’s word? When can we seek autonomy when it comes to the study of prescription medications or the implementation of nuclear weapons? We need to be able to seek out the truthful answers and decipher the reasons behind why scientists are actually developing certain technology. We need to ask why as to how the application of the theory is being implemented, and how does this affect us and people as a whole. Even Bronowski questions the impact science has on our values “Is science an automaton, and has it lamed our sense of values?” (70). Bronowski believes we need to unfold each layer as to the reason why the scientist decides the next step in research (70). Understanding scientists’ motives gives any society an understanding as to why a theory has come into form. If we investigate and question biased assumptions while researching the answers, we may begin to unfold whether the

specific application of a theory is for the betterment of the people and then agree or disagree accordingly.

It is the responsibility of scientist's to fully grasp the understanding of how human values participate in science. Scientists cannot and should not separate their values from their work. Just as the people of this culture cannot separate the responsibility of understanding science, as Bronowski notes, "The shame is ours if we do not make science as part of our world, intellectually as much as physically, so that we may at last hold these halves of the world together by the same values" (73). With this understanding the scientist must take the responsibility to incorporate the necessary values and include these values within the formulation of the discovery. The theory will then be based upon truthful measures and unethical doubt behind the creation of the theory could be put to rest. The responsibility lies in the hands of the people also, but we seem to believe science has all the answers for future discoveries and Sam Harris notes, "A more detailed understanding of these truths will force us to draw clear distinctions between different ways of living in society with one another, judging some to be better or worse, more or less true to the facts, and more or less ethical" (2-3). We cannot disregard the fact that our responsibility is to evoke from the scientists higher standards of ethics.

Scientists need to project and predict the outcome of a theory for future generations and not for our generation we are currently living within. His or her theory needs to be indispensable for future generations, instead of just predicting the great accomplishment his or her theory may make; such as life altering changes for society and

themselves. If this major issue is accomplished then scientists have a chance of positively affecting the people of Western society.

How can we decipher the truth of something when trying to understand the outcome of a scientific discovery? If we disengage from the known and open our eyes to new resources which are available, we may have a better understanding as to where the scientists' rationale is leading. Harris points out, "In both cases, science—and rational thought generally—is the tool we can use to uncover these facts" (31). The advancement of scientific discoveries is for the progression of Western society, but then again it does not take into consideration the effects an application has on the people of the world. Feynman notes, "When the scientist is told that he must be more responsible for his effects on society, it is the applications of science that are referred to" (7). The importance of realizing the ideals the scientists create as Feynman also contends "If you work to develop nuclear energy you must also realize that it can be used harmfully" (7). This development of nuclear energy appears to be in favor of the scientist but not in the favor of the environment.

Science can lead us down the path of the unknown and this problem can exist when we take for granted the words of the scientist as being full of promise and 100 percent without question or correct. One example is Feynman's response to stating society does not have the answers all the time and "If we take everything into account, not only what the ancients knew, but also all those things that we have found out up to today that they didn't know, then . . . we must frankly admit that we do not know" (33). Not only should we disengage from the known and open our eyes to new resources, but as Joseph

Agassi quotes Einstein as saying, “[D]o not listen to what a scientist says he does, look at what in fact he does” (219). If the people have an opportunity to dissect the theory it gives us a better understanding how it could affect us now and in the future. And we should take it a step further and continue to dissect the known facts, as Agassi quotes Bacon as saying, “Observe facts as they are and never jump to conclusions: let the conclusions impose themselves on you with utter certainty” (10). We should not only let the facts prove the outcome, but also impose our values to prevent the scientist from utilizing the discovery for only the good of himself or herself and the scientific community. However as Feynman notes, “Looking back at the worst times . . . there were people who believed with absolute faith and absolute dogmatism in something” (33). We believe with utter certainty and that everybody should agree with them (Feynman 34).

We may ask ourselves what a “value” is. Each person lays a claim to their own description by their own experience or resource, however it is known to be universal with regard to moral values within Western society. Bronowski explains the concept that a value entails justice, honor, dignity, and tolerance. (Bronowski 38) Each of these values constitutes a moral value and the truth is addressed as an absolute truth, which connects through the logic of concepts.

In conclusion, society cannot just rely on the words of the scientist, nor can they build a false trust when it comes to the scientist’s opinion. Bronowski quotes Abelard, “[B]y doubting we are led to inquire and by inquiry we perceive the truth” (45); i.e. understanding the meaning of the discovery and asking questions as to what is the meaning behind the theory. If society requires more from the scientific community by

inquiring, doubting, reasoning, and formulating its own opinion, then the scientific community may incorporate a value system within the work, or at least may move a scientist to require value within their discovery.

Science breaks off into different areas of scientific research. Basic science is the knowledge behind applied science and technology. Science is not an easy term to define by reason of all the areas which it encompasses. The past and present theories basically function as a result of the natural world once the theories are applied by scientists. What society has learned in grade school and how they apply their knowledge about science today is different. Theories are created by exploring phenomena addressing a scientific problem, having the understanding of scientific knowledge, utilizing available resources, current and past events, investigating problems and resources, and applying imagination and creativity (Clough and Kruse 2). Once these steps are applied to a theory, society then needs to question the motives of the scientists' reasoning for creating the scientific method. The model of "Three Ways of Knowing" depicts over time how we have lost the sense of human values, as scientists test and incorporate their theories into scientific evidence (Masters 7). Losing the objective behind human values may seem potentially harmless, but is it really? How can people gauge between what is good and bad when deciphering scientific theories if the value is now free from science? In the late 1990s scientist Richard Feynman questions, "Is science of any value?" (6). The relationship between science and nature is insurmountable; without nature science could not exist as Feynman states "Whether the result is a good thing or a bad thing depends on how it is

used, but the power is a value” (6). Yet, scientists sometimes suggest values should not co-exist with nature and this is a destructive pattern to follow.

Finally, science does have the potential to solve environmental issues and cure infections however, society only is aware of the minimal understanding of science to have fundamental characteristics. Unfortunately, when an issue arises or a catastrophe occurs people scramble to find the reason behind the negative infliction upon themselves or the environment.

## CHAPTER II

### SCIENCE: THE LEADING CAUSE OF MISTAKEN IDENTITY

-We are confused about what science can and what it can't do . . .  
about the role of science in society and the role of society in science.

—Susan Haack

It is important to recognize Western society's misinterpretation of science and how the public can continually believe in past notions as the correct interpretation of science. Sometimes we forget how racism and bias form and carry on from generation to generation as the correct understanding of science. It is only when an opposing opinion is so strong that the viewpoint and interpretation starts to change the public's view to question the path they are being led down by scientists.

Science historian Steven J. Gould believed that scientists' incorporated racism and biases in the nineteenth century led to the creation of pseudoscience. The different sizes of ethnic skulls prove the intellect of man versus woman and race versus race by Samuel Morton and is contested till this very day. Paleontologist Samuel Morton (1799-1851) collected over a thousand different human skulls. Morton's theory stated the brain size directly reflected the intellect of a man or a woman. Shown in (Figure 4) is the size differential of a Brazilian skull. It was not until 1978 that Gould challenged Morton's numerical sizes. What Gould found was a great discrepancy in Morton's calculations. Gould notes, "But Morton's fame as a scientist rested upon his collection of skulls and their role in racial ranking" (85). And as Gould observes, "Morton set out to

rank races by the average sizes of their brains”(85). However, his belief was in fact a racist and biased belief.

The advancement of applied science and technology inflicts a great responsibility upon humankind. Yet people’s basic understanding of what science is about and how it applies to our community lends an underlying misunderstanding as to how science plays a role within the public community. Regardless of the great progressions of the past, within the last fifty years, people have concerns as to how past theories and discoveries affect people and the world today. These concerns include the use of chemicals and their destruction on the environment, the development of prescription medications and their affect on humans, and scientist’s biases and ideals affecting specific gender roles and race affiliations within our society.

It is important to understand how science and scientists are misinterpreted by our society as being the leading experts in the field of technology and application. We interpret many different views about science by scholars, scientists, philosophers, and even other people of Western culture, yet hardly disagree with their ideals. In 1640 Galileo was on trial and convicted for his beliefs and arguments concurring with Copernicus’s theory, but for the most part we will believe in scientific theories and never question higher authority as to why a specific belief exists. Does this mean our ideals should follow previous opinions all the time? Sometimes following theories or thought processes from previous thinkers can still relate to our current situation. However, times have changed and new theories will override old theories most of the time. In

understanding how scientists can guide us in the wrong direction, we first have to acknowledge how their racism and gender bias can play a major role in either area.

