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Genetic Engineering and Ecological Responsibility: Ethical Debates in To Be Taught, If Fortunate

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Becky Chambers' novella To Be Taught, If Fortunate provokes a profound ethical discourse surrounding the intersection of genetic engineering and ecological stewardship in the context of space exploration. Chambers' narrative serves as a moral compass, challenging readers to contemplate the moral responsibilities of scientists when faced with the power to manipulate genetics and ecosystems in uncharted territories. Through a critical lens, this paper scrutinizes the characters' ethical deliberations, unveiling the multifaceted ethical landscapes and internal conflicts that arise when confronted with the power to alter life forms and environments.

Keywords: Genetic Engineering, Ecological Ethics, Space Exploration, Ethical Responsibilities, Xenology, Genetic Modifications, Transhumanism.

1. Introduction

Genetic engineering technologies have advanced quickly since the turn of the twenty-first century, sparking heated discussions about their possible uses and ethical ramifications. Concurrently, an increased consciousness of environmental issues has elevated humankind's understanding of its ecological duties on Earth and in possible extraterrestrial habitats. Science fiction literature has provided a rich environment for the investigation of these parallel developments, allowing writers to extrapolate present trends and analyse their long-term effects.

To Be Taught, If Fortunate (2019) by Becky Chambers sticks out as a particularly perceptive examination of these subjects. The work, which is set in a near future in which genetic modifications that can be reversed facilitate space exploration, addresses the moral challenges of human adaptation to alien environments and the obligations placed on scientists to investigate and study extraterrestrial life. The story told by Chambers offers a distinctive

perspective on the current discussions about genetic engineering, ecological stewardship, and the philosophy of science.

The purpose of this research paper is to examine the ethical arguments made in To Be Taught, If Fortunate about ecological responsibility and genetic engineering. The possible future of space exploration and the ethical issues it might raise by looking closely at Chambers' depiction of human genetic modification for space exploration and the characters' interactions with alien ecosystems. Additionally, this analysis will add to the current conversations in environmental philosophy, bioethics, and the ethics of scientific research.

One can gain a better understanding of the intricate relationship between scientific advancement, ethical responsibility, and the relationship between our species and the environments we inhabit and explore by analysing To Be Taught, If Fortunate through this analytical lens. The purpose of this study is to show how science fiction literature can be an effective tool for discussing and foreseeing the moral dilemmas raised by new scientific discoveries and technological advancements.

2. Literature Review:

Science fiction's initial investigations into genetic engineering tended to centre on the technology's potential for either dystopian control or human enhancement. The 1932 novel Brave New World by Aldous Huxley depicted a genetically stratified society, posing concerns about the social ramifications of this kind of technology. Works such as Frederik Pohl's Man Plus (1976), which examined the modification of humans for space habitation, but with a gloomy view of the psychological consequences, further developed this theme.

The latter part of the 20th century saw a rise in the importance of the ecological aspect of space exploration. The 1972 book The Word for World is Forest by Ursula K. Le Guin introduced themes of ecological responsibility that would become more and more pertinent as it critically examined the colonisation of alien planets and the exploitation of their resources. In a similar vein, Kim Stanley Robinson's Mars trilogy (1992–1996) offered a complex perspective on humanity's role in modifying alien environments by delving deeply into the moral and practical difficulties of terraforming.

These themes have started to be integrated more thoroughly in more recent works. The 2008–2011 season of Paul McAuley's The Quiet War delves into the moral and political ramifications of human genetic adaptation for extrasolar life, addressing ethical concerns related to science and the environment. The 2015 film Planetfall by Emma Newman explores the ethical issues surrounding human interaction with alien ecosystems as well as the psychological and social effects of long-term space colonisation.

Philosophers like Nick Bostrom, whose work on transhumanism in Human Genetic Enhancements: A Transhumanist Perspective (2003) has been influential in framing discussions about the ethics of human enhancement, have laid the philosophical foundation for these debates in the non-fiction realm. Environmental philosophers such as Holmes Rolston III (2012), in A New Environmental Ethics: The Next Millennium for Life on Earth, have advanced our knowledge of human obligations to ecosystems and non-human life.

