

Ethical limits of science and technology in *Frankenstein* and *The last man***AKONDO Dyfaizi Nouhr-Dine**

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Abstract: The present study is about the representations of science, technology, and ethics in *Frankenstein* and *The Last Man*. It attempts to highlight a view of science and technology in connection to morally accepted values from the angle of creative writing. From a reader-response perspective, this article aims at examining the representation of scientific and technological achievement and the limits of their method. The study has found that the quest for knowledge and its applied uses can result in moral and ethical alienation and generate hardships for mankind as is highlighted in the desperate commitment of the protagonist to destroy what his wits have created.

Keywords : Literature, science, technology, ethics, invention

Limites éthiques de la science et de la technologie dans *Frankenstein* et *The last man*

Résumé: La présente étude porte sur la relation entre la littérature, la science et l'éthique. Il s'agit d'une tentative de mettre en lumière une vision de la science et de la technologie en relation avec des valeurs moralement acceptées sous l'angle de la création littéraire. De la perspective du « reader response » l'objectif de cet article est d'examiner la représentation de la méthode des réalisations scientifiques et technologiques et de leurs limites. L'étude a révélé que la quête de la connaissance et ses applications peuvent entraîner l'aliénation et générer des difficultés pour l'humanité, comme le montre l'engagement désespéré des protagonistes à détruire ce que leurs propres esprits ont créé.

Mots-clés : Littérature, Science, Technologie, l'Éthique, invention

Introduction

Literature and science are fields of endeavor that encompass different methods, aims, and activities. Literature as a representation of human experience and predicament, focuses on the happenings of society and attempts to fictionalize the world by reflecting issues that occur in and determine human life. What happens in a society is reflected in literary works in one form or another (Dubey, 2013: 84). This is illustrated by the work of many 19th century writers and scholars who have devoted their works to exploring the trends of the modern era as it became overwhelmed by the advancements in science and technology exposing how scientific progress has resulted to sudden disarray and destruction of human lives on earth. The work of such writers as H.G. Wells, Octavia E. Butler; Margaret Atwood, to mention but a few, have contributed to exposing the threats and also raising people's awareness on these problems about the future of humanity and stability in society. As a result, such a view of art, has been the motivation behind Mary Wollstonecraft Shelley, a famous English novelist who has through *Frankenstein*¹ in 1818, and *The Last Man*² in 1826 exposed thoughts on the social, and political realities of her period, influenced mostly by the scientific progress. Mary Shelley novels represents her time because "It is worth noting that, since the nineteenth century, science is much more integrated and is visibly reshaping society in the form of new technology in such areas as transportation, lighting, communication, medical treatment, and mass production." (Flohr, 2005 :3) It has increased man's curiosity, and desire that push humans to further their research beyond the limits of ethics at the risk of drawing the world into a complex predicament.

Burke *et al* view that science has greatly contributed to uplifting people's lives in a way that changes became possible. However, these improvements have also endangered the course of human life by making him a slave of discoveries and creations. (1985: p.iii). According to Asimov: "Science does not purvey absolute truth; science is a mechanism. It's a way of trying to improve your knowledge of nature, it's a system for testing your thoughts against the universe and seeing whether they match." (Asimov, 1989). Scientific advancement has led to the development of the world, it has made people promote ways of thinking and of changing their way of life. This led them to distort the natural way of things regardless of the effects. However, once scientific methods and research were acquired, modern man is unable to incorporate the ethical values that should help control intellectual efforts. Ethics in the framework of this study should be understood as "a branch of philosophy that used to study ideal human behavior and ideal ways of being." (Rich, 2007: 4). This implies morality that ethics and science work to achieve human welfare while the method of science turns out to fall into deviance and alienation that lead to dismaying outcomes.

Mary Shelley's *Frankenstein* and *The Last Man* received much criticism and inspired rewritings. Critiques by scholars have enlightened readers on the issues of science and technology and the outcomes that have followed uncontrolled scientific breakthroughs. Critics have highlighted how scientific and technological advancements can harm humankind and nature. In connection to the two novels, Hugh Luke states: "Both grow out of the tradition of the Gothic novel, although neither may

¹ Shelley, M. (2020). *Mary Shelley collection: Frankenstein, The Last Man, Selected Tales & Stories*". Monee, IL.USA. Subsequent quotations from *Frankenstein* are parenthetically included within the text as *F* followed by the page number.

