

Univerzita Karlova
Pedagogická fakulta

Katedra anglického jazyka a literatury

BAKALÁŘSKÁ PRÁCE

Frank Herbert's *Dune* from the Ecocritical perspective

Román Frank Herbert *Duna* v ekokritické perspektivě

Giang Duong Phuc

Vedoucí práce: PhDr. Tereza Topolovská, Ph.D.

Studijní program: Specializace v pedagogice

Studijní obor: B AJ – NJ

Year: 2021

DECLARATION

I hereby declare that this bachelor thesis, “Frank Herbert’s *Dune* from the Ecocritical perspective,” is an original project individually conceived by the author of this thesis under the supervision of PhDr. Tereza Topolovská, PhD., using sources cited within the thesis, as well as on the page reserved for them. Furthermore, I declare that this thesis has not, and will not be used to gain any other academic degree.

Prague, 28th November 2021

ACKNOWLEDGEMENT

First and foremost, I would like to express my profound gratitude to PhDr. Tereza Topolovská, PhD., for her invaluable insights, helpfulness, endless inspiration, and immense patience during the creation of this work. Besides her, my thanks go out to my wonderful friends and family for their unrelenting support and love throughout this arduous journey.

ABSTRACT

This thesis seeks to analyse Frank Herbert's *Dune* (1965) from the point of view of its treatment of ecology and determine the novel's role as a pioneering work of science-fiction focussing on ecology. The theoretical part presents *Dune* within the context of Frank Herbert's work as well as within the context of other works presenting a similar agenda. Consequently, the 1960s will be presented as the turning point for science-fiction writing as well as ecocriticism, the newly formed critical perspective. The interpretative part offers a deeper ecocritical analysis of *Dune*, with the emphasis on the role of water, the warp-speed technological developments, and the perusal of underlying environmental warnings. The thesis thus ultimately presents the ecocritical viewpoint of *Dune*, interpreting its potential ecological warnings and pondering upon possible ways to avoid ecological disaster.

Keywords: Frank Herbert, *Dune*, ecocriticism, science-fiction, water conservation, resource extraction

ABSTRAKT

Cílem této bakalářské práce je analyzovat román *Duna* (1965) Franka Herberta z hlediska vztahu k ekologii, a dále určit roli toho románu jakožto průkopnického vědeckofantastického díla zaměřeného na ekologii. Teoretická část představuje *Dunu* v kontextu tvorby Franka Herberta a zároveň i v kontextu děl s podobným zaměřením. Šedesátá léta budou tudíž představena jako přelomová pro vědeckofantastickou literaturu i ekokritiku, tj. nově vzniklý kritický pohled. Praktická část nabízí hlubší ekokritický rozbor *Duny* s důrazem na roli vody, bleskový technologický vývoj a nahlížení do environmentálních výstrah. Tato práce tedy ve výsledku nabízí ekokritický pohled na *Dunu*, interpretuje její potenciální ekologická varování a zamýšlí se nad možnými způsoby, jak se vyhnout ekologické katastrofě.

Klíčová slova: Frank Herbert, *Duna*, ekokritika, science-fiction ochrana vody, těžba zdrojů

Contents

1 Introduction	7
2 Theoretical Part.....	10
2.1 Frank Herbert.....	10
2.2 Ecological writings in the 1960s and 1970s	12
2.3 The rise of environmental studies	17
2.4 Ecocriticism	19
2.5 Water is life.....	22
3 Practical Part.....	25
3.1 Water is power	25
3.2 The World of Arrakis.....	27
3.3 The Fremen	28
3.4 From Eden to Hell.....	30
3.5 Technology	32
3.6 The Sandworms of Arrakis	39
4 Conclusion.....	43
5 Works cited.....	46

1 Introduction

Growing up, I did not have many opportunities to lose myself in books as many of my peers. I did not get the chance to read any sci-fi books until I was in puberty because I was never allowed to read anything else but textbooks for school. The very first science fiction book that I stumbled upon and caught my attention in the public library was *The Sands of Mars* (1951) by Sir Arthur C. Clarke. Since then, I have been rather keen on reading science fiction and fantasy books. Most importantly, *Dune* (1965) by Frank Herbert was an eye-opener for me, thanks to its very topical themes. I believe it has played a crucial role in my interests in ecology, science fiction, and fantasy as of now. This was however one of many introductions to fantasy literature which included Robert Jordan's *Wheel of Time* (1984), Andrzej Sapkowski's *The Witcher* (2007), and J.R.R. Tolkien's *The Lord of the Rings* (1965).

In 2020 I was greeted with great news, which is the film adaptation of Frank Herbert's *Dune* (1984) and terrible news as the pandemic started and since I had a lot of time on my hands, I decided to re-read Frank Herbert's *Dune* (1965) to prepare myself for the upcoming film adaptation featuring Timothée Chalamet as Paul Atreides and Rebecca Ferguson as Paul's mother, Lady Jessica. It is my belief that with the release of this adaptation by Denis Villeneuve, *Dune* will receive more recognition, spark a newfound interest in the novel and hopefully people's awareness of environmental crisis such as climate change, scarcity of fresh water, deforestation and biodiversity will be heightened.

After re-reading the book, I realized that when I read it the first time 5 years ago, I did not fully comprehend the complex story of political intrigue, war and most importantly ecological issues. During the pandemic, I also indulged in a lot of TV series (*The Blue Planet* (2001), *State of the Planet* (2010), and books, e.g., *A Life on Our Planet: My Witness Statement and a Vision for the Future* (2020) which was a book by Sir David Attenborough,

which was later also adapted into film under the same name. His observations along with the consequences of worldwide lockdown have pushed me towards a vital question: “Is there still hope for humanity?”. Another pressing matter at this time was the topic for my thesis so I pondered about what I was going to research. After an extensive discussion and being given a plethora of pointers and advice on the topic by my supervisor, I finally decided to write about *Dune*. Thus, having considered *Dune*'s considerable and interwoven themes, complex characters and intricacies, it was its ecosystem that stood out and which has ultimately drawn my complete attention to the ecology as the main focus of my research.

The principal goal of this thesis is to explore *Dune* from the ecocritical viewpoint, which is a perspective that gained immense popularity during the second half of the 20th century. First, I will briefly introduce Frank Herbert's life and his most influential works, and his earlier fiction *The Dragon in the Sea* (1956) and *The Green Brain* (1966) in relation to his creative development and also his masterpiece *Dune*. As Brian Herbert (2003) emphasises it in his book about his father, *The Dreamer of Dune* (2003), *Dune* and *The Dragon in the Sea* contain recurrent water-and-ocean themes and the prevailing ecological message his father was trying to convey remained his most important legacy (26). Paradoxically, Frank Herbert's intentions at the time of writing of his work and most prominently, were not focused on ecology but rather political implications and religious issues. Next, an introduction to ecocriticism will be instrumental for understanding why and how it rose in popularity. Subsequently, this thesis will examine how ecology became a prominent approach in science fiction works. In relation to that, I will explore vital works that started to deal with ecology in the 1960s and 1970s during its cul-de-sac (Clareson 129). It was also during this time that science fiction moved away from the Golden Age of Science Fiction and towards what is perceived as the British new wave, a movement in science fiction that focused more on psychology and sociology rather than technology and science. Subsequently, the thesis

will discuss the rise and development of ecocriticism, a discipline that has been garnering the public's attention for the past few years by analysing the reason, motivation and timing of its emergence and development. For this, I will mainly utilize articles from Sandip Kumar Mishra called *Ecocriticism: A Study of Environmental Issues in Literature* (2016), *The Messiah and the Greens: The Shape of Environmental Action in Dune and Pacific Edge* (2001) by Susan Stratton and a book by Harold Fromm and Cheryl Glotfelty called *The Ecocriticism Reader: Landmarks in Literary Ecology* (1996). Next, in the Practical Part, this thesis will compare and contrast the relationship between the environment, the invaders and the native inhabitants, the Fremen. Subsequently, using the original novel *Dune* (1965) and the third instalment in the series, *Children of Dune* (1976), a study of the deadly sandworms, their role and their relationship to the indigenous populace is necessary to fully comprehend the ecology of Arrakis. In doing so, I will attempt to determine whether an analogy between Earth and Arrakis can be drawn.

