

**T.C.**  
**ISTANBUL AYDIN UNIVERSITY**  
**INSTITUTE OF SOCIAL SCIENCES**



**BEYOND HOLOCENE: THE QUESTION OF PEAK OIL**  
**IN ECO-FICTION**

**M.Sc. THESIS**

**Mofeed Bahjat Sabrı SABRI**  
**(Y1512.020016)**

**Department of English Language and Literature**  
**English Language and Literature Program**

**Thesis Advisor: Assist. Prof. Dr. Timuçin Buğra EDMAN**

**October 2017**





T.C.  
İSTANBUL AYDIN ÜNİVERSİTESİ  
SOSYAL BİLİMLER ENSTİTÜSÜ MÜDÜRLÜĞÜ

**Yüksek Lisans Tez Onay Belgesi**

Enstitümüz İngiliz Dili ve Edebiyatı Ana Bilim Dalı İngiliz Dili ve Edebiyatı Tezli Yüksek Lisans Programı Y1512.020016 numaralı öğrencisi **Mohamed Bahjat Sabri SABRI**'nin "BEYOND HOLOCENE: THE QUESTION OF PEAK OIL IN ECO-FICTION" adlı tez çalışması Enstitümüz Yönetim Kurulunun 12.05.2017 tarih ve 2017/10 sayılı kararıyla oluşturulan jüri tarafından **ayb2017** ile Tezli Yüksek Lisans tezi olarak **kabul** edilmiştir.

Öğretim Üyesi Adı Soyadı

İmzası

Tez Savunma Tarihi :04/10/2017

1)Tez Danışmanı: Yrd. Doç. Dr. Tinuçtin Buğra EDMAN

2) Jüri Üyesi : Doç. Dr. Ferma LEKESİZALIN

3) Jüri Üyesi : Yrd. Doç. Dr. Yıldray ÇEVİK

*(Handwritten signatures of the thesis advisor and jury members)*

Not: Öğrencinin Tez savunmasında Başarılı olması halinde bu form **imzalanacaktır**. Aksi halde geçersizdir.

## **DECLARATION**

I hereby declare that all information in this thesis document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results, which are not original to this thesis. ( / /2017).

**Mofeed Bahjat Sabri SABRI**





*To my spouse, brothers and sisters*

## **FOREWORD**

It is a pleasure to express my acknowledgement for those who made this study possible.

First and foremost, I would like to express my gratitude and deep appreciation to my thesis Supervisor Dr.Timuçin Buğra Edman for his constructive and valuable feedback.

I would similarly like to express my profound gratitude to Dr. Yıldray Çevik who offered technical assistance and sincere encouragement.

Special thanks to Istanbul Aydın University/ English language and literature department for their constant assistance throughout writing this thesis.

Additionally, I cannot find adequate words to express my gratitude to my friend Dr. Mohammed Anwar Rasheed who was always ready to provide the needed books and references.

Finally, I must express my very profound gratitude to my spouse, brothers, and sisters for their continuous support and encouragement throughout the process of researching and writing this thesis. This accomplishment would not have been possible without them. Thank you.

**October, 2017**

**Mofeed Bahjat Sabrı SABRI**

## TABLE OF CONTENT

	<u>Page</u>
<b>FOREWORD</b> .....	<b>vi</b>
<b>TABLE OF CONTENT</b> .....	<b>vii</b>
<b>ABBREVIATIONS</b> .....	<b>viii</b>
<b>ÖZET</b> .....	<b>ix</b>
<b>ABSTRACT</b> .....	<b>x</b>
<b>1 INTRODUCTION</b> .....	<b>1</b>
<b>2 ECO-CENTRIC ATTITUDES IN LITERATURE</b> .....	<b>8</b>
2.1 Overview .....	8
2.2 Exploring The Eco-Criticism .....	10
2.3 The End Of Holocene .....	13
2.4 Eco-Centric Implications In Fiction .....	17
<b>3 GEOSCIENCE AND ECO-FICTION</b> .....	<b>24</b>
3.1 Eco-Fiction And Peak Oil Relevance.....	24
3.1.1 State of fear .....	26
3.1.2 Last light .....	35
<b>4 CONCLUSION</b> .....	<b>46</b>
<b>REFERENCES</b> .....	<b>49</b>
<b>RESUME</b> .....	<b>54</b>

## **ABBREVIATIONS**

<b>AAPG</b>	American Association of Petroleum Geologists
<b>ASLE</b>	Association for the Study of Literature and Environment
<b>DDT</b>	Dichloro Diphenyl Trichloroethane (Insecticide)
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>LL</b>	Last Light
<b>NERF</b>	National Environmental Resource Fund
<b>NOAA</b>	National Oceanic Atmospheric Administration
<b>NSF</b>	National Science Foundation
<b>PAN</b>	Pesticide Action Network-North America
<b>SF</b>	STATE OF FEAR
<b>UHI</b>	Island Urban Heat Effect



## HOLOCENE ÖTESİNDE: EKO-KURGUDAKİ YAĞIN ZİRVEDEKİ SORU

### ÖZET

Son yirmi yılda , petrol tüketilmesiyle ilgili konularda ve dünyanın karşı karşıya bulunduğu zorlukların ortasında çevre dengesinin korunmasına önem vermeye başladı. genel olarak doğa ve bilim edebiyatı insan hayatına iyi kavrayış sağlamak amacıyla birbirleriyle etkileşim kurar ve işte soru şu. çevre edebiyatının kültürel katkıları bu yönden rolü olup olmadığını sorusu gelir . bu konuda bir çok aydın ve çevresel edebiyatının eleştirmenleri jeolojik ve çevre bilimler için daha geniş önem vermek çağırılmaya başladılar , ve derlerki : çevresel edebiyatı insan ve doğanın daha geniş bir şekilde anlamak için çok bilimsel alanları konu olarak alır . ek olarak yaşama ve dünya düzeyında bir kültürel alan önemli iklim değişiklikleri tuttu konuların , kırlılığın sürekliliği ile çevresel edebi eserler almaya başlamıştır .topluluk üzerinde getirilen bu zorluklara tepki olarak , çevre sorunlarını ve petrol ile ilişkilerini anlamak için farklı yansıtan edebi romanlar üzerlerinde ışık tutmak önemlidir. yazar Michael Crichton *State of Fear* ve yazar Alex Scarrow *Last Light* roman kitapları hale çelişkili çevresel görüş ve eğilimli uyandırmasına rağmen bu edebi eserler üzerine ışık tutmak gerektiğini düşünüyorum , dünya bölen bir çok fenomen anlamak için jeolojik bilimler ne kadar önemli olduğunu anlatmaya çalıştılar. bu anlayışla iki anlatının çevresel edebi eserlerin gelişmesine yol açtığını açıklar .

**Anahtar Kelimeler:** *Anthropocene; Chemtrail ve Contrail; Eko-merkezli; Jeo-Mühendislik; Altın başak; Holosen; Hubbert'in zirvesi; Zirve yağı; Petro-Kıyamet; Sıfır noktası.*

## BEYOND HOLOCENE: THE QUESTION OF PEAK OIL IN ECO-FICTION

### ABSTRACT

During the latest decades, significant issues that are correlated with maintaining the environmental balance and the depletion of oil reserve started to gain wide popularity amid serious challenges the world is facing today. Commonly, the nature-writings and sciences are interacting with each other in imaging, picturing out and forming the humans' life. The first question that comes to mind is what about the contribution of literature as an active role in stirring up the cultural imagination? In a point of fact, many Eco-critics and scholars started to call for a deeper invest in geological and ecological disciplines, noting that Eco-criticism is regarded as the interdisciplinary field that calls for a deeper understanding of both humans and the nonhuman's world. Accordingly, Eco-fiction works have come to evaluate the sustainable means of life, by referring to cases strained the dominant culture like the impacts of the world-wide immoderation of climate, pollution and the depletion of oil. In response to the challenges that contemporary societies pose to literature, it is important to shed light on novels that demonstrate different approaches in quest to see how the Eco-centric topics are represented and what is the relevance of oil implication? Considering the fact that Michael Crichton's *State of Fear* still fuels contradicted Eco-centric views and attitudes, however, focusing on the debated work aforesaid in addition to Alex Scarrow's *Last light* is an attempt to show that as an acknowledged approach, Geoscience in literature is better suited to arouse common sense on many phenomena articulated with the surrounding world. It can be argued that, by adopting this understanding, the two novels are able to hold on to the traditional literary concepts; thereby, constructs the route by which the development of Eco-fiction is likely to take.