² Shelley, M. (2020). *Mary Shelley collection: Frankenstein, The Last Man, Selected Tales & Stories*". Monee, IL.USA. Subsequent quotations from *The Last Man* are parenthetically included within the text as *TLM* followed by the page number.

accurately be classified as belonging to that genre. Both are animated by the same deep interest in the impact of scientific knowledge on human life and human institutions.” (Luke, 1965: 316-327). From this extract, one can say that *The Last Man* and *Frankenstein* elaborate on scientific progress and its impact on society. Mary W. Shelley’s novels have always been shoved in the category of Gothic novels and while others claim, there is a futuristic trend in her writing, very few have elaborated on ethical issues. In the light of reader response theory, these issues have appeared relevant in the corpus novels under this study. Therefore, this article seeks to uncover the representation of scientific and technological achievement and its limits in the light of ethical and moral values. The reader response theory will allow to look at the issues, using the novels as a stimulus towards the interpretation of the various clues that lay in the novels, which allows to infer Mary Shelley has alluded to science and technology and also presented the picture mankind erring because it lacked ethical and moral values.

In light of the reader’s response, we intend to analyze the novels’ historical, cultural, political, and social contexts. I contend that the novels are shaped by the discourses and the context that influenced the writer’s creation. Subdivided into three sections, the paper focuses on ethics and science and attempts to emphasize the moral values and the limits of scientific endeavors. The first section is about Modern man’s morality as represented in both novels under study. The second section elaborates on ethics in scientific progress while the third section sheds light on the need to establish a balance between scientific progress and the survival of humankind.

1. Mankind and Morality in *Frankenstein* and *The Last Man*

Every society is built on values that need to be maintained for the society to progress and live in harmony. Each individual irrespective of class and profession has a part to play in the moral and ethical heritage of the society. In this line of thoughts Rich states: “Morals are specific beliefs, behaviors, and ways of being derived from doing ethics.” (Rich, 2007: 4). Which implies that morality is concerned with our beliefs and attitudes that seem to be judged as good or bad through ethical analysis. Velasquez advocates that “Morality consists of the standards that an individual or a group has about what is right and wrong or what is good and evil.” (Velasquez, 2015: 489). Considerations of good and evil, in their turn, determine the ethical principles upon which human beings are governed. Such standards refer to the beliefs, conducts, and rules of conduct by which people live. Acting according to moral and ethical manners implies that individuals are prone to sacrifice their ego to conform to social standards and work to maintain common value systems. The advent of scientific and technological development has provided human beings with a new but liberal mentality that continues to tune with progress and survival. Mary Shelley’s *Frankenstein* and *The Last Man* are a critique of science, and a warning to humanity not to play God.

Scientific and technological progress have enabled mankind to prioritize the pursuit of knowledge and enhance the possibilities of economic aggrandizement. Scholars and scientists have always taken on value the acquisition of knowledge and savvy. In *Frankenstein*, Mary Shelly puts this forward as she has the protagonist state “I ardently desire the acquisition of knowledge. I had often, when at home, thought it hard to remain during my youth cooped up in one place and had longed to enter the world and take my station among other human beings.” (F: 27). However, in his thoughts, and interactions, his research fails; he values himself as more intelligent and more human than those around them. Frankenstein has forgotten what morality is. Desolation, injustice, the creation of new tools, the

disconnection of humans from nature, and the immorality toward the natural law become the inherent attitudes of man. He says, "Curiosity, earnest research to learn the hidden laws of nature..." (F: 20). The sense of collaboration is abandoned; profit and self-interest become the pursuit of the modern man.

Frankenstein's decision is to be considered morally wrong. The conception of morality which is to reflect on the good actions and take the right decision becomes a forgettable issue.

Victor Frankenstein as a scientist has pursued research to know the origin of life, and how to give life to organic matter. Moved by the scientific and experimental methods he used, he got alienated to the point of seeing himself in the capacity of a God. Without any sense of ethics, he challenged the natural order of things. While he seeks to conform to the trends of the scientific enlightenment in his days, he has overlooked the sense of morality and ethics. He is moved by the scientific ambition to build a living creature with human attributes. Such scholarly choices were made without heeding the implications they may have on the society around him. The loss of empathy for his social surroundings leads him to such a catastrophic decision. Victor attempts to surge beyond accepted human limits for the acquisition of forbidden or undiscovered human knowledge. Some critics advocate that the novel craves "no lesson of conduct, and manners or morality.