2 Theoretical Part

2.1 Frank Herbert

Frank Herbert was born on the 8th of October 1920 at St. Joseph's Hospital in Tacoma, Washington to Frank Herbert Senior and his wife, Eileen Marie. His illiterate mother, who was of Irish Catholic descent, had to flee the British oppression in the 19th century to Canada, and then later to the United States of America. As mentioned by his son, Brian Herbert, in the biography of his father, *Dreamer of Dune* (2003), much of his upbringing would come to influence him heavily in his philosophical and religious attitudes. Growing up during the Depression-era America he had to overcome a fair share of hardships endeavouring in various professions such as a highway patrol officer, salesman, judo instructor and later spending a short time in the U.S Navy during the Second World War (O'Reilly 54-55). Despite his varied pursuit of careers, he always knew that he wanted to become an author: "Oh, I knew what I wanted to do with my life even when I was quite young. In fact, on my eighth birthday I told my family, "I'm going to be an author'" (Stone).

Needless to say, some of these peculiar professions influenced his writing; for example, the time he spent in the Navy heavily influenced the main themes of his first novel, *The Dragon in the Sea* (1956) as his interests in psychological, ecological, and anti-war themes were apparent. The same themes are developed in *Dune*. In his second novel, *The Green Brain* (published as "*Greenslaves*" by *Amazing*) came into existence. A story set in the twenty-first century in Brazil, to humanity's dismay, the overusing of insecticides (DDT) has led to the creation of a dangerous artificial intelligence "Green Brain", which can govern over all insects, is created and its purpose is to take over the world. However, what had the most prominent effect on him and prodded him to develop his own ecological ideas was his job as

a tabloid journalist. During this time, he stumbled upon a pilot project by the U.S. Department of Agriculture, whose focus was on a method of stabilizing dunes driven by wind over buildings and roads, inundating them. It was during this time that he turned his focus to the research of ecology and deserts and attempted to write an article called “They Stopped the Moving Sands.” However, he never finished, and this would ultimately steer his path towards extensive and diverse research that would later shape *Dune* (Herbert 123):”the idea come came from an article (I was going to do an article, which I never did) about the control of sand dunes” (McNelly).

His other science fiction novels include *Destination: Void* (1966), a novel concerning the creation of artificial consciousness along with the assumptions and fears about the nature of artificial intelligence. *The White Plague* (1982) is a story about a biologist, John Roe O’Neill, who decides to exact revenge on humanity by developing a deadly disease that only kills women after losing his loved ones.

It was thanks to Herbert’s varied professions and interests, which were projected into his work, that eventually helped him become one of the most renowned and respected science fiction authors. Herbert’s *Dune* won the Nebula Awards in 1965 and is considered one of the most popular science-fiction novels of the last twenty years and on 15th April 1975 according to a poll conducted by a science-fiction community news magazine, *Locus*, *Dune* was voted the all-time best-science fiction novel (Touponce 119). *Dune* stands out in science fiction because it stands in the middle of two worlds, space opera elements from the Golden Age of science fiction, which concerns space warfare, melodramatic adventures, and chivalric romances, and the features of the New Wave movement, which is the preoccupation with the human mind.

2.2 Ecological writings in the 1960s and 1970s

Having briefly introduced the author; this thesis will discuss both fictional and non-fictional ecological writings that were published during the second half of the 20th century in order to illustrate the influence, themes, and inspirations present in *Dune*. To accomplish this effectively, this thesis will gather vital information from the contents of contemporary environmental texts and online articles.

Unsurprisingly, Herbert was not the first author to display concerns about the environment in science fiction. Many authors have offered their views on ecological disasters since the late 19th century (Roberts 165-170). Among them were works such as Robert Barr's *The Doom of London* (1892), Richard Jeffries *After London* (1885), W.D. Hay's *The Doom of the Great City* (1880), and Grant Allen's *The Thames Valley Catastrophe* (1897). Environmental disasters featuring an immense cataclysmic event were the central theme for many of these books. For example, H.G. Well's *The War of the Worlds* (1898) falls into the category as it depicts a Martian invasion and an almost complete obliteration of London. What makes this an environmental disaster is the appearance of Red Weed that the Martians bring to Earth, causing the most devastation. This plant is suggested to be the reason behind Mars's red hue and a vital instrument in terraforming Earth to a habitable planet for Martians. In the end, both the Martians and Red Weed perish due to Earth's bacteria. However, this scenario presented in the novel represents a very plausible environmental threat.

Throughout the first half of the 20th century, science fiction authors entered an experimental phase and concentrated more on scientific romances, microcosmic romances, political fables, and tall tales of scientific miracle-making (James and Mendlesohn 57-60). Such authors include Sir Arthur Conan Doyle with his *The Lost World* (1912), Jack London's *The Iron Heel* (1907), and H.P Lovecraft's *The Colour Out of Space* (1927). Not many

writers concerned themselves with ecology until the second half of the century, thanks to the creation of a dystopian novel by George R. Stewart, called *Earth Abides* (1949). Interestingly, it bears a significant number of similarities to *Dune*. In *Earth Abides*, the readers are presented with documents that discuss the history of mankind from the event of the plague. Similarly, in *Dune*, various documents give the readers a sense of prescience of the storyline. The story of *Earth Abides* follows Ish Williams, a graduate student who survives the plague and his journey through the new quiet world. He encounters people who seemingly cannot cope with the post-apocalyptic world., he fears for humanity and decides to settle down and create a tribe to impart old world knowledge onto the new generation. Despite his teaching efforts, the people born after the plague stray further away from the ways of the old civilisation, and Ish eventually becomes the last survivor from before the plague. Ish may be seen as a failed Messiah, just like Paul Atreides in *Dune*. Tribes in *Earth Abides* reverting to primitive tools instead of using existing weapons are similar to the situation of the Fremen in *Dune* when they must abandon their environment and adapt to changes made to the planet in order to survive.

The events of the Cold War, specifically the 1962 Cuban Missile Crisis followed by the nuclear arms race, which brought the world closer to a nuclear war than ever before, fuelled the general public with more anxiety and pessimism about the future. However, it was mainly the introduction of the thermonuclear weapon and the revelations from Hiroshima and its consequences that 1960s ecologists started to pay more attention to Earth's environmental future. During this time, non-fiction works like Carson's *Silent Spring* and Paul Sears's *Where There Is Life* emerged as most impactful ecological writings popularising other environmental works including Herbert's *Dune* (Ellis 108). However, ecological works in the 1970s are more representative of public's concern and disquiet. As a result, many texts featuring these messages start to appear, such as the environmental text *A Blueprint for*

Survival (1972) published in *The Ecologist* and signed by over more than thirty leading scientists of the day. The text went on to examine topics such as exhaustion of resources, disruption of the ecosystem, failure of food supplies, and the collapse of society. It further suggests specific strategies for a more stable society, such as minimising the disruption of ecological processes, stabilising the population. However, if it does not stabilise on its own volition, it needs to be cut down by nature i.e., famine, epidemic, war, or creating a new social system – revert to tribal system, e.g., decentralisation (15). With the apocalyptic tone of the text in mind, it is rather suggestive that if humanity does not change, it will “muddle our way to extinction” (7).

Another non-fiction work published in 1972 that had a substantial impact on contemporary ecological writings is *Only One Earth: The Care and Maintenance of a Small Planet* (1972) by Barbara Mary Ward and René Dubois. Although authored by only two authors, over one hundred scientific and intellectual experts from 58 countries contributed to the text, which was created for the 1971 United Nations conference on Human Environment held in Stockholm. The primary subject matter of the report is the detailed description of the world of humankind, which is at odds with the environment. Adhering to prevailing the trend of these kinds of texts, it presents the state of things in a fear-inducing way, followed by an optimistic solution, albeit with enough doubt to maintain anxiety for humanity how to survive the impending natural disaster. There are five key topics to *Only One Earth*: the developing world, the planetary biosphere, the current state of the world, the development of high technology and science, specifically nuclear power (Sloan 278). Taking into consideration the nuclear arms race, the humanity’s ability to survive is severely challenged. Unlike *A Blueprint for Survival*, it does not suggest humanity revert to a tribal community but instead stresses the importance of global cooperation and responsibility. Despite its optimistic tone suggesting that planetary community and love will be our salvation, it still instils anxiety and

fear by emphasising the possibility of an ecological disaster stemming from humanity's misuse of science, technology, and the environment itself (Sloan 280). In the same year, the *Club of Rome* created another vital text for the ecological awareness *The Limits to Growth* (1972). This collection of leading ecologists, economists, scientists, industrialists, and educators was formed in 1968, and the authors for the aforementioned text were Donella H. Meadows, Dennis L. Meadows, Jørgen Randers, and William W. Behrens III. Similarly to *Only One Earth* and *A Blueprint for Survival*, it also introduces environmental issues in a pessimistic tone before offering solutions to the mentioned problems. Moreover, it combines fear and anxiety to motivate humanity to change to avoid an environmental calamity – to limit Earth's growth in five key areas. It differs from *A Blueprint for Survival* in the sense that it advises a global response and development of third world countries rather than tribal communities. (Sloan 278).