Jean Jacques Rousseau was an eighteenth century philosopher whose perspective on education for boys is detailed by different age groups and the fact that reasoning and social conduct does not take place until the ages of twelve and fifteen. Rousseau's *Emile* mentions the needs of adolescent girls and how their education should be non-existent, for their work is in needlepoint (Rousseau 221). Another belief of Rousseau specifies, "Woman was made to especially to please man." and if "A woman is formed to please and to live in subjection, she must render herself agreeable to man instead of provoking his wrath; her strength lies in her charms" (218). Philosophers during this era, such as Rousseau, believed an education is only required by the wealthy and not the poor, who are less than intelligent as Rousseau states, "A part from general human characteristics each individual is born with a distinctive temperament which determines his genius and character" (29). Rousseau's gender bias theory is relative to the theory of Samuel Morton who displayed similar gender biases.

Scientific theories can appear to be indestructible because of sound evidence or reasoning. The issue with this point of view is there are times when scientists' bias or racial views are the main source of the meaning behind the theory of intelligence. Susan Haack states how this idea can lead disillusionment throughout a society:

We admire its theoretical achievements, and welcome technological developments that improve our lives; but we are disappointed when hoped-for results are not speedily forthcoming, dismayed when scientific discoveries threaten cherished

beliefs about ourselves and our place in the universe . . . disillusioned when we read scientific fraud, misconduct, or incompetence (17).

How do we go beyond the rational of the scientists' old standard of ideals? The answer is by challenging the hypothetical belief to reflect the current situation. By questioning these old beliefs over and over again, we realize these beliefs start to contradict themselves. One example is when Gould decided to research deeper into Morton's theory of intelligence, and this led him to analyze and formulate new ideals on the intelligence of gender specific men and women.

The premise of Samuel Morton's theory of intelligence did not figure in the sex or body size of the human to reflect the ethnic skull sizes (Gould 94). Morton failed to expose all factors due to his racial and gender biases. Gould clearly addresses Morton's biases yet, he acknowledges the mere fact that Morton did not realize how his prejudices played a significant role in his theory (94). Gould allows Morton some flexibility when acknowledging Morton's error.

Gould recognized Morton's primary focus "He had a hypothesis to test: that a ranking of races could be established objectively by physical characteristics of the brain, particularly by its size" (83). Morton's theory carried well into the twentieth century and even into the twenty-first century. Morton published *Crania Americana* in 1839 and *Crania Aegyptiaca* in 1844. Of Morton's publications, Gould states, "They outlived theory of separate creations and were reprinted repeatedly during the nineteenth century as irrefutable "hard" data on the mental worth of human races" (85). Our culture has had to deflect some of these prejudices, and it takes a strong individual to counteract these

judgments by reassessing opposing beliefs such as when Gould challenged Morton's belief's of the relation of intelligence to the size of the brain.

Mathematical equations formulated to support a theory suggests concise evidence, however, this is not necessarily true. There are times when numbers only work in the scientists' favor if they are manipulated according to their biases, as Gould contends, "Evolution and quantification formed an unholy alliance . . . their union forged the first powerful theory of "scientific" racism . . . many do who misunderstand it most profoundly: as any claim apparently backed by copious numbers" (106). Scientists and people dutifully adhered to the belief in the mathematical numbers which only made racism more pronounced. The ratios of the sizes of the brain and Morton's biases blended together only strengthened Morton's theory. Gould challenges Morton's mathematical equations by revealing Morton's claim is based upon unscaled numbers which subjects Morton to a "unconscious" fraud. If there was an "unconscious fraud," can racial bias be an excuse? No; when racial bias plays a significant role in the scientist's theory and the numbers are influenced to reflect the scientist's theory as being true, then an ethical fraud has been committed.

Carolyn Merchant is an American ecofeminist philosopher of science who brings forth a feminist viewpoint which is strongly missing during the early fifteenth or sixteenth centuries. Merchant suggests humankind has created its own demise upon the Earth, by negating the fact that science plays a strong role on how it affects our environment. Merchant confirms the biases which men have upon women, by acknowledging "Like our nineteenth-century counterparts, we live our lives as characters

in the grand narrative into which we have been socialized as children and conform as adults” (“Earthcare” 54). Merchant is convinced the upbringing of men and women have been tainted by previous gender biases of our society. Merchant also contends that our society is a narrative of ideology of stories and once we recognize the story we should “challenge the structures of power” (“Earthcare” 55). Scientists of Western culture have not matured from previous beliefs and assume the general facts and theories of the past are applicable for future theories.

Merchant also explains the perception of society’s environmental issues and its connection to science and technology, and “The contributions of such founding “fathers” of modern science as Francis Bacon, William Harvey, Rene Descartes, Thomas Hobbes, and Isaac Newton must be reevaluated” (“Death of Nature” xxi). This re-evaluation is to acknowledge and question the past biases of scientific theories. Based upon Roger Masters’ viewpoint, science’s paradigm establishes “Three Ways of Knowing” (7). If modern science and society conjectures from the “Three Ways of Knowing” is it possible to separate values from modern science? (7).

## CHAPTER III

## SCIENTIFIC CREATIVITY AND THE DESTRUCTION OF SOCIETIES

. . . I had perhaps developed a distinctive point of view of my own, out of my  
experience. —Carl Rogers

It is important to acknowledge how scientific creativity can lead us to the destruction of nature. This information will give us a better understanding of how scientists can be swayed by colleagues, military forces, and the scientific community to utilize non-ethical choices for the advancement of science.

The direct result of past disasters have shown severe ramifications. Previous scientific mistakes are brought to society's attention to better understand what should not take place in the future. The lapse in time tests future occurrences and as Masters notes, "History may have contributed to the attack on science in the name of intuition" (53). Also as Masters notes, "For many, belief in science and technology has been undermined by the horror of Hitler's "final solution" and the fear of nuclear annihilation" (53). Using and creating modern technology as negative means is the basis for *Science's Harmful Power*.

As noted in Chapter I, scientific discoveries have influenced Western Society as early as the second century A.D. The exploration of these theories by scientists have implemented ideals, methods, research and theories. Knoeble notes Descartes as stating, "[I] also learned not to hold on too firmly to those truths which I had accepted merely by example and custom"(22). Descartes learned to separate his own opinion from others and

as Knoeble mentions Descartes stating, “[T]hus I gradually liberated myself from many errors powerful enough to cloud our natural intelligence, and keep us in great measure from listening to reason” (22). Descartes became aware that in order to separate his thinking from other powerful influences of society he had to challenge the intellectual thinking of others. Galileo took it upon himself to dispute the view of the Catholic Church based upon the rotation of the Earth, as Gregory notes, “But, largely between the clash between Galileo and the Roman Catholic Church, the world knows him best as the champion of heliocentrism” (113). Unfortunately Galileo’s level of valor led to his imprisonment and eventually an early death.

However, some scientific progress has caused severe negative reactions after the discoveries have been applied to the community. Even after seventy years, some scientists still regret their decisions based upon the negative effects of Nagasaki, Hiroshima, and World War II. Past and current scientists such as Morton, Curie, and Potti chose to make life-altering decisions based upon fraud, power, and the elation when their theory became a reality. Scientists’ creative discoveries such as the atomic bomb and radioactivity directly reflect upon society in ways which cannot be comprehended, Bowler and Morus notes, “On witnessing the explosion, Oppenheimer famously quoted a line from Hindu Epic the *Bhagavad-Gita*: ‘I am become death, the destroyer of worlds’” (476). Their creativity based theories can lead to the possible destruction of the world.

Galileo Galilei embarked on an examination of Copernicus’ theory in connection with his theory of motion, on the basis “ Galileo had been working on a new theory . . .

Copernican theory was more consistent with the new physics than was the geostatic theory” (Numbers 69). What Galileo was trying to expose about motion contradicted Church doctrine. In 1613, Galileo wrote a letter to Father Benedetto Castelli explaining his findings and disagreeing with Scripture, which is not bound by natural laws (Aymar and Sagarin 53). Galileo’s *Dialogue* published in 1632, depicted the earth revolving around the sun; however, Galileo stated both side of the arguments to defend his point (Numbers 70).