Against the natural and anatomic conditions that require the union between a man and a woman before a baby is conceived, scientific advances have allowed Frankenstein to bypass such a natural order of things and create a being out of experiments with organic matter. Thus, with scientific and technological advances, manners and morality have been adulterated in contemporary society.

Ethical and moral issues are also raised in Mary Shelley's *The Last Man* which illustrates the need to reinstate morality in mankind. *The Last Man* is about the spread of an ailment of SARS-CoV-2 II type. The novel portrays the contagion as a metaphor of a political weapon and we can see that the attitude of a character known as Lord Raymond. Through Verney Shelley exposes and speaks volumes of how degenerate mankind is.

In the novel, Lord Raymond is depicted as a powerful man, whose passions are violent, and looks at the structure of society as part of the machinery that supports the web on which his life is built (*TLM*: 179). War and seizure of land are his medium of accession to power. The novel dramatizes the legendary and historical wars between Greeks and Turks to highlight the manipulations of Lord Raymond and his control over the people. It transpires from *The Last Man* that with scientific progress, man thought that science could be a provider of people's happiness. Indeed, modern man has debased morality in pursuit of scientific achievements. Having fallen into immoral practices, man has reached for absurd creations that advance but cause dilemmas in social life. Let us consider what he says:

Philosophers have called man a microcosm on the scenery and reflection in the internal mind for all this machinery visibly at work around us. This theory has often been a source of amusement to me; and many an idle hour have I spent, exercising my ingenuity in finding resemblances. (*TLM*: 193)
Raymond believes that the soil is where "our desires, passions, and motives grow." (*TLM*: 194). Owing to activities run by Raymond, the environment is affected and polluted. In the words of a character named Leonel:

Each day the soldiers of the garrison assaulted our advanced posts, and impeded the accomplishment of our works. Fire-boats were launched from the various ports; while our troops sometimes recoiled from the devoted courage of men who did not seek to live, but to tell their lives dearly. These contests were aggravated by the season; they took place during summer, when the southern Asiatic wind came laden with intolerable heat, when the streams were dried up in their shallow beds, and the vast basin of the sea appeared to glow under the unmitigated rays of the solstitial sun. Nor did night refresh the earth. Dew was denied; herbage and flowers there were none; the very trees drooped; and summer assumed the blighted appearance of winter, as it went forth in silence and flame to abridge the means of sustenance to man. (*TLM*; 273)

Evidence of this is that Lord Raymond is awkward enough to unleash the plague which causes the extermination of the fictive world in which he blindly runs for power and domination. His ambitions controlled him without questioning the worth of what he was doing. Raymond and his soldiers seem to ignore the effects the war can cause. Leonel who has been there as an observer says: "I would not believe in his destruction; yet every mass that darkened the air seemed to bear with it a portion of the martyred Raymond. Horrible sights were shaped to me in the turbid cloud that hovered over the city;" (*TLM*: 279). Raymond, stands as a revolutionary idea said (Eva Antal, 2020: 6), "who epitomizes the arrogant masculine quest for world domination, and his dangerous charisma stands in stark contrast to the ineffectual Adrian ..., who preaches an ecological ethic of non-violence, vegetarianism, and harmony with nature." (Mckusick, 2010: 107).

It is a well-known fact that morality encompasses man's ability to choose between right and wrong. However, modern man seems to have fallen into a no-return trap of disasters due to his choices proceed through alchemy instead objective scientific experiments. Victor is the type Faustian hero who has not hesitated to resort to malpractices in order to achieve his purposes. In one incident of the novel, Raymond says: "I cannot rule myself. My passions are my master; my smallest impulse my tyrant." (*TLM*: 248). The assertion reflects human shortcomings when it comes to choosing the right course. Once overwhelmed by our ambitions, we become unable to judge and choose well. Raymond does not care about others; all his focus is his personal and selfish gain. He cruelly uses or preys upon his fellow creatures to advance his plans.

Freud (1962) suggested that moral development occurs as a person's ability to set aside their selfish needs and replace them with values of important socialization. However, seeing the behavior of Shelley's characters, it is obvious that they are affected by their ego, which influences them toward amoral actions. Their desires have been taken over them. Mary has portrayed the recurrent behaviors which are the image of making power of the mind, and the ability to think and draw the image in mind.