If the present growth trends in world population, industrialization, pollution, food production, and resource depletion continue unchanged, the limits to growth on this planet will be reached sometime within the next 100 years. The most probable result will be a rather sudden and uncontrolled decline in both population and industrial capacity. (Meadows et al.1)

Finally, it is necessary to mention a series of essays; *Small is Beautiful: A Study of Economics as if People Mattered* (1973), by the German economist Ernst Friedrich Schumacher. These essays take a more philosophical approach towards issues concerning consequences and production methods in relation to man's attitude to nature. Following the trend of ecocriticism writing, *Small is Beautiful* also presents the concept of environmental crisis in which humanity is waking up to the consequences of their greed – “The modern economy is propelled by a frenzy of greed and indulges in an orgy of envy...” (Schumacher 22), questioning why pollution, environment and ecology are becoming more prominent.

Subsequently, these series essays also offer a solution for this issue which includes smaller technological developments, adjustments to the way of life, and, most crucially, managing a conservative, local production, and consumption, something that ideally utilises the least amount of resources, destruction, and effort to achieve tolerable results. Schumacher also stresses the importance of non-finite, irreplaceable resources directed connected with the unsustainable damage done to the planet.

As we can observe, all those aforementioned provide a commentary of environmental issues in a gloomy tone. Thanks to its underlying ecological message that *Dune* was able to garner so much public attention and approval of the green movement. It was also more appealing to the general public thanks to the manner that the environmental issues were presented, as an integral part of the gripping plot, unlike other anxiety-inducing writings. *Earth Abides* by George R. Stewart and *Dune's* success and popularity paved the way for other authors to address environmental issues in a different manner than that of a natural disaster. These include *Grass* (1989) by Sheri S. Tepper, *Red Mars* (1992), and *Pacific Edge* (1996) by Stanley Robinson. Like in *Dune*, where ecological issues overlap with humanist themes, *Grass* also depicts the despoliation of a planet that is explicitly linked to gender and social inequalities. Despite being written a generation apart, *Dune* and *Pacific Edge* bring social, political and environmental matters to attention. Both works attempt to heighten the readers' awareness of the ecological issues (Stratton 306).

2.3 The rise of environmental studies

To illustrate why *Dune* and many other ecological writings became so prominent in the 20th century, I will delve more into the reasons behind why it is that environmental issues were not addressed more intensely until a couple of decades ago. Subsequently, I will discuss the pioneer works and events that inspired literary and cultural scholars, who have been working on ecologically informed criticism, to establish a more solidified community that concerned themselves with various ecological matters.

Unlike humanities-related disciplines such as history, law, sociology, and religion, literary studies regarding environmental issues remained untouched and did not “green” until the late mid-eighties. The civil rights and women’s liberation movement that occurred in the sixties and seventies managed to impact the literary field, whereas environmental concerns during the same time were barely touched upon. The world at the time was mainly preoccupied with current topics like race, class, and gender when it came to significant publications in the literary field. However, if you were to peruse the newspaper at the time, you would realise that the “earth’s life support system was under stress” (Glotfelty and Fromm 8). Issues like oil spills, toxic waste contamination, extinction of species, nuclear waste dumps, destruction of the tropical rain forest, wildfires, acid rain, Chernobyl disaster, famines, droughts, hurricanes, and many more were dissected within these periodicals. Interestingly enough, *Time*’s annual poll “The Person of the Year” went to “The Endangered Earth” in 1989.

According to Cheryll Glotfelty and Harold Fromm, environmental issues did not dominate the literary scene at the time was because the cultural scholars that have been writing ecological criticism since the seventies, wrote them in isolation (16). Thus, their

findings and research we dispersed widely in miscellaneous subjects such as pastoralism, regionalism, human ecology, nature in literature, or landscape in literature. In addition, they rarely cited their contemporaries' works and failed to build on one another because they did not know they existed. Consequently, ecocriticism did not garner much of public's attention nor was it an essential part of major institutions like the Modern Language Association (MLA), and students who graduated with environmental issues in mind did not have a community to call their own.

Environmental studies only began to flourish after literary scholars decided to cooperate on projects together, especially after Frederick O. Waage compiled, edited their texts into a comprehensive book called *Teaching Environmental Literature: Materials, Methods, Resources* and released it in 1985. It contained works of nineteen authors whose aim was to bring more awareness about environmental issues to the literary field. Notably, a special session, organized by Harold Fromm called "Ecocriticism: The Greening of Literature Studies" appeared on the programs of the annual literary conference in 1991 and managed to prod the community to strive for more. Subsequently, in 1992 a new Association for the Study of Literature and Environment (ASLE) was formed, whose objective was to "promote the exchange of ideas and information pertaining to literature that considers the relationship between human beings and the natural world" and to encourage "new nature writing, traditional and innovative scholarly approaches to environmental literature, and interdisciplinary environmental research (Glotfelty and Fromm 9). This association grew rapidly, reaching 750 members, most of whom wrote about nature but there were also writers who concerned themselves with urban ecology, human/nature dichotomy, and environmental injustice. Some theorists even dared to venture outside the norm and took a different attitude towards literature and started employing the term "ecocriticism" (Stratton 2), which will be introduced in greater detail in the following subchapter.

2.4 Ecocriticism

The major problems in the world are the result of the difference between the way nature works and the way man thinks. - Gregory Bateson 1976

The term “ecocriticism” was first coined by William Ruecker in 1978 in his essay “Literature and Ecology: An Experiment in Ecocriticism.” His definition was, however only limited to “ecology and ecological concepts to study of literature”, which differs from Glotelfy and Fromm, who define ecocriticism as “the study of the relation between literature and the physical environment” (9). As Arne Næss, the author of *Ecology, community and lifestyle* (1989) puts it, Ecocriticism can be divided into major approaches, namely the one concerned with shallow and deep ecology. The shallow ecology is mainly anthropocentric, meaning that nature exists only to serve humankind and that humans are the superior beings on this planet. In contrast, the deep ecology approach suggests that nature exists in harmony with humans, each having its own intrinsic qualities, and no one is superior to the other. Nature should stay “wild” and should not be touched by humans, lest it disrupts the harmony of the ecosystem. It further proposes that we abandon “ego-consciousness” (Mishra 169) and instead embrace the “eco-consciousness” (Mishra 169), re-wilding the world. To raise the awareness among man, deep ecology claims that the current environmental crisis is the result of human culture and its ethical intricacies therefore; we need to act upon it (Devall 63-68).

During the first wave of ecocriticism in the U.S, authors like Henry David Thoreau, John Muir, Mary Austin, Edward Abbey, Wendell Berry, and Annie Dillard focused mainly on non-fiction nature writings, putting emphasis on the individual connections with the landscape. They often wrote about the land and nature in a broad sense with a profound interest in the realness of the environment and promoted the value of nature (DeMott).

Furthermore, they often romanticized the wilderness and directed their criticism towards improbable pastoral past, some sort of unspoiled wilderness. The transition between the first and second wave of ecocriticism cannot be clearly discerned because the second wave also concentrated on the awareness and the importance of our interaction with the physical world. However, the second wave had a more sceptical view of the environment. Unlike the first wave, which aimed for a realist and less controversial way of interpreting nature, the second wave sought debate through a more formal method. In 'Ecocriticism: Some Emerging Trends' by Lawrence Buell it 'affiliated itself more closely with the other main historical strand of environmentalist thinking public health environmentalism, whose geographic gaze was directed more at landscapes of urban... and whose environmental ethics and politics were sociocentric rather than ecocentric.'" (94). Another notable aspect of the second wave ecocriticism is the emphasis on environmental justice issues. It is a literary criticism that explores how environmental degradation and social issues are inseparable and establishes literature as an effective means to express different perspectives and concerns regardless of place, time, and reality. Buell also predicts that ecocriticism will keep thriving in the future, challenging the existing ecocritical models, 'debate will continue for some time to come as to the extent to which ecocritical models generated in the first world apply to developing-world contexts' (99).