Galileo’s scientific theory of the Earth’s rotation discredited the Bible’s version of creation. Galileo was not aware that he had been barred from teaching by the Church and he was sanctioned and tried for his interpretation in the *Dialogue* on April 12, 1633. In his defense, Galileo gave his findings on the the earth’s rotation around the sun to the higher court (Aymar and Sagarin 58). The Church specifically withheld Galileo’s findings from the public, contending they would cause a lack of faith in the Bible. The Church forced Galileo to confess that he had misunderstood and that he did not support the findings of Copernicus. Galileo’s forced allegation sabotaged his reputation and he became imprisoned till his death in 1642 (Numbers 74). The following excerpt is mentioned by Ronald L. Numbers a historian, taken from the inquisition of Galileo is a sound example of how a “scientist” will surrender his reputation at the mercy of his superiors even centuries ago. Numbers notes Galileo as stating “[I] do not hold this opinion of Copernicus, and I have not held it after being ordered by injunction to abandon it” (75). Convinced he had no other recourse, Galileo caved in to the higher powers of the

Church. A few hundred years later Marie Curie discovered the substance radium and also put her own life at the mercy of scientific discoveries.

In 1898, Marie Curie, who was the first woman to receive a doctorate in France, and her husband, Pierre Curie, discovered pitchblende, a new radioactive substance. Later that year, the Curies identified another substance, which they named “radium.”

According to Diana Preston, a historian “Their paper stated . . . ‘[r]adioactivity seems to be an atomic property’ . . . it derived from some characteristic within the atom, the tiny brick from which all matter is built” (17). The consequences from working with radioactivity for a lifetime later became clear, Marie suffered a miscarriage, and her finger tips hardened; Pierre’s fingers became inflamed and painful (Preston 20). All of these symptoms were probably caused from exposure to radium rays (Preston 20).

Curie’s exposure to radium was another sign of how a scientific discovery potentially has a negative affect on society.

The foremost thinking of a scientist is to adhere to the structure of a tangible thing as Preston notes Marie Curie stating, “[I]n science we must be interested in things, not in persons” (34). This was obvious because Marie treated her own body as a test object in her quest to create and test her theories. Do scientists put themselves in danger so as to be able to create their masterpiece? If so, what lengths will they go to create the very thing which may put themselves and others within destruction?

Are scientists’ protecting their society or are they actually protecting themselves? Bronowski notes, “Nothing happened in 1945 except that we changed the scale of our indifference to man; and conscience, in revenge, for an instant became immediate to

us” (4). The scientific community has not only changed the “scale of indifference to man” but it has also created a monster, one who is blinded by the political and scientific force of advancement (Bronowski 4). The creative mind of a scientist alleges there is a responsible choice for creating a “nuclear bomb” even though that scientist cannot fathom the extent of destruction from the aftermath. Brilliant scientists build “nuclear bombs” by connecting atoms and fission together however, could they not envision the future mass destruction these bombs would create upon the use of weapons in war?

It is evident some scientists can work cohesively with other scientists, but not necessarily advancing together for their community and in the end they break off from the cohesiveness of working together and create for their own progress. Bronowski notes, “Science confronts the work of one man with that of another, and grafts each on each; and it cannot survive without justice and honor and respect between man and man”(63). The respect for scientists designated by the government is greater than for Western society; otherwise the world would be a much safer place to live. Galileo’s theory of the rotation of the Earth was denied its existence by the Church, which led to the concealment of a profound discovery, and Curie’s discovery of radium contributed to the poisoning of her body by over exposure of the substance, but also the theory of racial biases of intellectual Jews, led almost to the destruction of the Jewish race. These three issues are connected by one thing; science and as Bronowski argues, “If values did not exist, then the society of scientists would have to invent them to make the practice of science possible” (63). The condition of this world is the after effect of science’s harmful power.

What led to the after effects of science's harmful power became known on April 22, 1915. Germany introduced poison gas to warfare, releasing over 168 tons of chlorine into the air (Preston 52). What was not known was the fact that scientist Otto Hahn and another scientist James Franck personally witnessed the after effects this had on the enemy (Preston 53). As they walked through the aftermath of the destruction, Preston notes about Hahn stating, "The sight left him 'profoundly ashamed and perturbed', but as time moved forward he and his colleagues became 'so numbed that we no longer had any scruples about the whole thing'" (53). Does a form of numbness overcome all scientists who grapple with the understanding of what they have scientifically developed, and the affects this will have on society and the environment? Is annihilation just a means to an end to the scientist? The justification for scientist's choices to create harm should not be because they have become desensitized to the outcome. As Preston notes "Otto Hahn later recalled, Fritz Haber justified the use of gas by stating, 'It was a way of saving countless lives, if it meant that the war could be brought to an end sooner'" (53). Justification is another form of "an excuse" as to why scientist's make the choices in which they later concede as being the right choice at the right time. Scientist's may convince the protocol which they have chosen to initiate their discovery is correct; however, this does not mean their reasoning is without assigning blame as Gregory notes, "Being caught up in the drive to accomplish what was obviously an incredible feat, most scientists . . . or military figures gave any serious thought to the future implications of what they were doing" (553). The scientist's resistance to building the atomic bomb became lesser as the creation and the testing of the atomic bomb progressed.

Seeing Nagasaki for the first time after his plane has landed, Bronowski makes an interesting point as he reflects among the ruins. The destruction is all around him and he cannot decipher what he is seeing yet he notes, “Massacre is prevented by the scientist’s ethic . . . that the end for which we work exists and is judged only by the means we use to reach it” (Bronowski 71). When a scientist implements his or her scientific discovery with the intention of upholding ethical values; how then, when used by another scientist in a negative way, can the discovery not be considered the originating scientist’s wrongdoing? There should be an inclination on the originating scientist’s part as to whether the specific theory could be used for good or evil.

For some people the after effects of a war is the sign of the future progress of technology. Eric Foner an American historian states, “Today, with the United States the most powerful country on earth, it is difficult to recall . . . the fragile nation seeking to make its way in a world of hostile great powers” (236). Some people believe this power should never be decreased and so wish to keep the enemy(s) at arms’ length. If the United States is seen to be powerless, then the U.S. will be fighting many wars to come. The United States offers its citizens what other countries cannot, “life, liberty, and the pursuit of happiness.” Yet, at what length will the government and scientists utilize power in order to protect themselves or our country? These entities will go to extreme lengths such as creating and dropping atomic bombs.

War is a negative aspect of progress and should be considered chaotic to humanity. If a scientist was given the option to drop a nuclear bomb on our own country, on family and friends, would that scientist have chosen the same course of destruction?

Even though it has been determined the dropping of the bomb was a political decision there were some scientists who had no qualms about dropping a nuclear bomb on the enemy. In order to protect the U.S., our government will use any mechanism to see this course of protection through till the end as happened in World War II.

Curie's discovery of radioactivity led to further testing and developing methods for its use. The developing methods were leading to the atomic bomb and, "Since the seventeenth century, . . . scientists are trained to discover how things work or why they happen but not what is good or bad" (Masters 4). As noted previously, modern science led away from value science as defined in "Three Ways of Knowing" (7). Science started to lose its humanistic aspect, gravitating more towards a value-free science. Masters also explains fact value dichotomy as follows; "A gulf between the *Is* and the *Ought* . . . prevent the scientist . . . from addressing social or personal values . . . if a scientist raises ethical or political concerns, it is supposedly as a citizen, not a specialist" (Masters 4). If social values are taken out of the scientific equation, there may be severe consequences upon the environment and our society, which cannot and should not be ignored.

During the Holocaust the Nazis adopted sterilization to minimize the Jewish population and "Only in Nazi Germany was sterilization a forerunner of mass murder" (Lifton 22). It is noted Hitler's intention, "As . . . of *Mein Kampf* . . . Hitler had declared the racial mission of the German people to be 'assembling and preserving the most valuable stocks of basic racial elements . . . to a dominant position'" (Lifton 24). As the result of this belief Hitler instituted a group of medical physicians who would specifically ignore the Hippocratic Oath, pledging the SS Oath instead as part of their

allegiance to him. (Lifton 433)

According to Lifton, these physicians were keenly aware of the difference between the choice of right and wrong, however, they still chose to adhere to inexcusable forms of medical killing. Sadly, there seemed to be no regret or anguish on the part of the physicians for participating in killing “lesser form of society.” This became visually evident during the 1950s Nazi Trials in Nuremberg. The SS doctors were instructed to abuse and or mentally kill Jewish men, women, and children by the use of the gas chambers, phenol injections, and starvation tactics. (Lifton 18)

During World War II, some physicians tried to convince themselves the very thing a physician should not do is carry out a killing, but they did in fact become a “cultivator of the genes or biological soldier” of dedication to the regime (Lifton 30). This act of mass destruction translated into a “merciful act” which could change the reproduction process of Jewish men, women, and children’s through forcefully sterilization. These Nazi physicians psychotic ways of rationalization were used for the justification of their “experiments” on people; a former Nazi doctor stated, “Either one is a doctor or one is not” (Lifton 45). The physician’s who were instructed by the Nazis were reconstructing the human race by eliminating the weaker form of society.