**Key words:** *Anthropocene; Chemtrail and Contrail; Eco-centric; Geo-Engineering; Golden spike; Holocene; Hubbert's peak; Peak Oil; Petro-Apocalypse; Zero-point.*

## 1 INTRODUCTION

Over the course of time, human beings found in possessing knowledge the everlasting pursuit to have a better life and to control the irrational fury of nature or its unpredictable revolution; ignoring that knowledge is a “double-edged sword,” for it carries the secrets of survival insofar as the secret quest for mortality. However, life was in most of its forms pure and quiet, but something happened recently that started to upset the environmental balance and warn of a dark future due to the impacts of modern cultures and lifestyles on the fragile ecology. To get the world’s attention, it is important to know that the environmental change that takes place in the present time will not be limited to humans; rather, it would pose a threat to the entire ecosystem. In any respect, many people believe that climate change is one of the things that cannot be controlled due to the piled up environmental tragedies caused by human beings.

It is widely agreed that the preservation of the earth ecosystem is not only the responsibility of certain group or individuals; it is the responsibility of everyone, and in order to effectuate the required change, the dominant culture must bridge the gap between the human’s world and the world of nature. To attach emphasis on this point, Serpil Oppermann and Serenella Lovino argue in their “Introduction: The Environmental Humanities and the Challenges of the Anthropocene” that the Geologists and other nature scientists are not the only ones who feel interest about the environmental problems that face the earth ecosystem, since these challenges “are also social and cultural, philosophical and political” (Oppermann, 2016). This sense comes in harmony with the views of the anthropologist Margaret Mead when she states, “We won’t have a society if we destroy the environment” (qtd. in Castree et al., 2014).

Within the most important reasons that affect the ecology is the human per se, since the profit-driven systems are seriously affecting the nature whenever the patterns of life get complicated. The latest annoying problem is that the pro-carbon policies contribute directly to climate changes, stronger hurricanes,

melting icebergs, rising sea level, floods, forest fires, heat waves and can be followed by the spread of diseases and food scarcity as a result of the destruction of crops. Considering these contemporary issues, the critic Isaac Asimov has a significant view to mention when he asserts that the world is facing a real environmental challenge that threatens the whole existence, and that there must be a kind of global consensus on how to deal with this significant issue and encounter its impacts (qtd. in Reed Critchfield, 166).

The indispensable need for oil in industry has become one of the prominent factors that started to decimate ecology in countless ways; as in the consequences of climate change and the depletion of Ozone on the atmosphere. According to the US National Oceanic Atmospheric Administration, many scientists presume that relying on oil and the increasing rates of carbon dioxides in the atmosphere have pushed the climate into a state of immoderation, in a way that the ice will be disappeared within the next three decades (Carl Franzen, 2013). It could be the natural changes of the planet that would destroy the existence as in case of the previous ages, but in this time, the planet could also be among the victims. This is why the poet Judith Wright states in her *Because I was invited that* “we must regenerate ourselves if we are to regenerate the earth” (Wright, 206).

Within the challenges on the environmental responses or the transition to sustainability, the concern for nature and how to address the environmental problems may cause, according to Noel Castree, a “substantial disagreement” since the UN-led Kyoto negotiations and the successive climate conferences held in Paris and Morocco in response to these issues have come to nothing yet except for the expressions of deep concern (Castree, 2014). On the other hand, the epitomes of militarization coupled with the profit-oriented attitudes may also trigger a world-wide Geopolitical form of conflict over natural resources. In addition, the overexploitation of natural resources during the last two centuries has stirred up the Eco-centric writers to take issues with such alterations. Taking these issues into account, Glen A Love makes it clear that “It’s time to heal the breach between the hard sciences and the humanities” (David Carter, 139).

According to Gary Westfahl's *Hugo Gernsback and the Century of Science Fiction*, the first critical article that raised the concept of Hard Science was published at the *New York Herald* in 1835; the article refers to this concept in fiction as a scientific novel (Westfahl, 21). However, Westfahl considers it as a "fiction mixed with scientific facts and predictive vision" (20). This identification can also be understood in the light of the contemporary understanding of Eco-criticism as a meeting point between literature and science; in which the first uses the imagination while the other relies on experience and extrapolation.

Whatever the stakes of this debate, there are possible ways to reduce the factors that vitally contribute in breaching this balance, within them, raising environmental awareness among the people, which can be mostly achieved through several ways, including education, digital media and literature. At this point, Oppermann's argues, "Alliances between the humanities and the social and natural sciences are vital in addressing and finding viable solutions to our planetary predicaments" (Oppermann, 2016). That is, crystallizing an Eco-centric sense can be achieved through the collective interaction of literary discourses with the other disciplines and fields of knowledge, especially the natural sciences. In line with Oppermann's approach, Harry Crockett states, "We're informed by "hard" science. For critics of most stripes, the natural sciences are, at best, irrelevant. For us, they're vital. Too bad we can't say (yet) that the reverse is also true" (qtd. in Ralph Black, 1994). This is why natural sciences are regarded as the essential means to convey different notions through literary works.

It is by showing the risk of pollution; Rachel Carson expresses her regret for the excessive specialization in the field of natural sciences and the lack to communicate with literature. Carson's approach is focusing on the toxic effects of pesticides and other chemicals on organisms. However, her historical *Silent Spring* ignited many environmental movements since the early 1960s; simply because it is presenting pattern that can be understood by the public. For instance, the book does not go deep into environmental details; rather, it quotes research articles in an annexed appendix so as not to pose obstacles in the way of the readers. In the introduction part of his *Ecocriticism*, the critic Greg

Garrard refers to several phrases from *Silent Spring* could be directed into environmental benefits.

In the introductory part of *Silent Spring*, Carson illustrates that appreciating nature will promote environmental narratives, and thus bring to light non-anthropocentric viewpoints. This may be a strong argument to encourage for a better engagement of literary works with the non-human world. Considerably, the profound impact of *Silent Spring* can be figured out in its sincere words when Carson states, “The beauty of the living world I was trying to save has always been uppermost in my mind” (Carson, IIX). This awareness, moreover, can be perceived in the statements of Al Gore, the former U.S. Vice President and the founder of Alliance for Climate Protection. Democrat Gore often refers to Carson’s works in his writings, interviews and in his documentary *An Inconvenient Truth*, which received appreciations on a large scale for its environmental concerns.

In line with Carson’s approach, the critic Robert Macfarlane considers the environmental crises as multi-dimensional when he asserts that the fate of humanity and their surrounding are inseparable. By far, Carson’s views that attract much larger attention to the inseparable connection between humans’ world and the physically existing world can be regarded as a starting point, by which, broadening these Eco-centric attitudes in literature has become essential to understand the problematic issues that are connected with any apocalyptic scenario at the global scale. By that means, the thesis attaches emphasis on the efficacy of Eco-critical approach to adapt to various disciplines with the aim at constructing influential role within the contemporary discourses. That is, the debate about what is the relevance of the Eco-centric identification in novels that exhibit Petro-apocalyptic themes comes as the axial concern in this thesis.

Hence, it is important to pose the question ‘how to equate this approach with another one that promotes technology and industrialization?’ Aside from the environmental damage, lifestyle and the growing up economies that depend on the intensive use of oil are, by far, the main reasons behind any possible depletion of the oil reserves. Whatever the case may be, it is quite evident that any solution to distance similar ‘Petro-apocalypse’ should embrace the reliance on a clean and sustainable source of energy, since appreciating the ecosystem

has to come first as a dominant culture and at the expense of the other intentions.

In her *The Edge of the Sea*, Carson presumes that science in its quest to understand nature will make the life better (Carson, 13-14). As an Eco-centric approach in literature, this rejuvenated attitude is constantly being enriched in line with the advancement of natural sciences that share the fundamental concepts upon which Eco-criticism is founded. For instance, the historian Dipesh Chakrabarty argues that narratives in connection with the geological time and the biological conditions are important to enrich the critical discourses with the essential elements of life and its necessities. Chakrabarty makes clear that according to the nature scientists, the boundary between geological record and the humans' history started to fade away "when human beings switched from wood and other renewable fuels to large-scale use of fossil fuel—first coal and then oil and gas" (Chakrabarty, 208). This is why; Eco-criticism has to take part within the environmental discourses that aim to drop off the overconsumption of fossils fuel and regain the balance to the human-nonhuman relationship.

Eco-criticism can thereby be regarded as an interdisciplinary approach that takes a deeper and more sensitive attitude concerning the mutual relationship between humans and nature when it incorporates narratives that are intelligently dealing with environmental, geological, political and economic-constructed issues together, for the most part, to draw futuristic outlines of the lifestyle and its necessities in a changing world. This understanding comes in line with Barulkar Jeetendrasingh who argues, "Ecocriticism is by nature interdisciplinary. It involves knowledge of environmental studies, natural sciences, cultural and social studies, all of which play a part in answering the questions it poses" (Jeetendrasingh, 2012). Eco-criticism, then, is a comprehensive view and a practice as a value-centered approach to respond to the real crises that may globally take place.