God has created man with the ability to think and to make a difference between right and wrong and the capacity to think critically. Modern man as represented in *The Last Man*, overlooks social and moral values but muses the pursuit of secular schemes resulting from education and scientific endeavor. Characters only struggle for material and economic uplift with a total disregard for the ethical implications of their actions. In Leonel's view,

False was all this—false all but the affections of our nature, and the links of sympathy with pleasure or pain. There was but one good and one evil in the world ---life and death. The pomp of rank, the assumption of power, the possessions of wealth vanished like morning mist. One living beggar had become of more worth than a national peerage of dead lords---alas the day---than of death

heroes, patriots, or men of genius. There was much of degradation in this: for even vice and virtue had lost their attributes---life---life—the contribution of our animal mechanism--- was the Alpha Omega of the desires, the prayers, the prostrate ambition of human race. (TLM:337)

The novel presents cases of the desecration of life. Human life is devalued and humans have no reasoning in line with morality but rather with intellectual ambitions. Little consideration is given to the divine. This has caused negative consequences with strains on the lives of other humans. As Leonel says:

Once man was a favorite of the creator, as the royal psalmist sang, “God had made him a little lower than the angels, and had crowned him with glory and honor. God made him to have dominion over the works of his hands, and put all things under his feet. Once it was so; now is man lord of the creation? Look at him—. (TLM: 353-354).

There is a change in Leonel’s views. Under the aftermaths of disasters, Leonel begins to rethink the wherefores of human existence. Humans are shown to substitute God and the work of creation. Such attitudes as instilled in the characters help delineate where mankind has gone astray, in terms of conformism with the divine decree. The same is observed in Frankenstein ambitions when he asserts that “if I could banish disease from the human frame and render man invulnerable to any but a violent death.” (F: 22). He asserts a liking to assume divine prerogatives and even undo the natural order which has it that microbes and organisms survive by eating one another. It is blatant that Frankenstein’s selfish mentality led him to discoveries and inventions. Such a commitment to science and knowledge has mitigated moral rectitude in him. He has become a self-centered character who remained focused on the results of his research and invention. In the prime of achievements, he states:

As the minuteness of the parts formed a great hindrance to my speed, I resolved, contrary to my first intention, to make the being of a gigantic stature, that is to say about eight feet in height, and proportionably large. After having formed this determination and having spent some months in successfully collecting and arranging my materials, I began. (F: 31)

The quest for fame and honor made the protagonist careless and he remained driven by such a mindset throughout the novel. The type of human beings Shelley represents in the person of Frankenstein and Lord Raymond or Verney are self-made people who are only concerned with their personal interest, regardless of others.

The recurrent features in almost all of the characters are selfishness and seclusion from any social interaction. However, it needs to be noted that, they take all measures to protect themselves from disease just as we can read through Frankenstein, Ryland, Raymond, and the Duke as representations of man during the Industrial Revolution and the predicament people have to go through. In a justification of the period that informs Shelley’s novel, one can consider the views of new historicists, who think that in its representation of human experience at a given time and place, the literary text is an interpretation of history (Tyson; 2015: 280).

The progress of science since the 19th century is marked by inventions such as the steam boat that made transportation easy. There were also discoveries that improved health and allowed people to live longer. We can also mention the inventions and applied uses of technologies that allowed mass productions. However, it needs be noted that human ambitions have also grown to the point of running

out of control. The attachment to moral standards is no longer the order of the day. Modern man does not in terms of what is moral or normal behavior. Victor represents the modern man who refuses to listen to the calls of his consciousness, which recalls the accepted norms of society. Mary Shelley has shown that life without any morality could lead to perdition. Some of the people in *The Last Man* flee and confine themselves during the contagion but end up losing their lives.

2. Of Ethics for Science and its Improvement in *Frankenstein* and in *The Last Man*

Among other approaches to the definition of ethics, we can note the standpoint of Velasquez who says that ethics is “the study of morality. It is a branch of philosophy that tries to determine what things in life are morally good and which actions are morally right”. He adds that “Invariably, all ethical question involves a decision about what one should do in a specific instance...ethical questions are not concerned with what one would do but what one ought to do...”. So, ethics deals with moral values and choices made in given circumstances. However, it is not the same as morality. “Morality consists of the standards which an individual or a group has about what is right and wrong or good and evil” (Velasquez, 2015: 489). Moral attitudes refer to the conduct or rule of conduct by which people live, while ethics refers to the study of moral conduct or the code that people follow. In the same vein, Conklin states that ethics is concerned with ideals, conduct, and character (Conklin 1938: 265). Modern man’s break away from morality has not essentially served for social welfare. According to Conklin, it obvious to recognize that “the use of science without any ethics and for evil use threatens peace and progress; at the same time, they feel no responsibility to help avert disasters” (Conklin, 1937: 596). In *Frankenstein* and *The Last Man*, Mary Shelley raises topical issues about the nature of life and human existence. What does it mean to be human and where do we draw the line between scientific and technological advances and our humanity? With the crucial development in the history of the nineteenth century, science stood central and contributed to the establishment of distinct scientific disciplines, professions, and roles. In Mary Shelley’s novels, we discover characters who seek to assume the homo-sapiens attributes and who work to control science, technology, and most importantly the earnest application of the scientific method in the achievement of their goals.