In the present day, we can see that Buell's prediction has come true since ecocriticism continued to develop beyond the second wave. The third wave ecocriticism was formed at the beginning of the 21st century, and it was first mentioned in the Summer 2009 special issue of MELUS: Multiethnic Literature of the United States:

Literary expression of environmental experience is as diverse as any other body of writing, of course. Yet until recently the community of ecocritics has been relatively non-diverse and also has been constrained by a perhaps overly narrow construing of

“white” and “non-white” as the primary categories of ethnicity. Therefore, this issue will explore what seems to be a new third wave of ecocriticism, which recognizes ethnic and national particularities and yet transcends ethnic and national boundaries; this third wave explores all facets of human experience from an environmental viewpoint. (6-7)

The movement started gaining popularity after Scott Slovic’s essay- ‘The Third Wave of Ecocriticism: North American Reflections on the Current Phase of the Discipline’ was published in 2009. This movement focuses mainly on the exploration of ethnicity through the study of environmental literature and the examination of multicultural literature and arts that intuitively recognize ethnic and national particularities. It also transcends “ethnic and national boundaries” and explores human experience from eco global perspectives (Adamson and Slovic 6). Thus, third wave ecocriticism gives us a deeper insight into the environmental issues and helps us realise our place within them, and most importantly, it tries to establish literary bridges across cultures.

Similar to the way feminist criticism examines literature from a gender perspective, ecocriticism focuses on the research and study of earth related issues. The key concept is the notion that humans co-exist with the physical world, we can affect it and are affected by it simultaneously. As a result of this interdisciplinary fusion, theorists are invited to experiment more than just nature writing; it also suggests new ways to analyse science fiction. Ecocriticism, therefore, suggests the following questions: How is nature represented in this work? What constitutes “nature” in a Science Fiction text? To what degree does the environment crisis affect Science Fiction? Should we inspect *place* more closely in addition to race, class, and gender? Do male writings about nature differ from the female one’s? How was literature affected our behaviour towards nature? (Glotfelty and Fromm 19). Through this, ecocritics encourage the readers’ eco-consciousness by presenting the natural world in a

different point of view and putting concepts such as sustainability and unsustainability, balance, and imbalance to view nature in literature in perspective.

Even though *Dune* was written in 1965, it proves to be ahead of its time by tackling modern environmental problems. It serves as a serious warning to its audience to stop interfering with the environment, to leave it in its wild and original state (Smith 26). Through the voices and ideas of his character, Herbert tries to promote ecological protection and preservation. He hopes that *Dune* will serve as an “ecological awareness handbook.” Inhabitants of *Dune* transform the planet to their own selfish needs and just like in our own reality, those characters fall prey to a false sense of humankind’s ownership of an intricate global self-sustaining ecosystem. Therefore, it is crucial for humanity to step back to assess the situation and act accordingly. Water will be discussed further in the next chapter, one of the most vital elements for *Dune* and Earth alike that need to be addressed.

2.5 Water is life

Arrakis and Earth are two vastly different planets, one consists almost entirely of deserts, and the latter is made largely of water. Despite the stark differences, they still share the similarity of having water. However, this is where the likeness ends, water conservation rituals are of paramount importance on Arrakis, but it is almost non-existent on Earth. In *Dune*, water represents luxury or salvation from life. It defines the difference between the rich and the poor. The indigenous population of Arrakis, the Fremen, value their water and do not treat it as a renewable commodity that is endless, unlike people on Earth. Water reclaimed from stillsuits and dead bodies emphasizes the precariousness of Fremen existence in their environment. This type of behaviour is quite alien compared to the way humans on Earth treat their water. Not only do humans waste and treat water as a renewable resource but they also pollute it with toxic waste and sewage. By emphasising the Fremen’s attitude toward the

water, Herbert might be trying to tell the readers that people on Earth are very much indifferent to the concept of water conservation and that perhaps they need to take it more seriously. *Dune* does not let the readers forget for a single moment how precious water is on Arrakis and that water conservation is paramount to survival. This theme is highly relevant with the drying Earth due to the intensifying effects of global warming. It might also serve as a prediction that soon, the preciousness of water in *Dune* will become our reality as well. It is safe to assume that spice melange and water scarcity on Arrakis are a direct analogy to oil scarcity and clean portable water on Earth. The spice represents humans' dependency on natural resources as well as the consequences when control over such resources is absolute. Similarly, a corporate entity within *Dune* along with the Spacing Guild is the allegory for OPEC (see part 3.1) on Earth. Even though the process of extracting both spice and oil is quite dangerous, people still do it for a chance of profit.

According to USGS, about “71 percent of Earth’s surface is water-covered, and the oceans hold about 96.5 percent of all Earth’s water” but only 3% of the world’s water is freshwater, two-thirds are frozen glaciers or otherwise unavailable to us. As a result of agriculture contributing to the rapid consumption of fresh water in order to produce food, the world’s reserve is slowly running out. Interestingly, despite these facts being made public to everyone globally, not many are very keen on water conservation and take it for granted. Annually, approximately 1.7 trillion gallons are wasted from household leaks in America alone, and roughly one-third of food produced in the world for human consumption, which translates to 1.3 billion tonnes, gets lost or also wasted (UNEP). To sustain human life, clean freshwater is necessary, and currently, 1.1 billion people lack access to it and about 2.7 billion experience water scarcity at least a month every year. WWF claims that by 2025 two-thirds of the world’s population may experience water shortage along with poor sanitation, leading to deadly diarrheal diseases like cholera or typhoid fever.

The emphasis on water and spice melange being vital for characters in *Dune* might remind us of our non-renewable resources in our current society, like oil and water. Herbert's work is becoming increasingly relevant for today's society with ideas like global water shortage or political conflicts across countries.

3 Practical Part

3.1 Water is power

In order to analyse the multifaceted role of water and its scarcity on Arrakis, I will attempt to dissect a scene taking place at the beginning of *Dune* (1965). In *Dune*, the conservation of water is of utmost importance, and Herbert was rather relentless in this aspect as not to allow the readers to forget even for a moment. Shortly after Paul's family arrives on the desert planet, a banquet is arranged, and this is where we are introduced to many powerful political characters, those who regulate the resources of water and melange.

The primary purpose of this scene is mainly to accentuate the tension between power groups on Arrakis and the family Atreides, who took over the spice production. Despite water being a precious commodity, the previous ruling house, Harkonnen, flaunted their lack of need for water to the local inhabitants by saving several bowls of water and a towel near the doorway. They would drink, wash their hands, spilling water on the ground; afterwards they would throw the towel in the puddles and allow beggars to squeeze whatever they could from it. In contrast, the idea of wasting even a single drop of water to the Fremen is unimaginable since water represented life itself.

On Arrakis, it is customary for Fremen to measure worth and usefulness by how much water an individual carries. Similarly, the invaders who are in control of ample water supply usually have a greater significance. Therefore, even though the Duke is supposed to be in control, and since he is not responsible for the distribution of water, he is not. It is here that the readers are made aware of a theory called hydraulic despotism (see chapter 1), which was of particular interest for Frank Herbert, and it manifests not only in the form of water on Arrakis but also melange within the Imperium. This directly correlates to the extensive

exploitation of oil and clean portable water on Earth. Herbert even goes on to claim that “CHOAM (Combine Honnete Ober Advancer Mercantiles), a corporate entity along with the Spacing Guild who control all trade in the Imperium, is OPEC” (The Organization of the Petroleum Exporting Countries) (Herbert 2).

For the Fremen, who had to adapt to the harsh and unforgiving environment of Arrakis for thousands of years, conservation of water is of utmost importance. Pardot Kynes, Liet’s father, started a project along with the Fremen in order to transform their planet. This project involves the Liebig’s Law of the Minimum. It is a concept of an agricultural theory developed by the German botanist Carl Sprengel (1787 – 1859) in 1840 and later popularised by Justus von Liebig (1803 – 1873) hence the name. It states that “growth is controlled in any given environment by the least available resource” (Sloan 340). The growth of Arrakis is controlled by water; therefore, in order to create a self-sustaining system and change the climate on Arrakis, the native population must store a substantial amount of water. For this purpose, the Fremen started manufacturing stillsuits, which allow surviving the desert, and no more than a thimbleful of moisture is lost per day. The secondary purpose of the banquet is to present the political, economic nature of ecology and the dangerous and harsh environment of Arrakis from those who live on the planet but are not Fremen (Sloan 363).

In the process of creating spice a few vital ingredients are needed: sandworms’ larvae and water, thus making water even more prized than thought before. With that in mind, the vision of the Fremen along with their messiah is to terraform the planet into lush, vegetative landscapes that would allow for abundance of water and forests. Despite wanting to achieve this dream, its realization might prove detrimental to the supply of spice and the survival of sandworms. This notion thus highlights how water on Arrakis, and its lack thereof clearly symbolises life.

3.2 The World of Arrakis

The plot of *Dune* takes place on the planet called Arrakis, also known as Dune, since it consists of almost exclusively of dry dune deserts and rock outcroppings. The planet itself plays the most pivotal in the story because it is the lone source of the Spice Melange for a very long time.