The question that comes to mind is how can Eco-fictional works take an active role in stirring up the cultural imagination? Like any other genre of literature, creativity in Eco-fiction can be attained when the modes of knowledge are unable to address the problematic issues easily or to make the needed change

inside the communities. It would be significant to note that Christopher Brawley makes reference to this literary construct as a focus shift from an anthropocentric to the Eco-centric approach, which is the core when the Eco-fiction works and reality come together to reconsider the important role of nonhuman world (qtd. in Chris Baratta, 5). That is, Eco-fiction may have a big role in evaluating the sustainable means of life, by referring to cases that have strained the dominant culture like the impacts of the world-wide immoderation of climate, pollution and the depletion of oil.

In response to the challenges that contemporary societies pose to literature, this thesis emerges to shed light on novels that demonstrate different approaches in quest to see how the Eco-centric topics are represented and what is the relevance of peak oil implication, which can be considered the research questions. In a relevant context, the inclusion of scientific conceptions through Eco-fiction often creates powerful images on the necessity to address the essential elements of the humans' surroundings like flora, fauna and the whole ecosystem. However, the interaction between the natural sciences and different Eco-centric attitudes in literature has reflected in many literary works, some of them are stirring the senses and minds, while others are used to baffle rather than to illuminate.

Considering the fact that Michael Crichton's *State of Fear* still fuels contradicted Eco-centric views and attitudes, however, focusing on the debated work aforesaid in addition to Alex Scarrow's *Last light* is an attempt to show that as an acknowledged approach, Geoscience in literature is better suited to arouse common sense on many phenomena articulated with the surrounding world. It can be argued that, by adopting this understanding, the two novels are able to hold on to the traditional literary concepts; thereby, constructs the route by which the development of Eco-fiction is likely to take.

Accordingly, the first chapter attaches importance to identifying an Eco-critical perspective on the human-nature problems. In addition, it serves as a spotlight on Eco-fiction that has been initiated when the writers as the other scholars realized that humans' world is in real jeopardy. Thereby, resorting to the environmental ethics has to be the reasonable contribution of literature for the aim at tackling serious problems with reference to the ecosystem. This approach



has been fully illustrated by various attitudes that raised valued ideas and notions in this regard.



## 2 ECO-CENTRIC ATTITUDES IN LITERATURE

### 2.1 Overview

After the World War II, literary critics and writers started to focus on a set of debated key concepts, within them culture, colonialism, history, race, sex, societies, in addition to the ecology. However, the Eco-centric approach has significantly evolved by the end of the twentieth century. As a dominant culture, these attitudes started to appear in various branches of knowledge as in literature, music and technology. Noticeably, the continual progress in scientific discoveries has a big role in formalizing new conceptions about the people's lifestyle and how to adapt with these day-to-day changes. On account of that progress in sciences, the geological discoveries have triggered literary concerns about the earth's ecosystem and the environmental equilibrium, to the extent that the lines between the natural sciences and the environmental humanities started to disappear since the scientific facts produce the knowledge and the culture as well.

With regard to the above mentioned concerns in Ecology, Glen Love argues in *Literary Theory* that the environmental problems are real; this is why, "it's time to heal the breach between the hard sciences and the humanities" (qtd. in David Carter, 139). In a relevant context, Lawrence Buell states, "There is an extra-textual reality that impacts human beings and their artefacts – and vice versa" (139). Thus, the Eco-centric perspective, according to Love and Buell, may succeed in changing the humans' relation with the environments, in addition to bridge the gap between the natural sciences and the environmental humanities.

Historically, it could be argued that the Eco-centric attitudes in literature have emerged along with the modern environmentalism in the 1980s in response to Carson's views that gained a unique resonance, especially, in her *Silent Spring* that bridges the gaps between the hard sciences and the environmental humanities. Considerably, the influence of Carson's approach, especially in her *Silent Spring* ignited a public controversy as to whether the widely used

pesticides pose a threat for both the environment and humans' life. And yet, many scientific researchers have proved years after Carson's death that much of what she said in her book was true, since the overuse of pesticides do not only damage health, but may create on the long run resistant insects.

Carson believes that there is something wrong when the people do not show affections in response to the destruction of nature or do not have emotional connection with nature and its beauty. This environmental affection can be noticed in a delivered speech before a group of journalists when she considers that destroying the nature would be reflected passively on the spiritual values of human beings (qtd. in Linda Lear, 160). In consequence of Carson's views and her publications on the public opinions, the American authorities passed an Act that prohibits the use of certain pesticide on domestic scale after almost a decade of publishing her book.

Moreover, the authorities in Main established *The Rachel Carson National Wild Refuge* in honor of her contributions. Indeed, the deep insight of Carson's *Silent Spring* and her writing style have much influence on both the environmental and Eco-critical discourses including Greg Garrard's *Ecocriticism*. As for Carson's advocated approach, surely it is not restricted to the harmful effects of pesticides and other pollutants. The importance of her writings comes from the fact that she established an Eco-humanitarian criterion for maintaining the ecosystem of the earth by setting aside the human intervention that added new complications to the rules of nature.

What makes the Eco-centric senses in literature distinctive is that lots of scholars embrace, as they go hand in hand to give a better understanding and solution about contemporary issues like the industrial pollution and climate change. In their anthology *Beyond Nature Writing*, Karla Armbruster and Kathleen Wallace assert that the Eco-centric attitudes need to expand the boundaries to include what links the humans with the non-human world. They point out to John Elder's definition of the Eco-centric writings as a personal reflection to the concerns in science and the world of nature (Armbruster, 2). And yet, their anthology discourses did not cover current issues like the overlapping effects between humans and nature, the global climatic changes or the risks of pollution that Eco-critical discourses are mainly concerned about.

Given this background, the historian Dipesh Chakrabarty proclaims that although the advancement in science and technology has opened new prospects and horizons, the industrial world and the lifestyles should not take strides to threaten the reason of existing the human beings, no matter the costs (Chakrabarty, 218). Likewise, Fred Dallmayr considers that writers and critics who are interested in various Eco-centric issues will find significant conceptions about the basis of human-nature problems (Dallmayr, 83). Stacy Alaimo goes farthest in her consideration of the ecological side when she holds the view that there was no boundary between the Eco-centric approach and the other scientific disciplines till the end of 19th century. (Clarke, 103)

In her article “Eco-criticism and Nature Writing,” Tidita Abdurrahmani makes clear that despite the fact that male writers are in general more materialistic and of dominant intentions, there is one thing that brings them all with female writers, it is the strong connection with the earth that affects their perceptions to this necessity. The critic approximates this understanding to the Eco-centric approach by saying that literary criticism is not concerned only with the study of the community and its surroundings, but it extends to include new aspects of life associated with the non-human world (Abdurrahmani, 2014). Considering these views, it appears obvious that developing the Eco-criticism has come as a response to broadening the humans' concern to include the non-human-world and the ‘biocentric issues’ with a view to being able to shape the Eco-centric ethics in fiction and non-fiction works as a neo-canon.

## **2.2 Exploring The Eco-Criticism**

As a new literary theory motivated by the global concern in nature and acknowledged by many contemporary critics, Eco-criticism has opened up on wide aspects which tend to highlight the relationship between the human and the nonhuman world. The theoretical framework of the Eco-critical approach can be traced back to 1966 when it is brought about by Cheryll Glotfelty’s *The Ecocriticism Reader: Landmarks in Literary Ecology* edited with Harold Fromm. In their anthology, the critics point out to Eldridge Cleaver’s words that say, “If we're not part of the solution, we're part of the problem” (Glotfelty, 21). Moreover, Glotfelty founded with Scott Slovic and other scholars *The*

*Association for the Study of Literature and Environment (ASLE)* during the 1990s.

Considering Glotfelty's approach, Eco-criticism is defined as "the study of the relationship between literature and the physical environment" (Glotfelty, 18). The critic adds, "Just as feminist criticism examines language and literature from a gender-conscious perspective, and Marxist criticism brings an awareness of modes of production and economic class to its reading of texts, ecocriticism takes an earth-centered approach to literary studies" (18). This broad identification of Eco-criticism is literally defined in terms of other designations, including green cultural studies, eco-poetics and environmental literary criticism. However, Glotfelty believes that in spite of its complexity, Eco-criticism implies the essential notion that the world of nature is inseparable from the humans' world (19). Accordingly, this Eco-centric shift comes to emphasize on the necessity to mold the physical environment and the issues of the real world in the literary studies.