The end result was a process of eliminating the mentally ill, epileptic, terminally ill, and criminally insane by using the victims as test studies. Children were killed by Luminal tablets hidden in their drinking water until they went into a coma. (Lifton 55) These children were the victims and test subjects of Hans Frank, as explained to Lifton, “All brains of autopsied children . . . ‘were of some scientific interest’”(61). And Hans

rationalization was “In other words, he and other doctors could follow . . . the immersion of themselves in “medical science” as a means of avoiding awareness of, and guilt over, their participation in a murderous project” (Lifton 61). This is a prime example of rationalizing the decision to sidestep the Hippocratic Oath. Hans Frank’s attempt to justify his decision to kill children so he could study their brains like as Lifton notes “He compared his decision to study those brains to that of any contemporary medical scientist . . . for examination” (61). Is viewing what Hans Frank chose to do, any different than what any scientist does, but physicians should not use their patients as victims; they are obligated to use their “medical science” expertise to save lives of these innocent men, women, and children (Lifton 61).

The Hippocratic Oath, as previously discussed, held no ethical value for the Nazi physicians to end a person’s life. The SS Oath took the place of the Hippocratic Oath. The Nazi medical doctors considered it an “ethical” oath, consistently repeating, “I swear to you, Adolf Hitler —as the Führer and Chancellor of the Reich—loyalty and bravery. I pledge to you and to my superiors, appointed by you, obedience unto death, so help me God” (Lifton 435). The Nazi’s using the term Führer and God in one statement represents an oxymoron. Hitler’s formation of the Holocaust incorporated the role of science and scientists who partook in the undertaking of mass destruction on to Western culture.

What is the defining logic behind the Holocaust and World War II? Two aspects come together, when medical doctors use the manipulation behind the destruction of the “lesser society” and World War II for the protection of the United States. Lifton explains

the reasoning for the Holocaust as being the “deadly logic” and “sacred science” providing the solution in Hitler’s theory; as a scholar stated to him, “From insane premises to monstrous conclusions Hitler was relentlessly logical” [and] “derived the conclusion that he who loves the human race must destroy the Jews” (Lifton 439). Lifton explains what psychoanalyst Erik Erikson has called “pseudospeciation”, “Or seeing other human beings as belonging to a different species” (qtd. 501 - 502). Hitler strove to become the leader of his society based on his reasoning behind for total control of the human race.

When the public misinterprets the scientists who implement and release a new drug to be manufactured and sold by pharmaceutical companies, people conclude the drug is safe. Martin Gardner mentions, “Yet the sad fact is that the history of science swarms with cases of outright fakery and instances of scientists who unconsciously distorted their work by seeing it through lenses of passionately held beliefs” (“Science” 123). What beliefs can be mentioned? The beliefs of the scientists and of the scientific community.

Often drugs are prescribed to patients when it is still too early to understand whether the long term effects are damaging to the patients. The length of a study is sometimes cut short because the income from the gross sales of the drugs becomes the top priority to the pharmaceutical company. Michael Tigar notes that for the drug Vioxx, was produced by the Merck pharmaceutical company, in 2003 the sales alone were around \$2.5 billion (399). Vioxx was a prescription anti-inflammatory medication to treat arthritis pain. Litigation cases started to ensue when a direct correlation to the

medication was found in patients being treated for heart attacks. There is an error of connection when the public community believes in the truth of the physician and the physician believes in the truth of the scientists and/or pharmaceutical companies. However, before a patient has sufficient knowledge of the medication they will be ingesting, the pushing of a prescription drug by a physician may not give them ample time to research on their own. When deaths or numerous deaths start to occur, these medications become scrutinized, as in the Vioxx trials. Tigar notes, “Because Merck is a public company . . . Merck faced in responding to the inevitable large number of lawsuits claiming that Vioxx had caused injury or death” (476). Still, isn’t the mentioning of “possible risks” on the labels of prescription medication, really stating to the public, take at your own risk?

At this final stage of the outcome the public is still only given an idea of possible side effects and not a conclusive answer, until the drug is withdrawn from being sold. There are a vast number of physicians who prescribe medications to their patients, and these patients believe in the effectiveness of those drugs for the treatment of a disease. The patients, however, may not realize the seriousness of the detrimental effects the medication could have on a person. Still, there are medications which have proven to be in favorable scientific medical advancements, such as antibiotics.

Some technology advancements give us a much easier way of living, such as, indoor use of running water, toilets, automobiles, telephones, refrigerators, stoves, and washing machines, and also smallpox and polio vaccine to name a few. But as Masters notes, “These technological marvels . . . the instrument of satisfaction is divorced from

judgments of . . . whether that satisfaction is itself “good” or “bad” (21). Also as Master notes “The phenomenon is evident in public matters . . . nuclear weapons were developed by both constitutional democracies and Communist dictatorships” (21). These advancements may be strictly meant as conveniences, but as Masters notes, “The inventions that mark our civilization are means to satisfy desire, but they seem equally open . . . as the virtue or vice of the user or the user’s purposes” (qtd. 21). What is equally important to acknowledge is what Masters argues “The Nazi used scientific or pseudoscientific theories and advanced technologies to implement a policy of killing over six million people” (54- 55). Masters also argues “Doesn’t it follow that scientific thought, by “leading to” these horrors, is somehow responsible?” (55). The question arises throughout the thesis, when does the “scientist’s purposes” become a harm to Western societies?

## CHAPTER IV

### SCIENCE GOES BAD WHEN SOCIETY IS MISLED

-Science is a set of rules that keeps the scientists from lying to each other.

-Kenneth S. Norris

There is a direct correlation between choosing to incorporate human values within old and new scientific discoveries, such as the creation and dropping of the atomic bomb, the recall of prescription drugs, Nazi physician's use of scientific discoveries for inhumane acts, and scientists thought process on the after effects these creations had on the world. There is also an internal and external push for scientists to publish somewhere within the journals of scientific advancement. However, this push is still a conscious ethical choice on behalf of the scientist which can distract the public from making a logical choice as to how it will affect them personally now and in the future. In this chapter, what will be discussed is how important it is for a scientist to choose ethically when implementing their knowledge about applied scientific research and if they fail to follow higher standards of morals, what they and innocent people will encounter as to the repercussions of their choices. There are scientists make a conscious choice to either follow an ethical path of research or, bend the numbers here and there in their favor with regard to statistical research findings. Again, there have been instances when a scientist chooses to commit outright fraud. This type of fraud can lead the public community astray if the public's belief in the research is believed to be resistant to any forms of error. There does not seem to be much evidence to scientists fitting the definition of the "mad

scientist”; however, there is proof, and it is worth mentioning, scientists do bend the truth, either by fudging scientific methods, committing plagiarism, or testing experiments and reporting different results.

An example of scientific fraud today deal with biomedical research. Broad and Wade’s synopsis explains how fraud occurs. In 1981, at Harvard Medical School, John Roland Darsee, a leading cardiologist, was caught forging raw data on research that was completed in a very short amount of time, and when Darsee was confronted by his colleagues he led them to believe this was a onetime occurrence (Broad and Wade14). However, further investigation showed it was not, and Darsee was shown to have faked his results in eight to ten other papers (Kohn 84). In Harvard’s defense, an official stated at a congressional hearing, “[S]cientific fraud happens rarely, and when it does, ‘It occurs in a system that operates in an effective . . . self correcting mode’ . . . anyone who tries to fake scientific data, goes this argument, must be crazy” (Broad and Wade 14). The official speaking for Harvard Medical School acknowledged the fact that fraud does happen but only very rarely. If it does occur, the scientist must be “insane” for even trying to attempt anything remotely related to fraud. (Broad and Wade14) The public community is not aware that fraud is being hidden under the covers of science. As more unethical practices become widespread and whistleblowers are coming to the surface, fraud is being revealed even though it may or may not directly affect the one who is revealing the source of deception.