(...) spice of Arrakis (Dune) with geriatric properties first noted by Yanshuph Ashkoko, royal chemist in reign of Shakkad the Wise; Arrakeen melange, found only in deepest desert sands of Arrakis, linked to prophetic visions of Paul Muad'Dib (Atreides), first Fremen Mahdi; also employed by Spacing Guild Navigators and the Bene Gesserit (*Children of Dune* 30).

The spice is a crucial ingredient for an array of things, but most importantly, it is vital for space travel. To have control over Arrakis means to have control over the Imperium and as Paul puts it: "He who can destroy a thing has the real control of it" (449).

We are presented with a world with the harshest environment imaginable with its scorching heat and extremely dry climate, yet it is capable of sustaining life. Countless mountain ranges permeate the planet, splitting up the desert and providing protection for the planet's limited lifeforms. Humans can survive without any breathing equipment thanks to the harmonious consistency of oxygen and nitrogen in the atmosphere. Water is extremely scarce, and the reserves are hidden deep within the mountains and sandtrouts. Little native life can be found on Arrakis due to its sweltering heat and arid climate, and those who endured were eclipsed by the territorial sandworms that roamed the deep deserts.

I've a filmbook on a small specimen, only one hundred and ten meters long and twenty-two meters in diameter. It was taken in the northern latitudes. Worms of more

than four hundred meters in length have been recorded by reliable witnesses, and there's reason to believe even larger ones exist. (*Dune* 46)

3.3 The Fremen

The human inhabitants of the desert are the Fremen, formerly known as Zensunni wanderers, sent into forced migration again and again over countless years, taking them from one world to the next. The exact reason for their persecutions is not evident, however, it is speculated to be due to their religious beliefs. The Fremen can be viewed as a nomadic tribe, whose religious belief is based on Zen Buddhism and Islam. Every single aspect of their lives has been fully optimised and refined for the survival on Arrakis: from their clothing, martial arts, method of travel, to their religion and economy. They have been described as “people who lived at the desert edge without caid or bashar to command them: will-o'-the-sand people...marked down on no census of the Imperial Regate” (*Dune* 15). To the native population, the sandworms are viewed as a spiritual symbol of their faith as well as the physical embodiment of their Creator and Adversary. Among the Fremen the sandworms were often referred to as The Maker or Shai-Hulud, which had various meanings. “The Fremen have a saying they credit to Shai-hulud, Old Father Eternity,” he said. “They say: ‘Be prepared to appreciate what you meet’” (*Dune* 203). Due to the harsh climate of Arrakis, the necessity of water conservation is permeated through every facet of their culture, from inventing stillsuits as clothing, to the nature of their value system. Every person who has nothing to contribute to the Fremen community would be viewed in terms of water in their body and, most of the time, killed for it. One may shed a tear in showing respect or honour and spitting on the ground would be considered sincerity or respect.

The Fremen stared at the Duke, then slowly pulled aside his veil, revealing a thin nose and full-lipped mouth in a glistening black beard. Deliberately he bent over the end of

the table, spat on its polished surface. As the men around the table started to surge to their feet, Idaho's voice boomed across the room: 'Hold!' Into the sudden charged stillness, Idaho said: 'We thank you, Stilgar, for the gift of your body's moisture. We accept it in the spirit with which it is given.' And Idaho spat on the table in front of the Duke. Aside to the Duke, he said: 'Remember how precious water is here, Sire. That was a token of respect.' (*Dune* 99)

Along with their traditions, the Fremen community is organised around a tribal structure known as Sietches, a Fremen term for a community or village, and is led by a Naib, the strongest male member in the tribe. Each Sietch is also led religiously by a Sayyadina, a "feminine acolyte in the Fremen religious hierarchy" (*Dune* 544). Most of them were located within rock formations that dot the sands of Arrakis, whose ecology shapes every single aspect of their daily lives. As a result, they became extremely tough and resilient people. Their water gathering, measuring, and distributing water is impeccable and not a single drop is ever wasted, and thus, they are described as perfectionists. "...watermasters emptying their load into the pool through a flowmeter. The meter was a round gray eye above the pool's rim. She saw its glowing pointer move as the water flowed through it, saw the pointer stop at thirty-three liters, seven and three thirty-seconds' drachms. *Superb accuracy in water measurement*, Jessica thought" (*Dune* 321). The Fremen's austere discipline towards water conservation to fuel their straightforward ecological goal is finally revealed when Stilgar tells Paul and Jessica exactly how much water is needed to transform the planet.

In due course, they even learn to cohabitate with and benefit from the dangerous sandworms that stalk the deep deserts to the extent that they can ride them when they follow the proper way of summoning the worm. The Fremen children are taught martial arts from a young age, often to compete for the strongest position in their respective sietches. They are also taught to master the way of transport as it is essential for crossing long distances across

the deep desert. Their fighting technologies do not seem to be exceptionally advanced, but they are adapted to the environment they fight in. The Fremen's strength, discipline, and resilience directly correlate with the harsh and unforgiving environment of Arrakis. It is primarily thanks to natural selection and the practice of eugenics. They have merged themselves so fully to their environment that they acquired physical characteristics that allow them to survive such a hostile place like that of prolonged intestines and tough, leathery skin and ultra-fast coagulation. The blood of a minor cut thickens quickly and stops almost immediately as a possible moisture conserving mutation. They also practice eugenics by abandoning the weak and the disabled, which is interlinked with the survival of the tribe rather than the creation of a superior model. The blind is often left in the desert because their inability to traverse the deep desert quietly would hamper the progress of the tribe.

3.4 From Eden to Hell

To grasp the extent of the harshness and aridity of Arrakis, one must look to a more habitable planet, Caladan, Paul's birthplace and home. Unlike Arrakis, Caladan, Paul's home planet is a lush planet, abundant in water, flora, fauna, vast oceans, forests, and swamps permeate the planet; it also reflects the inhabitant's culture. Because of the favourable climate for human life, the natives of Caladan live a comfortable, peaceful life rather than a rough-and-tumble struggle for survival. Paul notes that this prosperous and carefree lifestyle has affected their culture negatively, making them soft: "We came from Caladan—a paradise world for our form of life. There existed no need on Caladan to build a physical paradise or a paradise of the mind—we could see the actuality all around us. And the price we paid was the price men have always paid for achieving a paradise in this life—we went soft, we lost our edge" (259). Here, we can observe an analogy between Caladan and Earth, since our planet consists mostly of water, albeit most of it is not drinkable. However, we only have one planet and

interspatial travel is not yet available for us, so if we continue to live too carefree, grow too soft and neglect our only living place, we could turn our Eden into Arrakis.

Thus, Herbert ultimately suggests that it is preferable if people are brought up in a harsher environment because when they must adapt and learn how to survive the ruthless landscape, they will achieve the strength of the mind and body. By contrasting the two extremes of Caladan and Arrakis, Herbert reiterates how hostile and dangerous the desert planet is and emphasizes the strong connection between the characteristics of people and their environment. Just like how Paul and his mother, Jessica, became much stronger by adapting to the Fremen lifestyle on Arrakis, the Fremen's physical and mental strength would diminish greatly if they were to live in a lush ecology like Caladan.

To further analyse how the environment is affected by human behaviour, it is imperative to put the relationship between the Harkonnens and their home planet, Giedi Prime, into perspective. Here, we can witness what can only be perceived as a dead planet due to humans' obsession with material things. Giedi Prime may as well represent Earth in the future if we do not cease our destructive actions. The planet is not described in great detail; however, we do learn that it is lush with minerals. And yet, it is described as an industrial wasteland. The capital city of Giedi Prime is characterized as "rubbish heaps...and the furtive scurrying of people" (325) due to its ruler's greed and oppression of the common folk. The Harkonnens also practice slavery, gladiator fights, and torture alongside mining the planet to the point where its entire ecological system is drastically altered. Just as Arrakis influences the Fremen, the Harkonnens influence Giedi Prime. This point further emphasizes the relationship between humans and their environment. Before the arrival of Paul's family on Arrakis, the planet and their inhabitants were under the control of the Harkonnens under a CHOAM Company contract to mine the Spice Melange for around 80 years. Given their brutish nature, the oppressors did not care for the Arrakeen native residents and scorned their

culture. The Fremen residents are thus looked down upon, seen as a nuisance and hunted down for sports by corrupt powers. Their only goal was to squeeze as much from the planet as they could for their own benefit, and they were not afraid to utilise deadly weaponry if it was needed: “Income then,” Rabban said. The Baron lowered his arm, made a fist. “You must squeeze.” “And I may do anything I wish as long as I squeeze?” “Anything” (*Dune* 241).