The term Eco-criticism was coined in 1978 by William Rueckert in his groundbreaking article "Literature and Ecology," as the study of literature-environment relationships. In this respect, Glotfelty identifies the Eco-critical approach by differentiating it from the other genres of literature that restrict the meaning of 'the world' on the societal attributes. Glotfelty gives to the world new attributes relevant to the Ecosystem, by that, "Literary theory, in general, examines the relations between writers, texts, and the world. In most literary theory 'the world' is synonymous with society--the social sphere. Ecocriticism expands the notion of 'the world' to include the entire ecosphere" (19). Moreover, in her "Ecocriticism," Kate Rigby gives significant remarks by saying that the modes of life at all levels have contributed in delivering new concepts about the world of nature through the literary and cultural texts. In addition, the critic considers that the Eco-critical approach is characterized as the influential tool in quest of both the reasons of mortality and survival, through examining the human's engagement in preserving the surrounding environment (Rigby, 2002).

In line with Rigby's conceptions about the Eco-criticism, Glotfelty considers that literature takes an important role within this Eco-system, in which the

notions, power, and all the other constituents interact (Glotfelty, 19). In other word, the critic suggests extending the literary field with a view to be attached to other scientific disciplines as a multi-dimensional approach. While Leopold Aldo makes clear that ecology brings the art and all the scientific disciplines together for a better understanding of the world (Aldo, 1991). This consideration of Eco-criticism as an interactive literary genre comes in harmony with the views of Lawrence Buell who give a comprehensive characterization to this Eco-centric attitude in literature. Buell explains that in essence, Eco-criticism is “a commitment to environmentality from whatever critical vantage point” (Buell, 11). The Eco-critical approach is thus, a quest to reattach different disciplines with respect to the most pressing ecological issues.

Adding to the aforesaid, in Kate Rigby’s *Ecocritical Theory*, Scott Slovic raises a question about how can literature deal with the ecological problems? (Rigby, 266) Likewise, Joseph W. Meeker asks whether the realization to the ecological problems can make the needed change when he questions if the literature “adapts us better to the world or one which estranges us from it” (266). That is, At this point, Peter Swirski asserts that literature comprises the essential elements to deal with “issues that challenged thinkers of yesterday, and will continue to challenge the thinkers of tomorrow” (267).

If literature has the ability to raise the awareness on the importance of restoring the connection with world of nature, its influence should recall the Eco-critics to be pragmatic; by raising the awareness on the crucial problems with respect to the dichotomy of environmental equilibrium and sustainability of civilization in the long run. This identification comes in accord with Oppermann when she states, “Ecocriticism actually launches a call to literature to connect to the issues of today’s environmental crisis” (Oppermann, 1999). Hence, discussing this dichotomy in literature can be promising when it comes to evaluate the environmental movement for it may provide valuable insights and deepen the common understanding of the human-nature interactions that forewarn of the coming era.

### 2.3 The End Of Holocene

According to the environmental scientists, the climate change takes place as a result of the 'greenhouse' phenomenon. This concept was described by Joseph Fourier in 1824 that refers to the gaseous constituents of the atmosphere, both natural and anthropogenic (qtd. in Mike Hulme, 4-7). It is widely known that fossil fuel is one of the main carbon emitters that are responsible for trapping the heat. To a certain degree, the stress-strain interrelationship between the overconsumption of fossil fuel and the environmental reaction has extended reversely on both sides. In his article "The Climate of History: Four Theses" the historian Dipesh Chakrabarty argues, "Unlike the crises of capitalism, there are no lifeboats here for the rich and privileged" (Chakrabarty 221).

In Steve Rayner's "To Know or Not to Know?" the author proclaims that climate experts are divided on whether it is good and feasible idea to spray sulfate aerosols in the stratosphere to minimize the projected solar radiation on the earth surface or to curb the emitted gases that are responsible for the greenhouse phenomenon; thus, assists in reducing the global climate change. Rayner concludes that as a critic, it is important to examine the impacts of this debated issue sociologically and from other perspectives in literature (Rayner, 3). To some extent, the goal of both scenarios is to reduce the globally climate change, but they differ in their modes of action. Rayner argues that it is not a matter of a scientific discord over the safest choice to adopt, but rather, a discord over the way of life we intend to choose (Rayner, 15).

To attach importance to the practicable role of literature in constructing environmental image, one needs to put forth a question about how can the Eco-centric narratives raise the awareness on the restoration of the global ecosystem in the light of what is scientifically possible? That is, choosing any method to decrease the reasons behind the climate change should come through the contribution of all the cultural, political and scientific efforts as a wide-package; it is a mutual responsibility of both the international communities as people and governments.

According to William McClenney's "Earth Changes: The End Holocene?" Geologists and Environmentalists are examining whether the alterations in

atmosphere and the lithology of rocks are evident signs that the latest geologic era has come to end, which spanned 11000 years (McClenney, 2014). This is why; geologists may consider the exceeding impacts of human activities on nature as the beginning of a new geological era, suggesting that human activities began to affect the geologic features of the earth and its ecosystems. McClenney illustrates that many scientists consider the climate change as an initial indicator that identifies the limits of different eras in the geologic history of the earth when it moves from Glacial Epoch to a warmer period and vice versa. The author concludes that Geologists will look for what are known as the "golden spike"; a point in the geologic time record that identifies the boundaries after which the earth will turn to another geologic era (McClenney, 2014). This may lead the International Union of Geological Sciences officially to announce in few years the 'inauguration' of Anthropocene era.

On a side note, scientists are expected to consider the extraordinary impact of man on our planet as the beginning of a new geological era. According to IPCC report, many scientists, experienced environmentalists and relevant institutes have reached through the evaluation of data to the conclusion that changes in climate across the whole world are underway (qtd. in David Rose, 2013). Expressing the changes in climate by 'underway' to foreshadow an imminent crisis can also be perceived in Rachel Carson's writings when she refers that "the consequences of failure to heed the warning are catastrophic, and the danger is not only imminent, but already well under way (qtd. in Greg Garrard, 95). In a relevant context, McClenney argues that humans did not interfere in these changes but in the latest two centuries of the Holocene, to the extent that the anthropogenic effects have exceeded the natural fluctuations that pose a transitional period between every two glacial eras (McClenney, 2014). The idea that we got in to an "Anthropocene" era has literally gained its momentum during the recent years, suggesting that human activities began to have a significant impact on the geologic features of the earth and its ecosystems.

In his *Ecocriticism, Ecology, and the Cultures of Antiquity*, Christopher Schliephake states that the term 'Anthropocene era' was firstly coined by the ecologist Eugene F. Stoermer and Popularized by Paul Crutzen in 2000s as a reference to the impacts of humans on the ecosystem. However, it serves, by far,



as a call to preserve the Ecology (Schliephake, 280). In his article “The Climate of History,” Dipesh Chakrabarty claims that the contemplation of the geological-eras, which sheds light on the geological and biological conditions, are important to enrich the Eco-critical approach and construct environmental imagination about the end of Holocene era.

Moreover, Chakrabarty calls the activities of human beings during the Industrial Revolution as “geological agents,” and affirms that in any environmental decline, the impacts will extend to everyone; thereby, there will be no advantage of wealth to reduce that damage. (Chakrabarty, 206) The notion of “geological agents” can be also perceived in the introduction part of Will Steffen' article “The Anthropocene,” when he considers that the industrial communities have become part of the geophysical factors that work on speeding up the transition from the Holocene era at the present time to the Anthropocene (Will Steffen et al., 2007).

According to Serpil Oppermann’s “Introduction: The Environmental Humanities and the Challenges of the Anthropocene,” it can be noticed that the change in Earth ecosystems bears the humans’ imprints in a way that almost every part of the world has become a “contact zone” (Oppermann, 2016). On a side note, Kate Rigby raises questions in her article “Writing in the Anthropocene” about the future of the ecosystem after the end of Holocene and the beginning of a frightening “ecocidal era,” since the industrialism foreshadows, to a degree, environmental calamities may endanger the whole existents. The author concludes by saying that any notion about the looming Anthropocene era would embrace connotations of destruction and death; this is why Eco-critical narratives should be written in a “prophetic witness” mode (Rigby, 2016).