Although Chambers's work offers a unique viewpoint, it builds upon this literary and philosophical foundation. To Be Taught, If Fortunate views genetic engineering as a tool for adaptation and coexistence with alien environments, in contrast to many previous works that depicted it as a means of enhancement or control. This is more in line with the idea of "moral bio-enhancement" put forth by philosophers like Ingmar Persson and Julian Savulescu in their 2012 book Unfit for the Future, which supports the use of biotechnology to enhance moral qualities in people.

Additionally, Chambers' perspective on extraterrestrial ecosystems takes into account current advancements in environmental ethics and astrobiology. The character's methodical, non-interventionist approach to researching alien life forms is consistent with ideas presented in books such as Jacques Arnould's Cosmoethics (2015), which addresses the moral ramifications of space travel and the quest for extraterrestrial life. By synthesizing these various strands of science fiction and philosophical thought, To Be Taught, If Fortunate offers a unique contribution to the ongoing dialogue about genetic engineering, ecological responsibility, and the future of human space exploration.

Transhumanism:

Transhumanism, as expressed by philosophers such as Nick Bostrom and Julian Savulescu, offers an analytical framework for analysing the process of somaforming that is portrayed in the novella. This school of thought supports the application of technology to improve the physical and mental capacities of people. However, Chambers presents genetic modification as a method of species-level adaptation to new environments, in contrast to traditional transhumanist narratives that frequently focus on individual enhancement. This is more in line with the concept of "ecological engineering," as defined by bioethicist Allen Buchanan in his 2011 book Better than Human, in which he makes the case for the application of biotechnology to aid in the adaptation of humans and other species to rapidly changing environments.

The study of environmental ethics, especially the writings of J. Baird Callicott and Holmes Rolston III, provides a framework for examining how the characters interact with alien ecosystems. Regarding the crew's approach to researching extraterrestrial life forms, Rolston's notion of "storied residence," which highlights the significance of comprehending and honouring the evolutionary history of ecosystems, is especially pertinent. Furthermore, environmental philosophy's discussion of the idea of non-intervention in pristine ecosystems offers a framework for analysing the moral conundrums the characters confront in juggling scientific curiosity and ecological responsibility.

The novella's treatment of scientific exploration requires an understanding of philosophy of science, particularly as it pertains to objectivity and the observer's role. Philosophers like Helen Longino on the social aspects of scientific knowledge production and Sandra Harding on "strong objectivity" provide insightful analyses of the characters' struggles with their own prejudices and the limitations of their human perspective when researching extraterrestrial life. Moreover, the notion of "epistemic humility," as expounded by science philosophers such as Nancy Cartwright, offers a structure for examining the characters' methodology of acquiring knowledge in foreign settings.

In Chambers' novella, these theoretical strands come together to form a complex ethical landscape that questions established ideas about scientific objectivity, ecological responsibility, and human exceptionalism. By using these frameworks to analyse the text closely, we can identify the complex moral arguments that are present in the story and how they relate to current discussions about genetic engineering and space travel.

Somaforming and the Ethics of Human Adaptation:

The core of the novella's ethical investigation is Chambers' concept of somaforming, or the process of genetically altering humans to adapt to various planetary environments. In contrast to numerous science fiction stories that depict genetic engineering as a way to enhance or create "superhumans," somaforming is presented in To Be Taught, If Fortunate as a tool for coexisting and adapting to the environment. Somaforming's reversible nature casts doubt on conventional transhumanist narratives of permanent enhancement. According to Ariadne, the main character, "Our bodies change to suit the planet, not the other way around" (23). This strategy emphasises adaptation over enhancement, which is more in line with Allen Buchanan's concept of ecological engineering.

This strategy has a variety of ethical ramifications. It offers a more modest and environmentally conscious perspective on human space travel, on the one hand. The characters alter themselves to blend in with the current ecosystems with the least amount of disturbance, as opposed to terraforming planets to suit human needs—a common science fiction trope. This is consistent with the idea put forth by environmental ethicist Holmes Rolston III, which is to respect the inherent worth of foreign environments.