A look at the moral standing of Frankenstein and his experimental efforts suggests that he goes through the same predicament as Leonel and his family in *The Last Man*. In *The Last Man*, the protagonist suffers from the effects of a scientific breakthrough symbolized by a contagion going on and meant to exterminate the entire world. The contagion is the omen of an all-made plague that spreads like Covid-19 in the society. If ethics was heeded such things would not happen.

Frankenstein believes in his capacities by experimenting without the assistance of someone. His plans are ruled by his egoism. He thinks of gaining honor. As he said: “A new species would bless me as its creator and source; many happy and excellent natures would owe their being to me. No father could claim the gratitude of his child so completely as I should deserve theirs.” (*F*: 31). Frankenstein is aware of his selfishness. Psychologically, his wrong choices due to weak moral standards have led him to follow the evil way. He is psychologically overwhelmed and ruled by his desires. Frankenstein also missed some extent of altruism. If he had not, he could have bounced back to the right course and avoided getting into such a catastrophic situation. Since Frankenstein does not think of others welfare, he says:

Nor could I consider the magnitude and complexity of my plan as any argument of its impracticability. It was with these feelings that I began the creation of a human being. As the minuteness of the parts formed a great hindrance to my speed, I resolved, contrary to my first intention, to make the being of a gigantic stature, that is to say about eight feet in height, and proportionably large. After having formed this determination and having spent some months in successfully collecting and arranging my materials, I began. (F: 31)

Once the results of his ethics-free adventure lay before him, he began to have a measure of his insanity and the possible aftermaths. However, Frankenstein does not give up. All he does is to watch for what follows. He could not stop the general havoc that his creature would cause in the society. A scientist who overlooks ethics is irresponsible and dangerous. All scientific ventures should first stick to the premise that the work of his hands should serve and protect the society that funds the research or the invention. In the same view, Nagy. et al state that, "Frankenstein as a lens for understanding how people imagine science and technology invites the scientific community to discover new ways to reflect upon science, ethics, and responsibility." (Nagy. et al 2018: 17). Frankenstein's application of scientific method shows that science can solve problems but it also is a source of danger. Then scientific experimentations are not done at random but must imperatively reflect ethics. "Any scientific research looking to human welfare and betterment must include ethics" (Conklin 1938: 265-266).

In *The Last Man*, Lord Raymond is a tool Shelley explores to address deviance in mankind when it comes to choosing and making use of conduct and ethical values. Moved by his selfish behavior and the illusions of secular life, Lord Raymond features a display of violent passions that predominate his personality and actions. He shares a lot with Frankenstein. Self-gratification stood as the paramount motive behind his actions.

Lord Raymond is skilled in martial arts and could also have used a sense of ethics when he gets involved in the war between the Greek and Turks. He could have thought and preserved the people from the disaster that ensued but he did not. His failure to think about the negative effects of his ambitions are moved by an unspoken lack of ethics. He could have avoided the plague. It needs to be noted that without the war in the novel, pollution would not have occurred. Leonel shares the same views when he says:

I would not believe in his destruction; yet every mass that darkened the air seemed to bear with it a portion of the martyred Raymond. Horrible sights were shaped to me in the turbid cloud that hovered over the city; and my only relief was derived from the struggles I made to approach the gate. Yet when I effected my purpose, all I could discern within the precincts of the massive walls was a city of fire: the open way through which Raymond had ridden was enveloped in smoke and flame. After an interval the explosions ceased, but the flames still shot up from various quarters; the dome of St. Sophia had disappeared. [...] The flames of the city bent beneath it; and the smoke and dust arising from the ruins was dissipated. (TLM: 279)

Given these chaotic pictures of the war and the plague, scientists must know that any intellectual adventure devoid of ethics is catastrophic to humanity. Modern machinery and chemicals used in wars are the token imagery of uncontrolled science and technology. The progress of science and technology should be measured against the safety of humanity. While economic specialization remains a move

towards vitality in economic prosperity, one should not lose the sense of morality to cause disaster for the consumer or the man in the street. According to Conklin:

The ethics of science regards the search for objective truth as one of the highest duties of man; it regards noble human character as the finest produce of evolution; it considers the service of all mankind as the universal good; it teaches that both human nature and humane nurture may be improved, that reason may replace unreason, cooperation supplement competition, and the progress of the human race through future ages be promoted by intelligence and good will.... (Conklin, 1938: 268)

This quotation clarifies the importance of moral standards for scientific achievements and the progress of the human race. Scientific endeavors require a measure of ethics for a proper course of action. In highlighting how the monster kills Justine, and William, Shelley points to the disastrous consequences that can stem from deviations from morality. The same could be noticed in *The Last Man*, Leonel mentions a world in which the central conflict is about the extinction of the human race through disease. In the scramble for a reinvention of the world, scientists become alienated by scientific logic and sometimes fall into absurd traps. In *The Last Man* a picture of such a mindset. As Leonel would say:

I remember, after having witnessed the destructive effects of a fire, I could not even behold a small one in a stove, without a sensation of fear. The mounting flames had curled round the building, as it fell, and was destroyed. They insinuated themselves into the substances about them, and the impediments to their progress yielded at their touch. Could we take integral parts of this power, and not be subject to its operation? Could we domesticate a cub of this wild beast, and not fear its growth and maturity? (TLM: 299)

From the lenses of new historicists who claim that “The literary text shapes and was shaped by the discourses circulating in the culture in which it was produced.” (Tyson, 2015: 80). One can infer that the characterizations given in the novels, replicate Shelley’s own time, which can be distinguished from the idealized tendencies that are embedded in the writings of the industrial revolution. Once the components of the atmosphere and the nature of the gases that secure life have been ascertained, it became obvious to single out the habits and practices that threaten air and environmental safety as depicted in *The Last Man*. The devastating effects of the diseases in *The Last Man* are reflected as the cause of man’s passion. The ills of society, like the diseases of the body, stem from natural causes, and they can be cured only by controlling the wayward attitudes of mankind. One needs to take a move towards more protection for the environment.

Mary Shelley seems to have imagined the character of Leonel to remediate the flaws of Frankenstein. Leonel is bestowed with a mindset that we hardly perceive in the personality of Frankenstein. He carries a sense of empathy for the plight of his fellow victims of the abuse of science and technology. As we can read:

As my authorship increased, I acquired new sympathies and pleasures. I found another and valuable link to enchain me to my fellow creature, my point of sight was extended, and the inclinations and capacities of all human beings become deeply interesting to me....an anger aspirant to the praise and sympathy of my fellow. (TLM: 252).

As opposed to Lord Raymond, Leonel observes a sense of ethics. Leonel intends to see that mankind has a unified sense of morality and solidarity. Several critics have suggested that in *The Last Man*,

Shelley advocates for sympathy as a force of moral action and a solution to the interpersonal and international problems foregrounded in the novel. Fuson Wang, for example, argues that “in *The Last Man* sympathetic social inclusivity constitutes “immunity” to the plague that kills off most of humankind.” (Wang,2011: 233).

Human actions should be directed toward collective values, safety, and survival for all. Conklin stressed the need for scientific activities built on ethics when he says: “any program looking to human welfare and betterment must include both science and ethics, and there would be great gain for the world if organized science could cooperate more effectively in the promotion of practical ethics.” (Conklin, 1938: 265-266). He advocates for a more controlled use of knowledge and its applied uses. Science and technology can make life easier and more rewarding for people benefitting from its achievements but there is no way it could threaten human life and safety as it could be seen in *Frankenstein* and *The Last Man*.

This section has elaborated on the importance of ethics in scientific or technological practices and endeavors. The novels under study suggest a regain of control. For, if we have to create a harmonious society, modern man should combine his scientific research with ethics, which will restore morality for a stable life. Man is a social being, therefore, any ethical decision, he or she makes has great consequences on his social environment. Any decision-making should be judged; various questions need to be asked so that we create a balanced society.