Therefore, as an “ecocidal era,” the looming Anthropocene is what motivates the literature and imposes upon the authors and writers to intervene and change their writing attitudes from the observer to a more effective and realistic position that anticipates the future and highlights what will accompany this critical era of disasters (Rigby, 2016). To challenge this problematic attitude, Oppermann argues, “We need more and more critical and imaginative tools to comprehend the Anthropocene” (Oppermann, 13). Accordingly, it could be argued that writing in the Anthropocene is not just a dive to draw attention to

the beauty of nature or for the sake of art, but also, it serves to disclose the ecocide path when the human-nature relationship becomes unbalanced.

This Eco-centric attitude in literature, according to Oppermann is “in a process of inventing and shaping itself, borrowing largely from other disciplines and the natural sciences” (Oppermann, 1999). However, the attempts to bridge the gap between the challenges of environmental change and literature are still characterized by non-effectiveness. At this point, the critic makes clear that “the deep ecological crisis is a global phenomenon that needs to be addressed in literary studies as well” (Oppermann). This attitude sounds resonated with Emily Barber’s viewpoint when she points out in her “Geo-engineering: Reality or Science Fiction?” that people are accustomed not to believe in Geo-engineering concepts, but as the indications of climatic crisis started to appear and became evident, the International community acknowledged the seriousness of the situation and set in search for sustainable solutions to preserve the life and environment (Barber, 2015).

Equally, Jeremy Moss considers in his *Climate Change and Justice* that Geo-Engineering discipline “should be available in case of any environmental change” (Moss, 48). He also points out to Caldeira & Keith’s article “The need for climate engineering research” when they argue, “The stakes are simply too high for us to think that ignorance is a good policy” (48). Accordingly, expanding the Eco-centric limits in literature to include the Geo-engineering themes and solutions has become an inevitable necessity to explain the scientific arguments about the transition to sustainability amid many contemporary challenges that are facing the world. This consideration is not only a range of large-scale innovative ways to alter climate change thought to be once mere a science fiction; it comprises new challenges concerning how to maintain the status quo and the futuristic attitude of the civilization.

## 2.4 Eco-Centric Implications In Fiction

The worldwide awareness of the environmental responses in addition to the emergence of Geo-engineering as a scientific discipline to solve the environmental problems did not go unnoticed on the cultural scene. Articulating this approach with fiction works has gained widespread popularity as one of the highest priorities. This engagement does not contradict the creativity when addressing purposeful thoughts at the global scale. In other words, the possibility of Eco-centric concerns and fiction to go together and reflect any environmental problems - in the light of the suggested Geo-engineering scenarios – can offer an entry point, at least in part, for solving ecological problems and enrich the literary discourses as well.

Therefore, it is important to give insight on selective fiction works that demonstrate environmental issues and embody scientific notions in order to get a greater understanding of the Geo-engineering implications in literature, in addition, to expose the contradictions in thoughts when there is a lack of environmental agenda. Undoubtedly, Eco-fiction has the narrative potential; it may stir up the community's respect of nature just as the Pulitzer awarded novel *The Road* for Cormac McCarthy in 2007. The novel presumes a post-apocalyptic reality when McCarthy pictures out ruined landscapes in America due to an unspecified cataclysm. Where, the cities and towns are covered with ash and devoid of life. Two years later, the novel was adapted to a film of the same name (qtd. in John W. Shiller et al., 1991).

During an expedition to Antarctica sponsored by the National Science Foundation (NSF) in 1995, the author Kim Stanley Robinson got the opportunity to be in touch with serious issues like the impacts of abrupt climate change and reflected in his *Antarctica, Science in the Capital trilogy, Sixty Days and Counting, Fifty Degrees Below* and *Forty Signs of Rain*. His works are characterized by environmental, cultural and political themes. Robinson mentions in his “Imagining Abrupt Climate Change” that the allegoric idea of “geologic timescales become individual timescales; and so, novelistic timescales,” which is of importance to enrich the environmental imagination of Eco-fiction authors (Robinson, 13). Obviously, his *Forty Signs of Rain* (2004)

in particular is a good example for the literature that deploys scientific conceptions to advocate the ecology.

Robinson's novel depicts an intense change in climate and the attempts of National Science Foundation (NSF) to adopt necessary procedures to curb this change. In a relevant context, the *New Yorker* points out that Robinson is commonly recognized as one of the best fiction authors (Tim Kreider, 2015). Robinson believes that since the climate change has started to cause extinction of many creatures, it is important to curb the economic system that stands behind the recent ecological crisis and may lead to a mass extinction of all the creatures. Hence, it is "time to adapt" (i.e., to regulate this system).

Robinson's contributions to literature over the past two decades have been highly influential in shaping an Eco-fictional attitude regarding the global alterations in ecology. The author concludes by saying that the issue of how to adapt to this critical stage of alterations must be deeply comprehended, and that it has to be brought into view through literature (Robinson, 18). In a relevant context, Patrick D. Murphy supposes in Chris Baratta's *Environmentalism in the Realm of Science Fiction and Fantasy Literature* that Eco-fiction works make people contemplate about their lives and their surrounding world (Baratta 4). In other words, Eco-fiction serves as a reflection of the real surroundings, its writers are concerned to draw inspiration from the natural phenomena and introduce the readers and audience to the existing challenges at the global scale.

The Eco-critics and the concerned in nature keep asking for inspiring stories and narratives that can connect the readers and audience to these daily environmental changes. Similar notions can also be noticed in Keira Hambrick's "Destroying Imagination to Save Reality" of Baratta's anthology. The writer raises concerns about the sudden environmental decline when she suggests important attitudes like climate change, overpopulation, and food production. (Baratta,7) Hambrick supposes that Eco-fiction motivates us to anticipate the consequences of the anthro-abuse of nature. In view of Hambrick and Murphy's approach, we can anticipate through the metaphorical thinking the consequences that follow some environmental disasters as a result of the overexploitation of natural resources and the irrational modes of technology.

The embodiment of the anthro-abuse of the Eco-system is considered the most attractive for the people due to the fears from future and the obsessions about death, which have always been kept in the minds of people. On the other hand, Eco-fiction and documentary films that are connected with the public policies and the addressed environmental phenomenon have brought the possibility of mutual understanding by putting together knowledge and facts from certain disciplines and locating them cognitively in others. In his *This Incomparable Land*, Thomas Lyon gives a new characterization by saying, “literature of nature has three main dimensions to it: natural history information, personal responses to nature, and philosophical interpretation of nature” (Lyon, 20). Therefore, it can be argued that Eco-fiction has the potential to deliver Geo-engineering notions to the public in a direct and entertaining way. Then again, Eco-fiction can lead the audience to think more about how to bring to light a realistic scenario planning to solve these problematic phenomena.

Articulating environmental problems and Geo-engineering conceptions with fiction works have inspired the ideological and Eco-critical debates derived from the prevailing cultural awareness about the progress of sciences that may offer suitable solutions. The challenge is to find out how to present purposeful works with a rate of sophistication in order to attract the people of all ages and from different levels of society to the environmental problems. At this point, Susan Sontag comments in her article “The Imagination of Disaster” that Eco-fiction movies concentrate more on bringing out the scenes of destruction and chaos (Sontag, 213). It appears evident that features of thrill and action have become the cornerstone of all thinking about environment. That is, they came to be the cause and excuse for profitable aims in most of the cases; and at times, for the aim of legislating decisions that serve influential companies and certain agendas.

The thesis takes a position on environmental narratives that are not based on facts, since many people tend to differentiate between fiction and fact in discussions about climatic phenomena. For this reason, it is important to give insight on popular Eco-fiction films that came to light in the 2000s with respect to the suggested causes of Global change like Gases Emission, Aerosols, and Electromagnetic Field instability. In addition, to present a critical analysis and

expose the contradictions with facts when there is a lack of environmental agenda. As an example, the premise of Roland Emmerich's *The Day After Tomorrow* (2004), which cannot be scientifically accepted, suggests that at a pace far beyond any climatic speculation, the temperatures across the whole northern hemisphere of the earth are suddenly plunging in less than a week and transforming the recent Holocene era to a new glacial age.

In whatever manner, drawing analogy between the climate changes that took place in the old epochs and the apocalyptic incident in this Eco-fiction was not successful. Our vision to the past can be useful for understanding the climate system during the ancient eras, but it does not mean that our predictions to the future should follow the same pattern. To this end, the theme in *The Day After Tomorrow* vividly depicts seriousness in climate change as a devastating factor; however, the plot has failed to develop an insight on the necessity to curb the causes of this phenomenon.