The novella does, however, also pose concerns regarding the extent of human adaptability and the possible psychological effects of such drastic physical alterations. The crew's bodies are altered to withstand intense cold when they land on the ice moon Votum: "The skin on my arms had gone marble-white, traced with a network of dark veins that looked alarmingly like cracks in ice" (89). Though vital for survival, this metamorphosis raises questions about the psychological effects of constantly changing one's physical appearance and the possibility of becoming estranged from one's own humanity.

The novella also examines the moral ramifications of consent in light of the genetic alterations required for space travel. Despite the crew members' voluntary somaforming, the journey's irreversibility raises concerns about the decisions they make now and how they will affect the world down the road. This is similar to current bioethics discussions concerning the morality of genetic engineering that impacts future generations. Chambers asks readers to reevaluate the goals and morality of genetic engineering by presenting somaforming as a tool for adaptation rather than enhancement. The novella makes the argument that helping people become more responsible and better suited to live in a variety of settings rather than trying to make 'better' humans may be the most moral use of such technology.

Xenobiology and the Ethics of Scientific Observation:

In To Be Taught, If Fortunate, Chambers deftly examines the moral dilemmas raised by researching extraterrestrial life. The crew's xenobiology approach poses significant queries regarding scientific objectivity, the possibility of anthropocentric bias, and the obligations of researchers to the subjects they are studying. The novella, which reflects current discussions

in astrobiology and environmental ethics, emphasises a non-interventionist approach to studying alien ecosystems. We observe, we document, and we study, as Ariadne says. “We don’t get involved (45). This way of thinking is consistent with the minimal impact principle that many environmental ethicists support and it is reminiscent of actual procedures for protecting the planet during space exploration.

However, Chambers emphasises the unavoidable effects of human presence, even when attempting non-interference, which convolves this seemingly simple ethical position. The crew finds that the behaviour of local organisms has been impacted by their mere presence on the planet Mirabilis: “Our scent markers were changing the social structures we’d come here to study” (72). This situation exemplifies the observer effect in quantum mechanics, which applies to macroscopic ecological systems and states that observation always modifies the observed phenomenon.

The novella also addresses the difficulties of preserving scientific objectivity in the face of extraterrestrial life forms that defy human classifications. Their Earth-centric conceptions of life are called into question when the crew on Opera comes across organisms that straddle the boundary between plant and animal. Jack muses, “We don’t have the right words... I don’t know how to classify any of this” (110). This conflict is similar to the idea of incommensurability, which is the idea that two paradigms or worldviews can be essentially irreconcilable, as proposed by science philosopher Thomas Kuhn.

The ethical ramifications of scientific labelling and classification are further examined by Chambers. There are concerns about the imposition of human frameworks on non-human entities when it comes to the crew’s practice of naming alien species using Earth-based terminology. This is in line with ongoing discussions in postcolonial science studies concerning the possibility of cultural imperialism in scientific research as well as the power dynamics present in scientific naming practices.

The novella also discusses the moral conundrum of intervening or not intervening in the face of possible ecological catastrophes on other planets. The crew discusses on Votum whether or not to alert the local species to the impending ice age, asking, “If we could save them, shouldn’t we?” (95). This hypothetical situation is similar to current discussions concerning the morality of conservation and the extent of human responsibility for non-human animals and ecosystems. By means of these investigations, Chambers invites readers to contemplate the moral consequences of scientific findings and the boundaries of human comprehension when faced with genuinely extraterrestrial life. According to the novella, conducting responsible xenobiology calls for both strict scientific procedures and a strong ethical foundation that recognises the inherent worth of extraterrestrial life and ecosystems.

Ecological Responsibility and the Ethics of Space Exploration:

The book To Be Taught, If Fortunate offers a vision of space travel that is intricately linked to ideas of environmental responsibility. Chambers employs the novella to examine the moral responsibilities that face humanity when they travel into and possibly affect extraterrestrial environments. The crew shows a great deal of respect for the local ecosystems on every planet they visit. Their careful decontamination methods and dedication to reducing their environmental impact serve as excellent examples of this. “We’re here to learn, not to leave a

mark," as Elena puts it (38). This mindset represents a change from the "frontier" mindset that is frequently connected to space exploration to a more conservationist one.