3. Balancing Society and Scientific Breakthrough in *Frankenstein* and in *The Last Man*

Mary Shelley sought to strike a balance between science as an asset for social life. To achieve such an impact, it is mandatory to transmit values, improve education, and create new know-how that will participate in the quality of human life. Progress in social welfare has always been the work of scientific and technological input and breakthroughs. Science has responded to some of the societal needs and global challenges that contribute to the improvement of life standards. With science and technology, man has been able to create, or invent useful technology and drugs that have made people live longer. Through education, scientists acquire the ability to perform any scientific experiments on purpose to improve by creating and inventing the needs of society. The advancement of science rests upon the freedom of scientists to seek, test, and reveal the truth. It is to be noted that scientists from their mentality have acquitted and put all their forces into selfish discoveries and inventions. They pursue how to experience the knowledge that they get from science. Thus, scientific discoveries are revealed to be very far from social needs. What they use to discover is not what people need for their well-being, what they do is to go beyond by exaggerating with some results that affect the society. These scientific discoveries said to be useful to society have turned to be a trauma.

Some of the scientific discoveries or inventions created do not help or do not fulfill social needs. Rather, they constantly create things that destroy life and question what the future generations will expect to have as heritage. For instance, Frankenstein as a scientist, from his obsession has gone beyond ethics to find the secret of life; he devoted himself to getting scientific knowledge that pushed him toward creating a being that he had not imagined. A monster is a creation that Frankenstein has set to create for his society. But, does society need such a thing or a creation? It has become embarrassing and even a burden to society instead of a solution. Frankenstein’s monster becomes a danger and everybody in the society fears the monster. Even the monster himself has complained for his rejection by human beings because of his appearance. The monster by telling his story says:

How miraculous did this appear! The huts, the neater cottages, and stately houses engaged my admiration by turns. The vegetables in the gardens, the milk and cheese that I saw placed at the windows of some of the cottages, allured my appetite. One of the best of these I entered, but I had hardly placed my foot with the door before the children shrieked, and one of the women fainted. The whole village was roused; some fled, some attacked me, until, grievously bruised by stones and many other kinds of missile weapons, I escaped to the open country... (F: 68)

From this extract, one can see that the monster is rejected by the society. It is an evidence that Frankenstein's creation does not meet the expectations of society. It therefore becomes a danger and is rejected. He does not consider what the society wants. Frankenstein did not predict the implications of his commitment to science. It is evidenced in the novel that at a given point, Frankenstein is horrified by his achievement. The result of his sleepless nights has turned into a "devil" (F: 63). In an excerpt from the novel, we can read the following: "A flash of lightning illuminated the object, and discovered its shape plainly to me; its gigantic stature, and the deformity of its aspect more hideous than belongs to humanity, instantly informed me that it was the wretch, the daemon, to whom I had given life." (F: 47). Society deserves improvement, but the improvement should not be estranged from the values and realities of the society receiving of consuming the results of scientific and technological breakthroughs. The reason behind the odds that derive from Frankenstein's work, is the projection of his anti-conformist into the experimental processes enough to foul the outcomes.

The same reality transpires in *The Last Man*, where Mary Shelley dramatizes how interpersonal conflict, socio-political injustices of violence, war, and other human-made disasters result in pandemics. In the novel, the war between Greeks is an allegory that aesthetically serves to address the aftermaths of weakening social values under scientific and technological achievement. In the war, the emphasis lay on characters who overlook the worth of a durable social bond. However, they find grounds to work for the destruction of fellow human beings or their manipulation to maintain the exercise of power. As Leonel describes the atmosphere following an explosion:

I would not believe in his destruction; yet every mass that darkened the air seemed to bear with it a portion of the martyred Raymond. Horrible sights were shaped to me in the turbid cloud that hovered over the city; and my only relief was derived from the struggles I made to approach the gate. Yet when I effected my purpose, all I could discern within the precincts of the massive walls was a city of fire: the open way through which Raymond had ridden was enveloped in smoke and flame. After an interval the explosions ceased, but the flames still shot up from various quarters; the dome of St. Sophia had disappeared. (TLM: 279)

The extract above illustrates the effects of guns and chemicals used in armed conflicts. Mary has predicted the consequences of the mechanized weapons used in contemporary conflicts. The explosions, flames, smoke, and dust are epitomes of misused technology. Scientists should in connection with the realities of social welfare measure the nefarious effects of the technology and how it can affect the lives of human life. Owing to science, war conflicts have taken another trend with the effect of causing more violence and environmental disasters.