Five years ago, Duke University announced it had found the core of cancer research based upon Dr. Anil Potti’s research theories on cancer and specific tumors. On

February 12, 2012, *60 Minutes* and author Kyra Darnton aired a report disclosing Dr. Potti's fraudulent research. This research contended that each person who has cancer has their own "genetic makeup" and when a tumor is discovered the tumor carries its own genetic factors. Supposedly, Dr. Potti discovered a way to compare the individual genetic makeup to the tumor factors through chemotherapy. The study consisted of 112 patients. Dr. Coombes and Dr. Baggerly were scientific researchers who kept testing Dr. Potti's work and kept finding the same errors. On February 12, 2012, Reporter Scott Pelley questioned Duke University's Dr. Rob Califf stated:

[V]ice Chancellor Rob is implementing new procedures for Duke and also overseeing the retraction of Dr. Potti's papers from the medical journals, one of the most significant retractions in medical history. He's examining how both a prestigious university and outside investigators missed all the warning signs.

(*60 Minutes*, Feb. 12, 2012 6:00 p.m. EST)

It is has not been specified as to whether Dr. Potti has been convicted by a grand jury of any wrong doing regarding negligent act(s) to his patients. As of 2011, the *New York Times* journalist Kolata states the outcome to the case as follows, "In the end, four gene signature papers were retracted" (3). Then Kolata states "Duke shut down three trials using the results" (3). Which actually should of happened upon learning of the onset of the alleged fraud. And finally, Kolata states "Dr. Potti resigned from Duke" (3).

When research is approved who is protecting the public from unauthorized drugs being dispensed as Kohn notes, "The public must obviously be protected against such

unethical practices and the FDA has prescribed a detailed procedure to be followed by the makers and testers of new experimental drugs” (177).

The drug Thalidomide, taken by pregnant women in the 1960s, resulted in 8,000 handicapped children in 46 different countries (Kohn 187). This drug was given to women during their pregnancies as a general sedative (Kohn 187). However, even before the drug was dispensed to the pregnant women the pharmaceutical company noted during testing there were side effects, which consisted of inflammation of peripheral nerves (Kohn 187). However, the pharmaceutical company Chemie Gruenthal concealed the reports and kept the findings out of publications (Kohn 187). These concealed reports and the drug manufacturer Distillers Company Ltd. who did not “do reproductive studies on thalidomide” led to lawsuits spanning the country, which were mostly settled out of court; damages and payments were made to the victims or their families (Kohn 189). Fraud is diminished when we have experts working on the side of the public to derail deceit before it becomes so damaging it is irreversible.

Fraud has occurred as early as 135 AD, in Ptolemy’s work. Kohn notes, Neugebauer questions as to whether this can be termed “fraud” because during this era they were working with limited resources (35). Ptolemy is known for his theory of the heaven’s rotation of celestial spheres and the equant and the equant accelerates and decelerates as the planets move within the orbit (Gregory 82). Copernicus believed Ptolemy’s theory held too many inconsistencies, and later astronomer from John Hopkins University Russell Robert Newton states “Delcambre and Newton claimed that Ptolemy’s alleged observations of the equinox in Alexandria were merely extrapolations from data

of Hipparchus” (Kohn 35). Unfortunately, Ptolemy was unable to reproduce his own theories, although Broad and Wade, as well as Dennis Rawlins, an astronomer at the University of California, contended Ptolemy continued on from Hipparchus’ previous theory and research (Broad and Wade 24). Ptolemy recorded the same latitude notations for both Alexandria and Rhodes, where Ptolemy was stationed when he cataloged his notations (Broad and Wade 24 - 25). Years passed and research scientists started to question Newton’s theories of gravitational pull.

Isaac Newton (1642-1727) is now known to have used a less than honest work ethic as well as what historian Richard Westfall calls a “fudge factor”— his results were “manipulated with unparalleled skill by . . . Newton” (Broad and Wade 28). Newton was the discoverer of gravitational pull. Yet, Newton’s reliance upon the “fudge factor” was not exposed with his initial discoveries; as Westfall explains, “Newton “adjusted” his calculations on the velocity of sound and . . . his theory of gravitation so that it would agree precisely with theory” (Broad and Wade 28). Newton’s calculations did not warrant enough suspicion by other brilliant minds, who might otherwise have required further testing to expose the fraud.

Gregor Mendel (1822-1884) was a brilliant individual who misunderstood his scientific findings for the future. Mendel’s theory on heredity did not become known until it led to the cross-pollination of peas thirty years later. Cross-pollination was a time-consuming process which had to be specifically separated from other polluting pollens. Refer to (Figure 4) of Mendel’s cross-pollination. Mendel later led other scientists to the discovery of heredity. Years before “Mendel’s ratios were judged to be interesting, but

of no theoretical value” (Gregory 466). When the greatest known scientists commit some form of fraud or an error on technicality, what happens now is the downward spiral effect that occurs today for other scientists.

There does not seem to be a secret society of fraudulent scientists working in a hidden laboratory of their own but Alexander Kohn notes, “Scientists . . . deeply disturbed by . . . many incidents of plagiarism, data falsification, misrepresentation of research results . . . reported in scientific periodicals as well as in the mass media” (1). There are different types of fraudulent practices include forging, plagiarism, trimming, and cooking (Kohn 4). Forging entails reporting experiments that were never performed (Kohn 4). One example of this would be William T. Summerlein and his report of skin exposure of mice. Plagiarism is using the thoughts or ideas of another person without referencing the source (Kohn 4). Trimming and cooking represent listing a greater number of experiments than were performed and then misreporting the findings. (Kohn 4) An example of trimming and cooking would be Dr. Potti’s case. While all of these fraudulent actions can be conscious decisions, the only one which might not be is plagiarism, which at times can be unintentional.

If there is scientific fraud how does this affect the people? First, it will affect the scientists themselves, then the companies who have supplied grant monies, other colleagues who are their mentors, the scientific community, and finally the public. Scientific fraud at the time of the occurrence may be viewed by the scientist as “minimal” if he is not caught, and the process may happen over and over again if there is reason to believe that there will not be any consequences. There are some scientists who look for

“name glory,” i.e., being the first to make a discovery and having their papers published in respected journals (Broad and Wade 19). Some scientific frauds, small and big have been discovered and revealed through peer review notifying either their university, their employer, and or the mass media.

In 1974, at Sloan Kettering, William T. Summerlin allegedly transplanted from one mouse to another white and black skin onto other mice, but “Summerlin became exposed when he used a black felt pen to darken an area of transplanted graft on two white mice” (Kohn 77). The peer committee looked into the research matter; Summerlin was reprimanded and put on a leave of absence. The mentioned cases show how when integrity and disclosure is put into place these procedures will stop fraudulent practices.

Is there an unwritten law to which scientists must adhere? Kohn notes, “One of the first lessons a scientist learns is that faking evidence is the worst sin he can commit; it is sort of a capital crime” (4). Some criminals commit crimes either for the joy of committing the crime or for the financial gain the crime produces. The negative effects of a crime can harm the individual committing the crime or its helpless victim. There does seem to be an association as to why criminals and scientists do what they do, but the severity of the crime may not be the same, or could it be? Obviously, each crime and discovery can be connected, but is vastly different. However, how the crime and discovery affects society can be very similar and new ideas later may need to implement ethical limits on discoveries.

Fraud is also associated with pseudoscience which can be best described as false theories presented as truths which at times can be difficult to distinguish. As Edgar E.

Knoebel notes about Francis Bacon, “Moreover, the works already known are due to chance and experiment rather than to sciences; for the sciences we now possess are merely . . . setting forth of things already invented, not methods of invention or directions for new works” (11). The information which is accessible to the public through the government, the media, scientists, and/or pharmaceutical companies, as discussed here, has been proven to be deceptive even consciously altered.

How can we tell the truth from what is not true? In 1620, Bacon became known as the philosopher of the scientific method and formulated principles based upon nature. Knoebel notes about Bacon, “The purpose of such knowledge was power, power to control nature and thereby advance the welfare of humanity”(10). Scientists and the government will never obtain power over nature even though these two entities have tried to use control by technologies or scientific methods. Nature has fully evolved on its own, but the damaging effects of destruction have taken their toll on nature, and the “truth” has shown this destruction is unequivocally harmful because of the power of technology and the failure of society’s awareness.

How does pseudoscience reflect harmful tendencies on nature? It is the public, so-called scientists, and the government’s belief in junk science which transforms junk science into pseudo-realism. Author Susan Jacoby notes, “Social Darwinism constituted the first mass-marketed wave of pseudoscience, or what would today be called junk science, in American history” (61). Racial issues and the belief there is an inferior race set the precedent for Social Darwinism. Two well-known, influential people displayed in (Figure 3), Martin Luther King, Jr. and Rosa Parks, who by all standards defied racial

issues, intellectually inspired parts of our nation. Spencer and Winchell would consider these individuals “lower forms of race.”