But the novella also addresses the fundamental conflict that exists between ecological preservation and scientific curiosity. There are moments when the crew's commitment to non-interference clashes with their curiosity about alien life forms. This conundrum is especially pressing on Opera, where the identification of possibly sentient fungal networks sparks moral discussions regarding the nature of consciousness and the rights of non-human organisms. In the context of space exploration, Chambers also examines the idea of human stewardship. The crew members regard themselves as observers and carers rather than as invaders or colonists. This viewpoint is consistent with "planetary ethics," a theory put forth by philosopher Holmes Rolston III that advocates for extending our moral compass to encompass entire planets and their ecosystems.

Significant issues regarding the long-term effects of human presence on otherworldly worlds are brought up in the novella. The crew can't stop themselves from making changes to the environments they study, even with meticulous protocols. They are forced to consider the moral ramifications of their mission as well as the possible outcomes of human expansion into space by this unsettling reality. Chambers challenges conventional narratives of space exploration - which frequently put human interests ahead of those of alien ecosystems - through these morally challenging investigations. Rather, she puts forth a space exploration paradigm based on ecological accountability and reverence for the inherent worth of all living organisms, irrespective of their provenance.

3. Conclusion:

To Be Taught, If Fortunate provides an insightful examination of the moral dilemmas that arise when genetic engineering, environmental stewardship, and space exploration come together. A valuable look at the possible future of space exploration and the ethical issues it raises, Becky Chambers' novella delves into the complex themes of somaforming, xenobiological research, and human-environment interactions. The novella's somaforming analysis shows how the narrative surrounding genetic engineering has shifted from one of enhancement to one of ecological adaptation. This method puts traditional transhumanist ideals to the test and offers a more modest interpretation of humanity's place in the universe. In the context of space exploration, Chambers challenges readers to reevaluate the moral implications of biotechnology by presenting genetic modification as a tool for coexistence rather than dominance.

The novella's analysis of xenobiology and scientific observation brings to light the difficult moral dilemmas associated with researching extraterrestrial life. The conflicts that arise between scientific curiosity and ecological responsibility, the difficulties of remaining impartial in the face of genuinely alien phenomena, and the possibility of anthropocentric bias in scientific research are all expertly illustrated by Chambers. These topics demonstrate how science fiction has the ability to address and shed light on contemporary ethical issues in astrobiology, environmental ethics, and philosophy of science.

The novella offers a model of human interaction with alien environments that places a premium on respect, minimal intervention, and long-term sustainability in its discussion of ecological responsibility in space exploration. This perspective goes against the "frontier" mindset that is frequently connected to space exploration and is more in line with newly developed ideas about planetary ethics and ecological stewardship. To Be Taught, If Fortunate contributes to current conversations concerning the moral implications of human genetic modification and our species' duty as stewards of both terrestrial and extraterrestrial environments by tying these themes together. The novella makes the argument that ethical space exploration necessitates not only the development of technology but also a strong ethical framework that takes into account the rights and worth of ecosystems and non-human life forms.

The moral issues brought up in Chambers' research have a big impact on actual space exploration projects. The novella's exploration of ethical issues becomes more timely as humanity approaches the possibility of interplanetary travel and colonisation. Space exploration research protocols and policy decisions should be guided by the values of ecological responsibility, respect for extraterrestrial life, and careful assessment of the long-term effects of human presence in space.

In the context of space exploration, To Be Taught, If Fortunate makes a significant contribution to the conversation about genetic engineering and ecological responsibility. Chambers invites readers to reevaluate humanity's role in the universe and our obligations as a spacefaring species by offering a vision of space exploration based on moral deliberation and ecological respect. The novella shows how science fiction can tackle difficult moral dilemmas and envision more conscientious and sustainable futures.

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