Scientists are bound to their views and methods which cuts them sometimes from common sense. When not measured against the intrinsic values of society, scientific discoveries become a threat and a waste to society. Before trying to bring something into existence, it is important to measure the implied uses and effects the invention can cause in society and the ecosystem at large. One needs to question

the purpose of inventions so that they do not embarrass the normal course of life. When the monster tells Frankenstein: "Remember, thou hast made me more powerful than thyself" (63) and also adds: "You are my creator but I am your master, obey!" (F: 111). The creature claims to be "the falcon" that makes mandatory statements on the "falconer" i.e. in Eliot's terms, a creature commanding its maker as if it was there when it was being made. Such a situation occurs because the maker has failed to follow the normal course of the process of making the creature.

The worst with scientists' adventures is that both, the scientist is not spared by the aftermaths of his findings. Mary Shelley achieves this perspective as she highlights Frankenstein's remorseful mindset when he realizes he made wrong choices. As he puts it:

No one can conceive the anguish I suffered during the remainder of the night, which I spent, cold and wet, in the open air. But I did not feel the inconveniences of the weather; my imagination was busy in scenes of evil and despair. I considered the being whom I had cast among mankind, and endowed with the will and power to effect purposes of horror, such as the deed which he had now done, nearly in the light of my own vampire, my own spirit let loose from the grave, and forced to destroy all that was dear to me. (F: 47)

Frankenstein's invention is a hideous creature that speaks volumes of the wayward methods of scientific experiments that participated in his making. All the havoc he imagines relates to his awareness of the things that went amiss in his decisions. Frankenstein is in the image of modern and contemporary scientists who fall into the traps of academic and scientific syllogism and find it hard to compromise. The life of seclusion that he lived has made him alien to social life and values. Readers can also find the justification why the results of his clandestine laboratory are unfit for social welfare but rather generate anarchy and disaster.

In *The Last Man*, Lord Raymond has shown his power and rule thanks to scientific and technological inventions for martial purposes. He does not hesitate to resort to guns to maintain control over the population. Artificial disease is used as a weapon to cause the extinction of humanity due to man's deviation in his use of scientific and technological inventions. Shelley states this through Hunt who clarifies it when he says: "The plague functions more as a symbol of varieties of human-made destruction than as an actual pathogen." (Hunt, 2022: 3). Shelley's demonstrates how Frankenstein's experimentation and the disease in *The Last Man*, are tangible situations of mishandled scientific savvy. In other words, Shelley seeks to prove how mishandled scientific knowledge is dangerous. Frankenstein himself vows the following: "how dangerous is the acquirement of knowledge." (F: 31) Frankenstein's statement confirms that the development and use of science should be done carefully to avoid any consequence or jeopardy to society. Science and technology should deeply abide by a collective interest and value system that will protect communities against disaster. Knowledge is power that needs to be exercised or handled with care. Shelley makes it clear as claims: "Farewell to the giant powers of man, to knowledge that could pilot the deep-drawing bark through the opposing waters of the shoreless ocean, --to science that directed the silken balloon through the pathless air, and vast machinery, that could divide rocks of granite or marble, and make the mountains plain!" (TLM: 357). Society cannot be spared if sets of practices in science and technology are set loose or league against it. The only way through such a conundrum lies in a balance in the use of scientific knowledge and how the results of its achievements are bent down to the welfare of society. Such a state of science and technology can only be achieved when scientist maintain their method of research and experimentation coupled with ethical values germane to their profession.

Conclusion

The present analysis of the limits of science and technology in *Frankenstein* and *The Last Man* by Mary Shelley's reached the evidence that the society and people Shelley represents in the two novels are morally depraved and act without restraint. The writer has dramatized characters in situations that highlight moral degeneration because their actions are void of moral standards and cannot be checked against any moral or ethical standards. The lack of certain moral standards caused Victor in *Frankenstein* and the military in *The Last Man* to err and cause disaster to the people around them. A consideration of social values could have served as a restriction to the malpractices that caused harm to people around them. In terms of ethics, Victor and the military in *The Last Man* have not heeded the ethics required in their respective professions. If Frankenstein did in his attempt to achieve a new invention and innovate technologically, would not have resulted in a creature that he could not control or put to use or the needs of society. In the army, as represented through the wars in *The Last Man* the misuse of scientific and technological inventions is the source of large-scale death and pollution of the atmosphere. Developments have shown that if a level of ethics was observed in the accomplishment of their duties Victor and the army general would not have lent their hands to destruction and inventions that would turn into threats. The study has finally found the need expressed in *Frankenstein* and *The Last Man* to balance society's values with the progress of science. Because scientific and technological progress are meant to participate to the welfare and prosperity of people in the society, scientific progress cannot be kept outside society and social values. Science should progress in the light of progress in society and its needs.

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