The difference between real science and pseudoscience is that real science should be based upon tests of theories and on actual facts and research. However, pseudoscience is based upon preconceived thoughts and information considered to be true facts by an individual or group, which is presented as real.

What is the reasoning behind Social Darwinism? How does Social Darwinism affect the public? Herbert Spencer was a civil engineer and biologist, coined in his *Principles of Biology* in 1864, the term “survival of the fittest” (Gregory 407). In the early 1880s, evolutionist Alexander Winchell defended his beliefs in *Adamites and Preadamites*, “Negros were too biologically inferior race to have been descend from Adam—who, as everyone knew, was white” (Jacoby 68). Only the elite, intellectual, and strong should be given the right to live; if a group of minorities were not strong enough, the group would die off in the process.

Darwin’s 1859 *Origin of the Species* is based on natural selection and how humans have evolved from common ancestors with other primates. What Darwin did not address with natural selection was the social and economic strength needed by an individual in order to become the superior race, which is pseudoscience. The promoters of pseudoscience try to be a part of the scientific network which forms an opinion for others to follow, but their claims have been debunked by evolutionary sciences. The great figures of the 1870s, such as Andrew Carnegie and William Graham Sumner, did not necessarily agree with Spencer; from an economic viewpoint. (Gregory 409). His

theory should have been coined social Larmarckism rather than Social Darwinism.

(Gregory 409)

Adolf Hitler created a regime based upon the justification of destroying the Jewish race by implementing pseudoscience. One aspect of this regime was the participation of physicians in carrying out the directive for mass murder. The Nazi regime utilized pseudoscience as a belief system to carry out their inhumane acts on the Jews. Physicians performed these horrific acts by manipulating science as a means to wipe out an allegedly inferior form of intellect. These physicians had not only originally sworn the Hippocratic Oath, but they were also held to an ethical standard of science in unfolding discoveries as a means of innovation for this world. However, these unethical and horrific acts carried out by the physicians do not incorporate their knowledge wisely and only cements a deeper understanding of what such scientific lapses could do to our scientific community and the effect it has on people generally. These scientific advances draws concerns from society as to how the scientist's themselves are later affected by their theories.

Leo Szilard (1898-1964) a physicist and inventor, questioned the very fact of the outcome of his theory, as Hagittal states "He was a born leader who invented new games and new rules for old games" (8). Szilard patented his idea for the nuclear chain reaction however, Szilard had second regrets and as Hagittal notes, "Accordingly, Szilard no longer wanted the bombs to be used and made three attempts to stop their deployment, all unsuccessful" (110). Szilard and Einstein were long time friends as Hagittal notes, "According to Einstein, Szilard was 'greatly concerned about the lack of adequate contact

between scientists who are doing this work and those members of [Roosevelt's] Cabinet who are responsible for formulating policy” (110). Noting that Szilard created the idea for a nuclear chain reaction there was also a conviction on his part, forecasting the future of his creation and what this could produce as Hagittal states “This was an important moment in the history of the Manhattan Project, because the person who is credited with initiating it went on record as opposing the deployment of the bomb” (111). Szilard became so opposed to the use of the atomic bomb he resonated Hagittal mentions “The petition of July 17, 1945, makes it clear that until recently there had been a fear that the United States might be attacked by atomic bombs” (qtd. 111). However, to Szilard’s dismay his reputation became known and the Manhattan District published the Smyth Report which stated Szilard was a “war criminal.” (Hagittal 112). All of this unsettling knowledge and effort which was used to build the atomic bomb was in retrospect not evident to Szilard at the time of his idea of a nuclear reaction. What has become evident is not all scientists create with the intention of destruction. However, it is pertinent to acknowledge discoveries previously connected to a theory can change at the turn of an idea leading to a catastrophe.

Szilard was fiercely against the government’s decision to use scientists to build the atomic bomb. Hargittai stated, “Szilard found it important to give assurances about the scientists’ ‘dedication to defense to those who are concerned about our national security’” (149). Szilard objected and blamed the government for its political role in the advancement of scientific destruction.

Scientific expert James Watson (1928), is a molecular biologist. Watson partnering with Francis Crick discovered the structure of DNA in 1953. What Watson objected to was the negation of values and morals within a theory as Wilkie conveys, “Knowledge of the human genome, James Watson believes, will open up a pathway to a goal that touches all humanity: it will lead to a reduction in the human suffering caused by genetic disease” (5). Watson initiated the Human Genome Project and the purpose for the project, as Wilkie states “The objective of the Human Genome Project . . . to map and analyze every single gene within the double helix of humanity’s DNA” (1). What led to the reasoning and formation behind the project became apparent; scientists were looking into the future and predicting what issues may arise as Wilkie notes “The Human Genome Project holds the promise that, ultimately, we may be able to alter our genetic inheritance if we so choose” (4). While there are no guarantees in any aspect of life, the choice to make an ethical and moral decision incorporates underlying factors based upon sound advice from the experts in their field and the knowledge which society has obtained through negating potential destruction.

Wilkie mentions exactly what society should be doing as Watson stated “[A]s we learn more and more, civilization can’t continue to ignore what we are, what the nature of life is, and the social implications of what we’re learning about biology” (7). Wilkie also mentions his interpretation of Watson’s statement as “He believes strongly that if society is to cope with the consequences of this knowledge, people must learn and become better informed about genetics” (7). Yet, let us take this a step further and realize to “become better informed about genetics” is not the only knowledge we should obtain, but to seek

out specific scientific knowledge based upon biomedical, environmental, and technological experimentation being completed.

In conclusion there are different types of fraud, some more severe than others. Some fraudulent acts have been a conscious choice on the scientist's part. Most of us may not be aware of such fraud having occurred as early as 135 AD, but as time passed scientists started to question the research and work ethic of their colleagues. There are still unanswered questions directed to a few of these great scientists. Ptolemy, Newton, and Galileo had indeed committed fraud. Pseudoscience has a tendency to take over the rationale of the scientists' decision-making. The error which most research companies seem to commit is not acknowledging that fraud has occurred within the structures of the university or medical facility. The public is led astray when it comes to "the truth" or the correct information; for a patient needs to be to make a rational choice when taking a new prescription. The press did however, expose the effects on women and children when exposed to Thalidomide. We need to understand how new chemicals affect the air we breathe or our physical surroundings.

Finally, pseudoscience is another type of so-called science which can lead to fraud, as with Hitler's attempt to justify his reasoning of Social Darwinism in the name of science. Scientists must make ethical and logical choices when implementing new procedures such as Szilard's retraction of his theory and Watson's discovery which was put in effect to protect society from moral and ethical frauds. Scientists are ethically bound by their own morals or by an unwritten creed which is known to all scientists. The

scientists obligation will always be based on distinguishing right from wrong when crafting their knowledge when implementing specific experiments.

## CONCLUSION

*Science's Harmful Power* reveals thought provoking questions regarding the negative effects science has on the people and the environment of Western society. Does science sway the opinions of people by giving them false hope about whether science has a positive result? Dropping of the nuclear bomb on Hiroshima and Nagasaki caused irrefutable damage on both the environment and the people of Japan. The after effects of this act killed, maimed, and destroyed natural life in the pathway of the bomb.

There are many reasons why people choose to let science control its knowledge and decision making. Science for centuries has led our nation by creative, non-humanistic, unethical and ethical choices. However, research shows the negative aspects of science outweighs the positive aspects of theories. There are theories which give Western society opportunities of technological and medical advancement through specific discoveries; however, with the growing number of environmental causes there are also a vast number of independent thinkers who are choosing to rebut science and seek their own opinions.

The World Health Organization (WHO) was created by people who seek other measures of protection from massive health damage. If an epidemic occurs, WHO implements standards to be followed by scientists in order to protect the public. When the H5N1 mishap started to spread to humans, killing 250 people, WHO gave strict instructions to stop all further research. The disclosure of good or bad results of testing

should be exposed either way. Sadly, it was not the scientists who decided on their own to halt further research.

Values within science are a cause for concern when scientists choose not to utilize moral ethical decisions in their research. However, when scientists do implement ethical choices, they now have the backing of the government to mandate the dispensing of either prescription medications or performing procedures even if it goes against their religious standards. An issue occurs when doctors or nurses refrain from dispensing drugs or performing abortions due to their own ethical views.