It might seem far-fetched, yet entirely plausible, to assume humans on Earth can be compared to the Harkonnens, the invaders, who, through their greedy and barbaric disposition, devastated their own planet. Likewise, we are currently very well on our way to destroying our own planet and are instead of attempting to cease our harmful activities, our goal is to find a replacement, just like how the Harkonnens did. Similarly, to we continuously try and extract precious minerals and energy resources from Earth for profit, the Harkonnens also treat Arrakis like a source of profit. They do not care about the planet or its future. They only care about how much spice they can mine. The Harkonnens were responsible for the oversight of the mining and supply of the spice melange to the universe. They carried their harsh governing methods of their homeworld to Arrakis, resulting in the persecution of the native Fremen people. The indigenous people were nothing but a nuisance to their mining operations and were hunted down for sports most of the time. The oppression of the native people of Arrakis is a direct allegory for colonisation on our planet, where we also take advantage of people and enslave them.

3.5 Technology

In *The Cambridge Companion to Science Fiction* (2003), edited by Kathryn Cramer, David Hartwell created a list of criteria under which works can be categorized as hard science fiction. According to that list, hard science fiction literature generally engages with technology and events which seem quite realistic and believable. It often takes the truth of

things and builds upon it to create a novelty (218). Apart from its ecocritical nature, *Dune* may also be classified amongst hard science fiction as the characters in the novel interact heavily with fictitious inventions like shields, aircrafts, and water-producing garment. It is important to note that the usage of technology seems to be a double-edged sword on Arrakis. On one side, it can be viewed as sine qua non, conditioning survival the deadly ecology. On the other side, in order to extract crucial resources, one has to utilise harmful inventions like the Spice Harvesters, which contribute to the planet's slow but inevitable destruction.

Though thinking machines were banned during the Butlerian Jihad 10,000 years before the start of the first *Dune* novel, other forms of technology are still prominent and necessary even though they are not focused on in other science fiction series. The primary focus of this chapter is the examination of various noteworthy technology such as body shields, stillsuits, and ornithopters in order to analyse how humans try to acclimate to the unfamiliar environment. The general consensus is that everyone wants to live comfortably and without worries. To do so, people tend to turn to technology in order to improve their quality of life. However, being so single-minded about our welfare, they often neglect what the creation and usage of new technology might be doing to the environment. People have become so dependent on technology to solve their problems that they even use technology to fix the problems caused by different technology.

As a reaction to the harsh and unforgiving Arrakeen deserts where temperature fluctuation is extreme and water is scant, the Fremen started manufacturing stillsuits. The suits gave them the mobility needed to thrive in the arid deserts, thus becoming an impressive fighting force. Without them, the Fremen would represent little to no threat to their enemies. Whereas the stillsuits are ingrained into the Fremen's life and culture as they were brought up with strict water-conserving discipline, the Harkonnens only use them during spice extraction in the deep desert. It is not explicitly described in the book how the Harkonnens ran their

mining operations, but one can assume that in order to keep Dune Men, the sand workers and spice hunters, in check, they had to wear it.

Shortly after arriving on Arrakis, Paul and his father, along with the Imperial Planetologist, Liet Kynes, set out to the desert which required them to put on a stillsuit. It is described as a “body-enclosing garment invented on Arrakis. Its fabric is a micro-sandwich performing functions of heat dissipation and filter for bodily wastes. Reclaimed moisture is made available by tube from catchpockets” (545). It has a similar concept to the spacesuit, but its job is to preserve and recycle all human beings’ water, including urine and feces. Water being so scarce on Arrakis, stillsuits play an essential role in the survival of the Fremen since they need them in order to navigate the desert for a prolonged period of time. A stillsuit made by the Fremen is always that of extreme high quality and efficiency in water reclamation.

It is an ultimate survival tool for the harshest of environments. Anyone who is stuck in the desert without a stillsuit is destined to become worm food. Since childhood, adopted in water preservation practices, they use every method available to extract and conserve water, even from the dead. “The flesh belongs to the person, but his water belongs to the tribe . . . except in the combat” (313). The most important purpose of the preserved water is to give it back to the planet in the future, hoping to change its ecology. The reason Fremen are able to thrive on Arrakis for thousands of years is their harmonious way of living with nature. The stillsuits are a symbol of that commitment since it is made not only for survival but it is also for the preservation of landscape, nature, and the ecology of the planet in mind.

In order to mine and transport the spice efficiently and swiftly, the Harkonnens brought with them a tremendous amount of colossal machinery like Spice Harvesters, ornithopters, and large carryalls. The ornithopters, or else known as thopters, are the only

option for transport for the invaders. In the book, they are often compared to birds and their wings “Leto fed power to the wings, felt them cup and dip – once, twice. They were airborne in ten meters, wings feathered tightly and after-jets thrusting them upwards in a steep, hissing climb.” (120). They are propelled by jets and flapping wings and have the ability to hover above ground with minimal noise, unlike helicopters on Earth, “thopter hovering in the air with just some gentle beats” (127). Thopters are mainly utilised for defence, and as mentioned before, shields can be applied to thopters as well, making them superb against projectile weapons. However, its combat capability is drastically lowered since shields render its firearms useless.

They can also be used for transportation and vary in size, ranging from small recon crafts to large carryalls. However, in the film adaptation of *Dune* (1984) by David Lynch, the ornithopter lost all its bird-like qualities and is instead portrayed as hovering crafts. And because it was only year 1984, the imagined inventions portrayed in the movie were quite limited due to lack of technology and were made to look either very shabby like the body shields or very simplified like the stillsuits. However, it did create a base for the 2021 film adaptation by Denis Villeneuve and through the rapid advancement in technology, he was capable of creating a version that does look very true to the source material.

Unlike the Fremen who adapted and learned to cohabitate with the planet, thus only needing to rely very little on technology, the newcomers need to depend on a plethora of technological inventions to survive. The only thing they could not deal with and feared was the apex predator of the desert, the deadly sandworms. They consider spice as nothing else but another mineral to extract as much as possible and make a profit by selling it to the Spacing Guild or the Bene Gesserit. Blinded by their greed and backed by the most powerful person in the universe, the Padishah Emperor, they would ravage the environment with their devices without conscience or guilt. On the other hand, the huge worms have become a

source of transport across the vast dunes and an unstoppable land-based war machine for the Fremen. While the Fremen respect the environment and learn how to live alongside it in harmony, the Harkonnens arrived on the planet with a single purpose, to exploit and ultimately bring destruction.

Another invention that is not typical for the Fremen but mandatory for the invaders in order to survive is a body shield. They were designed to protect the person from criminals, assassins, and accidents. It was customary for members of the royalty to always wear a body shield. This in turn made the use of projectile weapons and thrown blades inefficient. The Fremen who cohabitate with the sandworms could not use shields in case the vibrations from the shields attract a worm and in turn drive them into a frenzy. Thousands of years before the arrival of the Harkonnens and their machinery, the Fremen had unrestricted movement in the desert. Since then, the Fremen have been pushed back deeper into the desert in fear of being hunted down by the Harkonnen for sport. The inability of the Fremen to protect themselves by means of shields carrying shields is the reason why the Harkonnens with their lasguns, a wave projector weapon, have been able to drive the Fremen away from spice hotspot and restrict their freedom of movement in the desert.

For crucial technology, including the aforementioned inventions, to function correctly in *Dune*, Herbert introduced the so-called Holtzman Effect. However, it is not elaborated in detail, thus we know very little about it. What we do know is that it concerns the repellent force of the quantum particles and that it plays a vital role in space travel. The Effect has the ability to fold space, allowing for faster than light travel from one universe to the next (*Dune* 530). It is also responsible for the existence of body shields and affects human warfare greatly. Unfortunately, like many other inventions in the *Dune* universe, the Holtzman Effect is mentioned several times by Frank Herbert in his original *Dune* novels. However, no specific scientific inspiration nor principles behind it are given. Interestingly enough, the term

“Holtzman” is spelled slightly differently in each novel by Herbert. For example, in *Children of Dune* it is spelled with double m “Holtzmann Effect” (167).

Body shields are introduced at the beginning of the book as we witness a sparring scene between Paul and one of his mentors, the master of arms, Gurney. Body shields are created by the Holtzman generator, which is powered by the Holtzman Effect and provides a near perfect defence for the wearer as well as other vehicles using it. When the shields are active, they do not form a bubble around the user or craft but are rather attuned to their topography, making them non-restraining and easy to use. They are stored as a belt when not active and can be activated with a simple press of a button. Nevertheless, nothing is without fault; these shields can deflect all fast-moving projectiles but cannot stop a slow-moving attack. During the same scene, Paul states that during personal combat one must be fast on the defence but slow on the offense (37). With this in mind, Paul develops a particular way of fighting, to be patient and calculating. However, he must change the way he fights once he is among Fremmen, who do not use body shields during personal fights. The currents created by the shield always attract sandworms and madden them into a violent rage. As stated by Kynes: activate your shield in a worm zone and your fate is sealed (125), meaning carrying a body shield in the desert would signify your death. It is possible for aircrafts to have active shields during flight; however, the pilot must be careful not to fly too close to the surface, lest the vibration attract the sandworms.