According to Andrew Erin's *Toxic Skies* (2008), many people assume a presence of dangerous chemicals supposed to be sprayed into one of the atmospheric zones. As stated in Erin's Eco-fiction, it is one of the secret experiments that includes the visible Contrails jet-airplanes are leaving behind. However, it is scientifically approved that contrail lines occur "since the first aircraft engines achieved altitude decades ago" as a result of the condensation of water vapor when the jets pass through wet clouds (David DiSalvo, 2016). It can be argued that in contrast with the fictional stories that talk about intruders who use unknown flying objects, the scientific approach of Erin's Eco-fiction may overstep the bounds of reasonability. But unlike *The Day After Tomorrow*, and *Toxic Skies*, however, the plot in John Roger's *The Core* (2003) may not keep up with any limit of plausibility.

*The Core* is about a team of scientists carry out very necessary trip to the center of the earth for the purpose of speeding up the rotation of the outer core that exists in a molten form; thereby, regulate the magnetic shield that is responsible for deflecting the harmful cosmic rays. It is important to keep in mind that temperature and pressure gradients rise to unbearable levels for any sophisticated vehicle ever made to go deep inside the earth (Elizabeth Howell, 2013). In addition, the outer core begins at a depth of 2550 km while a deepest

borehole ever dug has reached 12 Km at Kola Superdeep Borehole by Russian scientific project in 1989 (Yevgeny Kozlovsky, 5).

Thus, it can be argued that Roger's Eco-fiction did not succeed in constructing a plausible disaster plot, for *The Core* cannot market the notion that an improvised 'terranaunt' vehicle assembled in the garden of undistinguished scientists is able to resist the conditions of an imperil mission to the outer core of the earth. In comparison with the exaggerated events of *The Day After Tomorrow* and the feeble plot in *Toxic Skies*; the excessive scientific mistakes that characterize *The Core* do not make it objective in terms of presenting potent plot for a better Geo-engineering comprehension as much as its concern for addressing an entertaining story. By analyzing the plots of the aforesaid Eco-fiction works, one can come across different shortcomings in presenting Eco-fiction for the aim at confronting the profit-driven systems and the economic modes of practices that may lead to such environmental problems.

To reason out the problem, it can be easily inferred that unlike many environmental novels, most of the authors and producers of the digital media works aim to exploit environmental topics as a source of profit. Chris Palmer argues that there is nothing to believe that most of the relevant films have the profound impact (Palmer 2002). That is, the exaggerated thrill and the steering away from the scientific fundamentals in addressing these topics lose any environmental fiction its moral credibility or the required impact in developing environmental sense as a dominant culture. This could be explained since the material gain without taking notice of the destruction of nature, or to the destabilization of ecosystem will be reflected passively on the social and economic structures, as is happening today in many parts of the world.

However, the implications of these Eco-fiction works possess an important foundation to describe in an accurate depiction the impacts of any environmental decline on survival; so that the recognition for the necessity to keep the ecosystem does not fade away. Moreover, including these apocalyptic themes ensures fertile area upon which a merging of natural sciences and literature may flourish. These notions highlight one of the reasons why it is necessary to think constructively and develop a literary vision that blends the

understanding of scientific advancement with the aim of addressing the mysteries of nature and the extent to which people are connecting to it.

During the last years, the media industry has paid more attention to the quality of the Eco-fiction content and scripts and focused on important issues like the depletion of fossils fuel, oil spill, protectorates and Geo-engineering scenarios of relevance. In this regard, the Environmental Film Festivals premiered many environmental films including Sam Bozzo's *Blue Gold: World Water Wars* in 2008, the award-winning for the best environmental film from Vancouver International Film Festival. The film discusses the issue of water scarcity, which will eventually trigger conflicts between the countries.

The widely known actor Leonardo DiCaprio produced *The 11th Hour* in 2007; its title presumes that life in this world is running out of time and that the last opportunity to change people's lifestyle has to be seized before the climate gets changed. The film explores the anthropogenic impacts on the environmental change and how these changes destabilize the ecological balance. While in 2016, DiCaprio produced *Before the Flood* that takes up relevant ideas like the depletion of earth's resources and the seriousness of this issue on the struggle outcomes between man and his environment. Indeed, the Eco-critics as the other people at all levels have to hold a truce between the humans and their environment so as to regain the lost natural balance marred by man-made activities.

The gap seems so clear between the stage of knowledge and the stage of taking practical steps and as Chris Palmer who makes clear that after the completion of the film, there is still half of the job not accomplished yet (Palmer, 2002). To that end, the people need new stories do not restrict only on issues of survival, but also to direct the humans' ingenuity for making the surrounding world more beautiful. This attitude emerges from the same approaches that Rachel Carson and *Greenpeace* used to tell; it is that a collective action can make that world better. This is why, the duty of Eco-fiction writers is to enlighten people on ways of thinking concerning the nature-culture issues and expose how to comply with these responsibilities.



At last, humans spent most of their history to secure their life against the horrors of nature and went but lately to protect the environment from the devastating effects of industrial activities when they realized that the ecosystem is getting close to an apocalyptic zero-point. By far, life style has changed when relied on fossils fuel in industry that started to warn of a disruption in the ecological balance. In his introductory part of "Life After the Oil Crash," the critic Matt Savinar argues that most of the scientists, scholars and thinkers are almost certain that the civilizational development is falling down as long as the actual reliance on energy is linked by a transient fuel like the oil (Savinar, 2005). This understanding comes in line with Arthur C. Clarke and Isaac Asimov who argue that "Humanity's overconsumption of natural resources would lead to its inevitable demise" (qtd. in Chris Baratta, 4).

By this line of reasoning, and the fact that there is no other planet to resort to, the world is witnessing a moment of clarity that inspires the socio- economic and political attitudes to consider this new reality; it is not a debate about the extent of which Geo-engineering efficacy may offer, but at heart, a debate over the kind of world it is needed to shape at the end of this Holocene Era. In the light of the aforesaid, and the fact that environmental narratives have the ability just as the other genres of literature to influence both their connotations and audience; the next chapter is a quest to provide some insight into understanding the manner on which the reliance on oil and the pro-carbon attitudes are viewed in literary narratives.

### 3 GEOSCIENCE AND ECO-FICTION

#### 3.1 Eco-Fiction And Peak Oil Relevance

This chapter will open up into the consideration of Eco-apocalyptic themes implied in literature by reviewing of Michael Crichton's *State of Fear* with its refutation about the climate change and its anticipation about the Holocene Era. In addition, it touches on Alex Scarrow's *Last Light* in its warning of the depletion of oil reserves that confront both the societies and civilization under the patronage of the pro-carbon era. Published in the wake of the globalizing markets that followed the fall of Berlin Wall, the two novels are positioned to directly engage controversial viewpoints that have cropped up as a result of the unintentional shift in humans' environment.

The approaches in *State of Fear* and *Last Light* imply kind of contradicted attitudes regarding the iconic peak oil production and how to keep up with the impacts of such a short-lived source of energy. For sure, other Eco-fiction works that came to light during the same period of time like James Kunstler's *World Made By Hand*, Emmerich's *The Day After Tomorrow*, John Roger's *The Core*, and Andrew Erin's *Toxic Skies* expose the extent to which themes with reference to the environmental challenges and sustainability are taking place in the cultural views of the 21<sup>st</sup> century. On account of that, there is a need to spotlight the relevance of the aforesaid fiction works to the gases emitter fuel as the main cause of the environmental retrograde that became more evident recently.

The cold war has shown what it looks like a triumph of free-market capitalism, and in a sense, regression of the environmental concern. The American novelist Benjamin Kunkel brings to light this connection when he explains that since the beginning of the nineties, the increase reliance on oil as a cheap fuel has accelerated the emergence of climate change phenomenon (Kunkel, 89- 98). It can be presumed that features of environmental change are closely linked to gases emitting reasons since it is generally known that burning fossils fuel

would release different gases to the atmosphere that seriously affect health, safety and the environment. In all respects, the idea of falling down the civilization is closely connected with the peak oil production in addition to the other unsustainable resources as it acknowledged by many scholars and thinkers like Arthur C. Clarke, Isaac Asimov and Matt Savinar.

As an oil expert, King Hubbert noticed that in a given site over time, the production rate from oil wells reaches to a maximum level, after which the production curve gradually falls down. His remarks have been scientifically approved and turned later to be Hubbert's theory and a denotation of what is commonly called Peak oil (Hubbert, 57). It is by the 1920s, the oil entered a new era of power and control in the history of humanity when the French P. M. George Clemenceau stated that "every drop of oil secured to us saves us a drop of human blood" (qtd. in Dimitris Chorafas, 39). On that account, the rates of Oil reserves that have formed over millions of years will inevitably drift to depletion within just a few decades. Oil experts can estimate the approximate time period within which oil will be available to mankind. This fact motivates scholars to raise questions about whether it is possible to change people's lifestyle that rely on energy overconsumption in many industrial countries.