While contemplating his own ethical views, Carl Rogers concluded psychology was as a form of freedom and satisfying his need of prestige. Rogers admitted that testing a hypothesis could be difficult and that results could be used to “satisfy others, to convince opponents and skeptics, to get ahead professionally, to gain prestige” (Kirschenbaum and Henderson 26). The late Rogers was a brilliant scientist and acknowledged his faults while minimizing his accomplishments. Rogers implemented his values and acknowledged his feelings in order to seek the truth within his profession.

President Truman reflected upon science as being the “leading solution to the problems of a war-torn world” (Petigny 9). However, it is difficult to agree with this understanding of logic about how science can be the solution, when science can ultimately have a hand in the potential destruction of the world.

The late Steven J. Gould researched Samuel Morton’s theory on how the size of skulls correlates with the intelligence of the individual. We are led to believe that

mathematical theories are concise evidence. However, the repositioning of numbers can offset the outcome of a theory to reflect the biases of scientists.

What can exacerbate the misunderstanding of science by Western society is the lack of knowledge about science on society's part. Science has the potential to cure diseases and solve environmental issues. However, the environmental issues in which society is experiencing at the present time is based upon scientific theories which were created in the past. Scientists strive to take over nature and have the ultimate power of knowledge, which is similar to the knowledge of technology used to assist in the killings of more than 6,000 Jewish men, women, and children. The engineering of devices such as the gas chambers aided in the killings. Lowrance defines the role of "Engineering, like medicine, is based on scientific principles" (63).

The ideology of an olive branch is metaphorically compared to science because of the different avenues of science, i.e. sociology, anthropology, psychology, and physiology, just to name a few. Most people are not aware of science having specific characteristics. Science may resolve issues without destroying the world, however, this can only occur when values are included in the mainstream of a theory. Masters discusses the "Three Ways of Knowing" detailing the points of what is missing from the graph, namely values (7).

Curie mentions how scientists should understand the structure of science by focusing on "things" and not "people." This way of thinking disregards human feelings of honesty and guilt by displaying uncaring tendencies. Curie's reasoning may have been this way, so one can focus on the issue itself, not the negative results of a theory. Society

ignored the fact of the warnings of many scientists who opposed the action because they pointed out the negative results of dropping these nuclear bombs. Scientists and the push from United States government failed to consider what the destruction would be after the bomb was dropped.

The creation of the gas chambers by the Nazis does define evil; this led to the deaths of millions of Jewish people. There is no other purpose or positive effect from the creation of the gas chamber other than causing devastation to human beings. Did the scientists' moral and ethical values allow them to create this technology? Could it be that Curie's reasoning to abstain from caring about people influence other scientists permission to create such harmful discoveries?

Another issue of science's damaging effects on society is fraud. Scientists disregard the main aspects of fraud by manipulating numbers, forging documents, and plagiarizing other researchers; however, the truth as to how much of an effect fraud has on society is based upon the ramifications of the outcome. The outcome can lead to thousands of deaths as in the Holocaust and Nagasaki.

Finally, pseudoscience is a false truth which guides scientists to extreme attempts to define real science. Hitler's belief in Social Darwinism, implemented by the Holocaust, came very close to eliminating the Jewish race if he had not been stopped. However, Szilard came to the realization of the damaging effects his theory could eventually cause, and sadly the destruction of Nagasaki became evident. Watson could foresee into the future not only by the creation of his theories about DNA, but the

consequences of his theory and the moral and ethical values which may be ignored or slighted due to the progression of solving or curing diseases.

The above research cases explain the reasoning behind writing this thesis, but there could never be a distinct or correct answer in solving the immense dilemma of people lacking in the responsibility of questioning the effects of scientific discoveries on humans and our environment. One way to attempt to find answers is to continually expose the negative issues by writing about past and present incidents and identifying the scientists who in part have acknowledged their wrongdoing.

Some limitations and weakness of study in this thesis should be disclosed. The first weakness is not being able to research every area of negative discussion about the topic. Consequently there were a vast amount of research left uncovered. Choosing cases was by preference; however, there were times when certain cases needed to be dropped only because their inclusion led into another, bigger area of concern. There was a difficulty in understanding the theory without having the calculations as to how the theory developed.

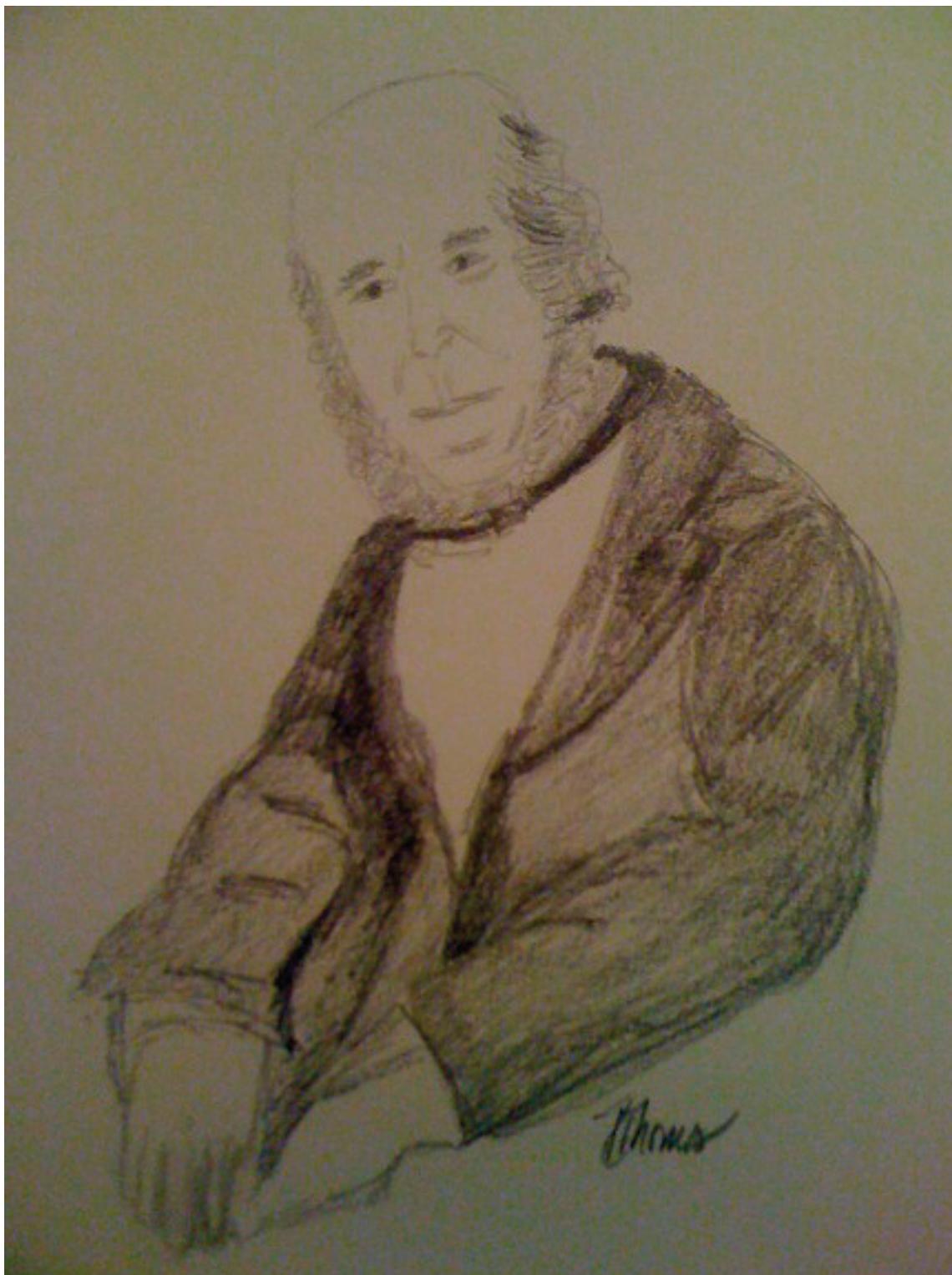
Another issue to address is assuming all science is negative. While I still believe science as a whole can be used for negative conclusions, not all science is bad; however I believe this exception applies to limited areas (i.e. the discovery of antibiotics). It is my viewpoint every aspect of science has an evil side.