Another limitation to the shield is that once the shield is active, no more “fresh” oxygen can enter the proximity and air becomes staler by the minute. In order to keep fighting, one must deactivate the shield, inhale and then re-activate, but this would expose them to firearms and projectiles. As stated before, there is no such thing as perfect defence either, with enough power or mass, the shield can be destroyed. Even with an active shield, a large enough worm can easily annihilate an ornithopter. It is observable here that the

colonisers' heavy reliance and usage of technology are not only slowly destroying the planet but also disrupting the native lifeforms. The difference between the colonisers who only exploit the planet and those who know how to cohabitate with their environment can be clearly seen in their behaviour towards the sandworms. As mentioned before, most if not all Harkonnen troops wear body shields and once it is activated in the desert, it is bound to attract a sandworm's attention and consequently drive it into a frenzy.

Nevertheless, the Fremen know how to summon a sandworm without enraging by using a thumper, "a short stake with spring-driven clapper at one end" (Dune, 547). Once summoned by the thumper, the Fremen are able to latch onto its back using Maker hooks, which are hooks used for capturing, mounting, and steering a sandworm. Understanding the nature of the worms allowed them to travel between sietches safely, efficiently, and ecologically. They acclimatised to the planet's ecosystem and did not disrupt it by utilising the natural resources which are to be found on the planet.

It is important to note that technology in Dune was not only inspired by technology available at the time was also ahead of it. Some of the less impactful inventions, albeit still significant, such stilltents, which are essentially a tent used to sleep in the deep desert of Arrakis. Being an essential item for travelling and surviving the Arrakeen deserts, it was airtight, and the moisture inside could be gathered and kept. Biological technology is also found in Dune; the Tleilaxu have the ability to create Gholas which are humans replicated from the cells of dead individuals and grown inside of a living organism called Axolotl tanks. Distrans is another technology used by the Tleilaxu, and it can be used to implant information into a person's mind or inside of an animal for storage and later retrieval. This information is stored subliminally through a form of voice and could be retrieved by a code word. It is remarkable to see to what extent the Fremen have integrated themselves with their environment that they even use small animals like bats or birds as a form of covert

communication. *Dune* is a humanist series, and the technology is simply part of the setting; the philosophies of *Dune* take centre focus while the technology remains in the background and has given very little focus or detail by Frank Herbert.

3.6 The Sandworms of Arrakis

On Arrakis, the sandworm reign supreme, inspired by epic tales of treasure-hoarding dragons, these behemoths are one of the most memorable and iconic elements of Frank Herbert's *Dune* universe. They are enormous in size, some "even growing longer than 400 metres" (544) and are virtually indestructible by usual means. They are thought by the Fremen population to be the physical manifestation of their Creator as well as Adversary. To the colonisers, they are nothing but a hindrance in their mission to mine spice melange. Interestingly enough, the sandworms and their larval form, the sandtrout, are not indigenous to Arrakis. They were brought here from another planet, eons prior and since then they absorbed all large bodies water, so that they could evolve into the giant sandworms of today. Thus, their introduction to Arrakis proved to have catastrophic consequences on the planet's original environment. We can observe similar environmental catastrophes involving introducing new species on Earth, namely the sea lamprey in the Great Lakes of the USA. It is by introducing these invasive species to a specific area or a planet, the balance of the whole ecosystem may be disrupted and destroyed.

To fully comprehend the ecosystem of Arrakis and its ecocritical significance, one needs to analyse the relationship between the sandworms, the desert, the spice, and water. The life cycle of a sandworm begins at the microscopic level as a sandplankton and when it matures to its larval form, also called sandtrout or Little Makers, it is small, flat, and leathery, resembling a leech. Since the sandworms have a fatal aversion to water and cannot survive in a water-logged environment. In the sandtrout stage, they must prepare themselves for the next

stage by seeking out and encapsulating any source of water they find and sequester it deep below the surface. When enough sandtrouts band together at these underground water pickets, the mixture of water along with the spice secretions form a liquid called the pre-spice mass. This mass produces carbon dioxide and over time with enough pressure, it explodes to the surface, killing millions of sandtrouts in the process. The exposure of this substance to the sun and the open air creates the refined form of spice that the invaders are after. The few sandtrouts that survive the event, also called a spice blow, enter a hibernation state for about 6 years, thus completing the metamorphosis into an adult sandworm. However, some sandworms do not fully develop and become stunted and the Fremen drown these creatures in water in order to obtain a formidable poisonous liquid, also called Water of Life. In the Fremen culture, this liquid is used when a Sayyadina is dying, and a replacement was required to take her place. It is remarkable to see the capability of the Fremen to adapt to the environment they live in without disrupting its ecosystem in the slightest. On the other hand, the colonisers who do not bother to adapt to the new environment but instead they only came to do one thing, to extract the spice. They do so without regard to the ecosystem, disrupting and destroying in the process. The well-being of the planet is none of their concern. Again, this behaviour of the invaders quite resembles people on Earth when it comes to precious natural resources like oil or water. Once a new source of oil is found on Earth, oil conglomerates will do everything in their power to seize control and start extracting it, disregarding the ecosystem as well as native people in living in it.

Adult sandworms are solitary and fiercely territorial, each sandworm patrols an area relative to its size and they will ambush anything encroaching on those boundaries, whether it be another sandworm or Spice Harvester. Even though they can anything they want, including humans, they only derive actual nutrition from the sandplankton that they obtain by sifting through coarse rock-filled sand. Though humans are not sought after as food, they are

perceived as a threat to their territory. There is a little chance of surviving a close encounter with these monsters as their approach is likened to that of a natural disaster. These details about the lifecycle of a sandworm shed light on a few mysteries of Arrakis, namely why there are no open sources of water and why when there are sources of water found, they dry up so quickly. Through the research on the sandtrouts by the Imperial Ecologist, Pardot Kynes, the father of Liet, that determined why Arrakis is so inhospitable for human life. This is because it is not for humans. The sandworms are responsible for the ecosystem that now exists on Arrakis, the sandtrout have terraformed this planet for their own survival. This theory is confirmed by Leto II. in Frank Herbert's *Children of Dune*, where he looked far back into his genetic ancestral memories and learned that eons ago the invasive species, the sandtrouts, were introduced to this planet from another place.

He fell silent and she wondered why he kept referring to the haploid phase of the planet's giant sandworm, but she dared not prod him. "The sandtrout," he repeated, "was introduced here from some other place. This was a wet planet then. They proliferated beyond the capability of existing ecosystems to deal with them. Sandtrout encysted the available free water, made this a desert planet ... and they did it to survive. In a planet sufficiently dry, they could move to their sandworm phase. (45)

One of the themes explored in Frank Herbert's books is ecological control, especially when it comes to the precious substance, spice. This is a resource that the universe has become utterly dependent on and if exploited with impunity, could have major repercussions. The spice melange is a by-product of the sandworm's life cycle, so these beings are sine qua non to the production of the spice. It is clear that if the sandworms are exterminated, so goes the spice. However, on Arrakis we see colonisers constantly contending with the environment to exploit it. Any attempt humans make at controlling their environment by using any sort of shielding technology is met with swift destruction by the sandworms. This contention by the

invaders stands in stark contrast to the local Fremen people who live with the planet, not against it. They revere the sandworm and have come to adapt every custom, every part of their lives to co-exist with them and their environment. They have even achieved this to such an extent that they are able to ride the huge sandworms as a youth's rite of passage. This feat further demonstrates the symbiotic relationship between humans and the environment. "Bless the Maker and His water," Kynes murmured. "Bless the coming and going of Him. May His passage cleanse the world. May He keep the world for His people."

The Fremen, who have learned how to live with what is given to them on planet, co-exist harmoniously with the large sandworms. They can utilise the beasts not only for easy traversal across the desert but also as deadly war machines, but they have no way of subduing or even exterminating the worms. So Fremen have no choice but to co-exist with them, but their lives would be better off if the sandworms were to disappear suddenly. Without the worms, Arrakis would return to its former glory, a lush planet full of water and plants. On the other hand, the colonisers most probably own sufficient tools to exterminate the sandworms to improve their quality of lives, but they refuse to do so because by killing them they would also be killing their only source of money. The colonisers therefore exploit the native inhabitants and their lives are not held in high esteem because mining for precious resources is better than the improvement of their quality of lives. Through this analogy, Herbert conveys a rather powerful, urgent, and ecological message about the ruthless resource extraction on Earth and the dangers it presents.