The question that comes to mind is – from which perspective Eco-fiction has to depict the oil-based civilizations? The answer, it seems, lies in the dangers posed by the industrial modes and practices that cast doubt on the looming post-petroleum era. It is really obvious that James Kunstler's *World Made by Hand* brings up themes related to the post-petroleum world in an analogy to the pre-development periods when the people used to depend on agriculture and barter as a form of trade, in addition to the hints that climate change is taking place in an unprecedented way.

The evidences indicate that the course of civilization may come to an end if the strategic reserve of oil is depleted. On that account, the thesis foreshadows similar implications as in Alex Scarrow's *Last Light* (2007) and brings out themes of relevance to the iconic peak oil and the pro-carbon approaches. These attitudes started to warn of apocalyptic scenes that may occur at the global scale due to the exploitation of fossils fuel as the main source of energy at the present time. Others on the contrary see in scaling down the reliance on oil at the

present time as opening a gate to petro-apocalypse episode. Hence, it is significant to highlight fiction works in which the Hard-science is utilized to convey different perspectives as in Michael Crichton's *State of Fear* (2004) that comes in close contact with themes of relevance to the end of Holocene.

### 3.1.1 State of fear

Michael Crichton's *State of Fear* is an Eco-fiction based on Hard-science. Like *The Day After Tomorrow*, the novel addresses facts and controversies when it depicts the general attitudes as media side the hardliners against any change of thoughts. *State of Fear* stands for the fictional complexity; that is to say, the author uses lots of scientific conceptions and information that go along with the novel. In the introductory part, Crichton's regards his book as a fiction, and that "references to real people, institutions, and organizations that are documented in footnotes are accurate. Footnotes are real" (SF, 39). The author brings up significant issues that started to emerge at the beginning of the 21st century, including the dichotomy of scientific facts and the dissenting approaches.

*State of Fear* demonstrates contrasted Eco-centric attitudes and focuses on the role of media campaigns that plot certain environmental reality to collect the donors' cash. The setting in *State of Fear* extends to different places across the world. The antagonist Nicholas Drake presides over an organization called National Environmental Resource Fund (NERF) and involves secretly with group of terrorist-scientists in a plot to raise misguided notions about the climate change.

Assuming that Drake wanted the tidal wave to hit on the last day of the conference, he would surely want it to happen during the morning. That would provide the most visible disaster. And it would allow the whole afternoon for discussion and media interviews afterward. (SF, 501)

Hence, Drake's group conspires to trigger a series of apparently environmental catastrophes range from the American southwest to the coast of California. Thereby, they can deceive the public and implant the idea that similar natural phenomena may occur as a result of the adverse causes of greenhouse gases effects. In addition, to institute a kind of ruling system controlled by untruthful

environmentalists when they appear to be the true scientists who seek to preserve the equilibrium of the earth.

The protagonist Peter Evans works as a legal advisor for George Morton; a well-off and charitable man who is naively financing the National Environmental Resource Fund (NERF). Vested with the Pacific Island Nation of Vanutu, the organization prepares a lawsuit, alleging that the irresponsible environmental policies of U.S. stand behind the rise of the sea level that jeopardizes the island. The other adversary to the villain Drake is Dr. John Kenner, a Geo-engineering expert works as a secret agent for the government.

Fortunately, the legal advisor becomes a hero against his will, through waging a fierce war with Kenner on the wicked environmentalists of NERF when they find out a considerable manipulation of science for Drake's profitability. After discovering Drake's scheme, Evans and Kenner work to prevent a series of unnatural but intentional Eco-disasters from taking place in Arizona, New Guinea, and even in Antarctica when the Eco-terrorist group tows a giant block of ice to create a pseudo-reality about the global warming and spread out fears; thus, being able to blackmail the others and strip off more money.

The connotation meaning in *State of fear* may refer to a kind of Eco-phobia that has no geographic boundaries when the storms, tsunamis or any environmental disaster extend over the whole countries. However, it could also be a reference to the dictatorship ruling systems that exist in many countries (Moony, 2004). As an Eco-fiction that explores the field of climatic catastrophes, it is obvious that Crichton is questioning several controversial concepts on which the hypothesis of global warming is based up on. Through the novel characters, the author supports his notions with scientific conceptions, Bar Charts and Graphs to disprove adversary approaches of relevance.

Speaking through *State of Fear* characters, the author seems to take issue with the approaches that warn of natural disasters may take place as a result of the immoderation of global temperatures over the long run. Crichton's novel is likely to claim that the idea of a climate change as a result of humans' activities is unproven and it a matter of magnified notions arose for certain purposes. In the author's note, Crichton explains that the world is witnessing a kind of

“natural warming trend that began about 1850” (SF, 545). Hence, Crichton’s novel depicts the villains as Eco-terrorists who plot to generate catastrophic changes in climate for utilitarian reasons, while the protagonists seek to stop these unnatural catastrophes across the world.

The Eco-fiction has shown to the people that the idea of global warming is still open to debate issue. Thus, it sparked a wide-scale debate between many scientists as they lifted up their voices, for some to denounce the approach of global warming and for others to uphold. In his "Author's Message," Crichton defended on his account and spoke of many scientific issues and concepts of a real controversy so that people can contribute in the debate and get acquainted with wide scope of relevant hypotheses (SF, 545). On account of that, Crichton uses unreserved prose and depends on content to convey certain viewpoints and conceptions. This kind of writing style may serve the Eco-centric stories and narratives when the constructed conceptions and hypotheses consolidate the plot. To discuss briefly the Eco-centric approach in Crichton’s novel, it should be mentioned some of its controversial points from environmentalist and scientific perspective.

The author is likely to presume that the threat of global warming was fabricated when *State of Fear* publicizes the notion that similar phenomena are improbable in the near future, and that “in science, consensus is irrelevant” (SF, 31). That is, the Eco-fiction seems to make a case against the IPCC experts that assume a direct relationship between the global warming and the increasing levels of carbon dioxides in the atmosphere (IPCC, 2007). An example of that can be deduced from a dialogue conducted between Evans and one of Drake’s advocates who illustrates, “Now I want to direct your attention to the period from 1940 to 1970. . . . During that period the global temperature actually went down” (SF, 86). In other words, the character raises doubts as to whether carbon dioxides levels are posing a real threat or not when she points out to a graph that shows an inverse relationship between the global mean levels of carbon dioxides and the temperature during certain period of time.

According to *State of Fear* assumption, there are no signs of melting state in Antarctica, and that it could be part of the environmentalist’s imagination. From the beginning, Evans brings into view this ‘anti-global warming’ opinion when

he expresses a skeptical attitude about the shrinkage of ice blocks in Antarctica. This idea is presented through Dr. Einarsson; one of the characters when he states that “in fact we are observing local climate patterns that are rather specific to Iceland and are unlikely to be related to any global pattern” (SF,78). Later on, the lawyer starts to show this attitude openly, even he mocks at this information and says, “Come on, guys. Antarctica is melting.”(SF, 196)

Crichton’s attitude can be also perceived through the discussion that takes place between Drake and Henley, the head of Public relations for NERF who underestimates the allegations about the global warming by depicting the advocates of such ideas as obsessed scientists. During this conversation Henley replies, “Back in the 1970s, all the climate scientists believed an ice age was coming. . . . But once the notion of global warming was raised, they immediately recognized the advantages” (SF, 323). However, many scientific reports within them John Roach’s “Kilimanjaro’s Snows Gone by 2022?” indicate that glaciers in Kilimanjaro Mountains which are mentioned in *State of Fear* are going to disappear within a few years (Roach, 2009).

Through his novel, the author’s opinion about Kilimanjaro Mountains comes in contradictory to what Carl Franzen, the Editor of *The Verge* sees in his “Arctic will be basically ice-free by summer 2050, NOAA study says” (Franzen, 2013). This is why, in a conversation with one of Drake's fellow travelers, Kenner tries to disapprove these assumptions and regard the information about melting the mountain of Kilimanjaro as too old.

Kilimanjaro has been rapidly melting since the 1800s—long before global warming. . . . Kilimanjaro is an equatorial volcano. . . . Satellite measurements of that region show no warming trend at the altitude of the Kilimanjaro glacier. So why is it melting? (SF, 423)

For sure nature scientists and the advocates of both sides of *State of Fear* as the other experts cannot predict the future, and that further studies are needed to scientifically approve the reasons behind the global warming and whether it is restricted on certain spots or extends to affect the entire ecosystem of the earth. At this point, Crichton notes that no one can predict the futuristic warming trends (SF, 545). Likewise, the climate scientist Ana Bastos confirms this fact

when she argues, “Weather patterns can be notoriously unpredictable” (qtd. in Sarah Gibbens, 2017). Nevertheless, it does not preclude taking measures to reduce the emitted gases and avoid any probable effects of burning fossil fuel since the opportunity is still at hand.