In conclusion, the answer to the problem is that not all science is bad, but then again not all science is good. Theories which are created by the masterminds of science who dictate how a theory or discovery is used have shown the underlying issue is a

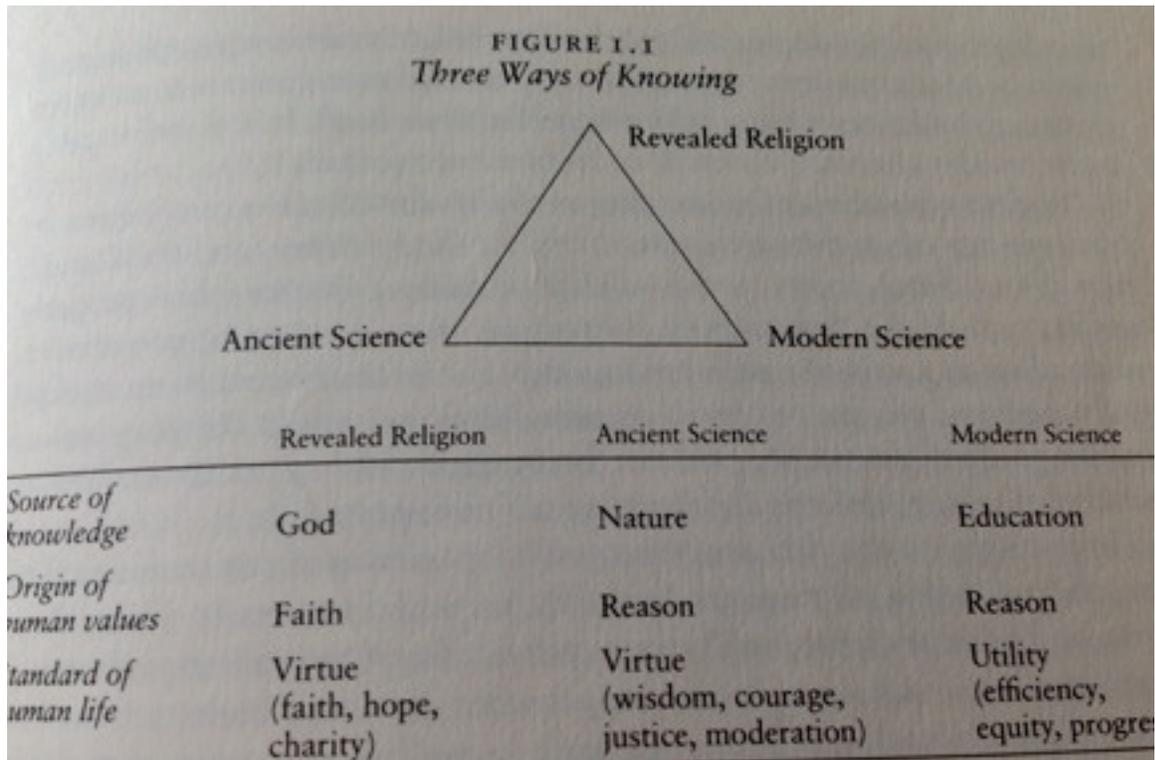
negative affliction onto Western society and is protected under the umbrella of science. Scientific technology can be used in detrimental ways at the hands of the creator of the discovery. However, most scientists have the intention to use a theory for the good of society. What is explained is how the knowledge of theories threaded and woven down the line, branch off to form newer theories, which have been used for the destruction of our society. To substantiate these findings, Merchant argues how society is at a disadvantage because of certain scientific discoveries which have proven to cause negative consequences and these discoveries have “accelerated the decline” of society (“Earthcare” 53). While some discoveries have the potential to “cure disease” there are still overwhelming facts which prove more of a negative contribution from science, such as nuclear weapons and nuclear power, radioactive wastes, and pesticides (Merchant “Earthcare”151). Lowrance argues science can be utilized either for “good or evil” (5). A scientist can make a choice as to whether a specific theory will include basic knowledge of using the “citizen” side of creative thought (Lowrance 72). If a scientist incorporates the viewpoint as a citizen then he or she may be willing to include values and morals within a theory. Lowrance quotes Bertrand Russell’s statement which best describes an understanding of the duty of a scientist;

The scientist is also a citizen; and citizens who have any special skill have a public duty to see, as far as they can, that their skill is utilized in accordance with the public interest . . . It is impossible in the modern world for a man of science to say with any honesty, ‘My business is to provide knowledge, and what use is made of the knowledge is not my responsibility.’ (Lowrance 72)

Science will never go away as Bronowski notes, because the scientist's "creative mind is a leap of imagination" and scientists are constantly creating however, if we could only put to use this imagination for a positive reflection on society (12).



*Natural Science in Western History* by Fredrick Gregory (407). Drawn by R. Thomas  
Herbert Spencer  
Figure 1



Masters "Three Ways of Knowing"

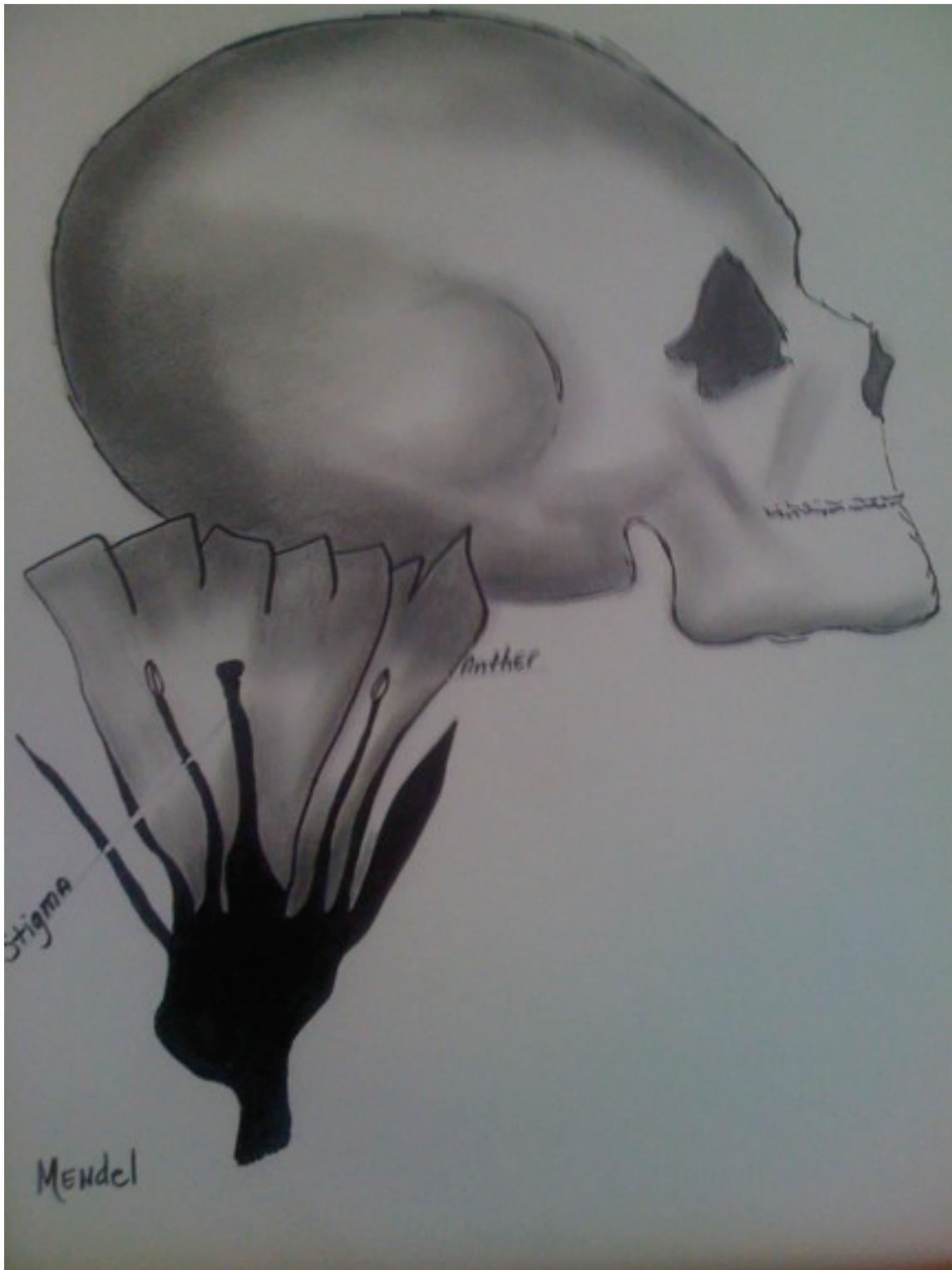
Figure 2



*The Autobiography of Martin Luther King, Jr. Carson* Drawn by R. Thomas

The Voice

Figure 3



Mendel's Peas *Natural Science in Western History* by Fredrick Gregory (407). Drawn by R. Thomas

Figure 4

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