4 Conclusion

This thesis's overall aim was to embrace the ecocritical perspective through which the ecological issues and messages present in *Dune* by Frank Herbert might be analysed. Since childhood, I have been keen on reading fantasy and science fiction literature, but these works rarely contain any of the tremendous ecological peril the world may face. However, upon perusal of *Dune*, I started to notice many similarities between Arrakis and the Earth. I came to the conclusion that perhaps the world is on the brink of collapse. Additionally, along with being witness to countless environmental catastrophes and an ongoing worldwide pandemic I started to feel what may be seen as eco-anxiety world, especially the environment. This concern along with a few ideas from my supervisor are why I endeavoured to study the Frank Herbert's *Dune* from the ecocritical perspective. To provide more insight, I also took the implications from the next two books in the instalment, *Dune Messiah* and *Children of Dune*, into consideration.

The purpose of the theoretical part lies in the presentation literary works that inspired the creation of *Dune*, the rise of environmental studies in the 1960s and 1970s, and ecocriticism, a new field of study that will function as the foundation for my analysis in the Practical Part. I began my analysis by briefly introducing the author and the relevant text that inspired the creation *Dune* and how it might have motivated other authors. This demonstrated that *Dune* played a pivotal role in the development of science fiction by bringing science-fiction to the forefront. But most importantly, the theoretical part highlights that *Dune*

heightened the general public's awareness about ecology, and its publication even may be regarded as an aspect of the rise of environmental studies. I will briefly introduce ecocriticism as a critical concept for understanding the interpretations presented in the Practical Part. In order to analyse *Dune* from an ecocritical perspective, one needs to understand what ecocriticism is. Broadly speaking, it is a study of the relationship between literature and the physical environment, which emphasises ecological issues. The chief focus of the study is the co-existence of humans with the physical world. In order to heighten people's eco-consciousness, ecocritics often present the natural world from a different perspective so that it is easier for the general public to grasp the main idea.

The Theoretical Part is used as the foundation for an ecocritical analysis of *Dune*. Since the primary focus of ecocriticism is to analyse the relationship between humans and the environment, the thesis revolves mainly around the relationship between the Fremen and the Harkonnens and the respective environments that they reside in. The environment is shown to play a vital role in moulding of the native inhabitants' intrinsic qualities. What is more, the native inhabitants' qualities imprint on the environment, which proves that their relationship is reciprocal. The two communities, the Fremen and Harkonnen are compared and contrasted, mainly from the point of view of their ways of living and treating their environment. The Harkonnens may be seen as a direct reflection of the people on Earth, in the sense that we only want to exploit for our own benefit without regard to the people around us. Herbert's narrative seems to suggest that we should follow the Fremen's footsteps and learn to co-exist

with our planet in harmony without disrupting and destroying it. We ought to stop inventing superfluous things that might harm the environment. Instead, like the Fremen, we need to learn how to preserve the landscape and the environment properly.

Another set of analogies between Earth and Arrakis may be drawn in the form of water and spice representing scarcity of oil and lack of potable water respectively. Although some readers see *Dune* mainly as a political or religious commentary, the ecocritical perspective is crucial for its understanding. That among many other reasons is why we might read *Dune* as an ecocritical warning. A number of eye-opening analogies between Earth and Arrakis demonstrates that it is vital for people to learn to live harmoniously with their planet rather than exploit it. If we keep treating our only planet, the Earth, like how the Harkonnens treat Arrakis, we will also transform it into a desert wasteland.

5 Works cited

Primary Literature

Herbert, Frank. *Dune*. Ace, 40th anniversary edition 1999.

Secondary Literature

Adamson, Joni and Scott Slovic. "The Shoulders We Stand On: An Introduction to Ethnicity and Ecocriticism", MELUS: Multiethnic Literatures of the US, Volume 34, June 2009, pp. 5-24.

Buell, Lawrence. "Ecocriticism: Some Emerging Trends." *Qui Parle: Critical Humanities and Social Sciences*, University of Nebraska Press, vol. 19 no. 2, Spring/Summer 2011, pp. 87-115.

Carson, Rachel., *Silent Spring*, Riverside Press, Cambridge, MA, 1962.

Dean Claeson, Thomas. *Understanding Contemporary American Science Fiction: The Formative Period (Understanding Contemporary American Literature)*. Columbia: University of South Carolina Press, 1992. p. 129.

DeMott, Nick. "A Brief History of Ecocriticism: Where Literature and the Environment Cross Paths." *Nick DeMott Medium*, August 2018, nick-demott.medium.com/a-brief-history-of-ecocriticism-a120614d30fc, Accessed 10 August 2021.

Devall, Bill. *Deep Ecology Living as if Nature Mattered*, Gibbs M. Smith, Inc. 1938. pp. 63-68.

Dune, directed by David Lynch. <https://www.imdb.com/title/tt0087182/>, 1984.

Dune, directed by Denis Villeneuve. <https://www.imdb.com/title/tt1160419/>, 2021.

Ellis R.J. *Science Fiction Roots and Branches: Contemporary Critical Approaches*, 1990, p. 108.

Glotfelty, Cheryl and Fromm, Harold. *The Ecocriticism Reader: Landmarks in Literary Ecology*, University of Georgia Press 1996. pp. 8-16.

Goldsmith, Edward. *A Blueprint for Survival*. Vol. 1972. London: Ecosystems, 1972.

Herbert, Brian. *Dreamer of Dune*, Tom Doherty Associates, LLC., New York, 2003. pp. 26.

Herbert, Frank. *Children of Dune*, The Berkeley Publishing Group, New York, 1976. p. 30.

Herbert, Frank. *The Green Brain*, Ace Books, 1973.

Herbert, Frank. *The Dragon in the Sea*, New English Library 1973.

James, Edward and Mendlesohn Farah. *The Cambridge Companion to Science Fiction*, Cambridge University Press, 2003, pp. 57-60.

“How Much Water is There on Earth?” *USGS*, www.usgs.gov/special-topic/water-science-school/science/how-much-water-there-earth?qt-science_center_objects=0#qt-science_center_objects. Accessed 15 Oct. 2021.

Jameson, Frederic. “Progress versus Utopia; Or, Can We Imagine the Future?” *Science Fiction Studies*, Vol. 9, No. 2, Utopia and Anti-Utopia, Jul 1982, pp. 147-158.

Jordan, Robert. *The Wheel of Time*, Tor Fantasy, 1990.

McNelly, Willis. “Herbert’s science fiction novels, “Dune” and “Dune Messiah”, 3 Feb. 1969 www.sinanvural.com/seksek/inien/tvd/tvd2.htm. Accessed 11 Apr. 2021.

Mishra, Sandip Kumar. “Ecocriticism: A Study of Environmental Issues in Literature”, *BRICS Journal of Educational Research*, 2016, pp. 168-170.

O’Reilly, Tim. *The Maker of Dune*, The Berkeley Publishing Group, New York 1987. pp. 54-55.

Roberts, Adam. *The History of Science Fiction*. 1st ed. New York: The History of Science Fiction, 2006. pp. 165-170.

Touponce, William F. *Frank Herbert*. Indiana University at Indianapolis, Twayne Publishers, Boston 1988, pp. 119.

Sapkowski, Andrzej. *The Last Wish: Introducing The Witcher*, Orbit 2008.

Schumacher, Ernst Friedrich. *Small Is Beautiful: Economics as if People Mattered*. New York: Harper Perennial, 2010. pp. 22-24.

Sloan, Russell Terence. *Evolution, The Messianic Hero, and Ecology in Frank Herbert’s Dune Sequence*, Faculty of Arts of the University of Ulster, 2010.

Stewart, George R. *Earth Abides*, Fawcett Crest, New York, 1976.

Tepper, Sheri S. *Grass*, Random House Publishing Group, 1993.

Tolkien, John Ronald Reuel. *The Lord of the Rings*, HarperCollins Publishers, 2009.

Stone, Pat. *An interview with Frank Herbert: science fiction author, yellow journalist, and a homesteading technopeasant*, May/June 1981, www.motherearthnews.com/nature-and-environment/frank-herbert-science-fiction-author-zmaz81mjzraw. Accessed 11 Apr. 2021.

Stratton, Susan. *The Messiah and the Greens: The Shape of Environmental Action in Dune and Pacific Edge*, *Extrapolation* 2001, pp. 303-316.