Within the other debated points raised by *State of Fear* is that carbon dioxide and fossil fuel are not responsible for the environmental change on a global scale. The novel disregards the hypothesis that Greenhouse phenomenon which came to light mostly as a result of human activities has been widely accepted. This intention can be inferred when the characters try to refute the notions about the effects of emitted gases by driving the attention to the collected data from particular stations about the Land Use Temperature or what is called Urban Heat Island Effect (UHI) as an indicator of any rise in temperature (SF, 370).

The idea of Land Use Temperature has come to mind firstly by one of Evans' counselors during their defense preparation on Vanutu lawsuit, which is made by the “Pacific island nation of Vanutu against the Environmental Protection Agency of the United States over global warming” (SF, 16). In this context, the counselor pushes for the Land Use assumption by saying that “one of the issues we’re trying to address concerns how surface temperatures change with land use” (SF, 88). In the author’s note, Crichton asserts this notion when he states, “I suspect that the principal human effect will come from land use, and that the atmospheric component will be minor.” Crichton adds that no one knows the extent to which this warming trend can be natural or to be attributed to man-made reasons (SF, 545).

To react to the Land Use assumption, it is important to point out to IPCC report in 2001 which shows that UHI effects did not contribute more than six percent of the average rise in temperature trends (IPCC, 2007). As a deduction, it is difficult to generalize a conclusion through collecting data from particular stations because each one will be subjected to local effects. This variance can be eliminated by averaging collected data from different spots of the earth. Yet, the effect of UHI according to IPCC is still relative in comparison with the increasing rates of carbon dioxides in the atmosphere, which is referred to as the Greenhouse phenomenon.



According to Julian Lincoln Simon's *Hoodwinking the Nation*, the skeptical attitude about climate change in *State of Fear* sends a message that the threat of global warming, pollution and the depletion of natural resources are in need to be disregarded by media and the public (Simon, 31). This attitude is plainly perceived within the context of the authors' three speeches and commentaries that are annexed to the novel when he mentions that "Some of the demons that haunt our world in recent years are invented by scientists. The world has not benefited from permitting these demons to escape" (SF, 27).

At several points in *State of Fear*, and then again in its subsequent conclusion, one of the characters comes across the subject of DDT and contradicts the public opinion; arguing that banning these chemicals in tropical developing countries led to the fall of deaths from malaria and other viruses that transmit by mosquitoes.

Since the ban, two million people a year have died unnecessarily from malaria. . . . All together, the ban has caused more than fifty million needless deaths. Banning DDT killed more people than Hitler. (SF, 487)

It is obvious that the character finds fault with banning pesticides, in addition, he discloses the author's anti-environmentalist attitude when he concludes that "the environmental movement pushed hard for it" (SF, 487). In response to these approaches, the *Pesticide Action Network-North America* stands up for what Crichton's adversaries believe when it cites, "many DDT promoters are also in the business of denying climate change" (PAN, 2017).

In any case, no one can ignore the fatal impacts of pesticides on both the humans and their surroundings. In Alan Taylor's "Bhopal: The World's Worst Industrial Disaster," Union Carbide Corporation, which produces pesticides accounted for the death of more than 3,800 people and 16,000 thousands injuries in India thirty years ago, in addition, these chemicals caused the birth defects and contamination of drinking water as a result of the leakage that occurred at the factory site (Taylor, 2014).

Other opinions that disagree with the environmental scientists of IPCC on the subject of global warming can be perceived in Ted Nordhaus and Michael

Shellenberger's *Break Through: From the Death of Environmentalism to the Politics of Possibility* when they state, "What environmentalists misunderstood about Crichton is that he is motivated not by anti-environmentalism per se, but rather by scientific contrarianism" (Nordhaus, 139). The authors assume that if Carson argues for ecology and the precautionary principle, *State of Fear* stresses that climate change is an open to doubt issue, besides, the novel appreciates the technological advancement, and this is "*Why We Can't Leave Saving the Planet to Environmentalists*" (139).

In a sense, it can be deduced that many opinions agree with Nordhaus and Shellenberger's opinions since most of the scientific notions raised in *State of Fear* are subjects for further discussions and debates. Myanna Lahsen goes in line with this attitude in her "Technocracy" that considers the novel as it addresses contemporary issues like the effects of institutions and scientific bodies in formalizing the public opinion (Lahsen, 156). In a soliloquy, Kenner exposes this view when he sheds light on how the order and authority are maintained. The character proclaims that the ruling systems try to keep the people in a constant *State of Fear* and mentions the "military-industrial complex" as an example:

Citizens of the West believed their nation-states were dominated by something called the military-industrial complex. . . . For the last fifteen years we have been under the control of an entirely new complex. . . . I call it the politico-legal-media complex. The PLM. And it is dedicated to promoting fear in the population—under the guise of promoting safety. (SF, 456)

Kenner also refers to the term 'politico-legal-media' as a reference to a complex of the prominent class in their societies in which the ruling system is depending on. Drake seems well acquainted with the power of this (PLM) complex when he delivers an after dinner-speech before an elite group at Mark Hopkins Hotel.

Through his speech, Drake tries to generate fear in the souls from the disrupted weather and the impending disasters by drawing the attention to a possibility of an 'abrupt climate change' may take place anywhere of Caribbean coast.

Our sea levels are rising—twenty-five feet in the next century. . . .  
New scientific evidence points to the specter of abrupt climate change.  
. . . In short, ladies and gentlemen, we are confronted by a genuine  
global catastrophe for our planet.” (SF, 126)

It can be argued, however, that, *State of Fear* clearly shows that scientists as the politicians and decision makers may use all the possible tools to defend personal interests. This attitude can be perceived in the annexed part that contains Crichton’s essays and commentaries that foreshadow the risks of "politicized science" (SF, 11).

Crichton illustrates that many scientific bodies and institutions work as a complex of politico-legal-media in line with the “military-industrial complex” to maintain a *State of Fear* through changing the certain facts in response to the financial-driven interests and the political pressures. At the end of his book, Crichton makes clear that the consequences of most Eco-centric attitudes may be in preserving the economic advantages of the West and thus establish modern imperialism (SF, 546). This is why Lahsen considers that Crichton is one of those who oppose the idea of global change and “celebrate high-profile skeptical scientists as innovators daring to speak truth to tyranny of political correctness” (Lahsen, 156).

Aside from the contradictory opinions on *State of Fear* scientific approach, it can be argued that as an Eco-fiction, it arouses common sense on concepts of relevance to Ecology, Geology and the natural phenomena in an entertaining way. At this point, many scholars and critics regard Crichton’s novel as “Alarmism,” as in Walter Donway’s “State of Fear’ by Michael Crichton Could Be the ‘1984’ of Climate Alarmism,” that considers it “the most scientifically literate and technologically brilliant” (Donway, 2016). With regard to this attitude, the president of the American Association of Petroleum Geologists (AAPG) proclaimed that the Executive Committee decided to grant a Journalism Award to Crichton as an acknowledgment for his contribution to a better understanding of geology (Peter Rose, 2006).

The Award raises doubts as to whether its goal is to add a kind of legitimacy to actions may inflict damage upon the environment as in the petrochemical

companies, refineries and the oil prospecting in certain regions of Alaska, North Dakota and in many other places of the world. According to Julie Brigham's "Petroleum Geologists' Award to Novelist Crichton Is Inappropriate," the objections spring from the allegation that the novel gives a misconstrued notion about the global warming (Brigham, 2006). In addition to the extent Crichton is using his fame to push certain views on the climate change and its consequences into a scientific debate.

Brigham considers that Crichton is mixing between the science and illusion through his novel, by using it as a starting point to change the certainties, and that AAPG seems to be moving in accordance with this trend (Brigham, 2006). In a sense, scientific viewpoints from AAPG admit that similar accusations need to be disproved. This can be inferred from Richard Fritz's "Courtesy Communicates Best," that addresses a conservative message to the executive council. In his article, Fritz suggests changing the name of their Award since it "was viewed by some members as a statement by AAPG that we do not believe in the concept of global warming" (Fritz, 2006). In response to the attitude, the Executive Committee acknowledged that as a Journalism Award, it "was poorly named" and recommended in his "President Reflects On Past Fiscal Year" to change it to "Geosciences in the Media Award" (Peter Rose, 2006).

Within the commentaries of the Author's message what resonates with the response of AAPG when Crichton states, "I have more respect for people who change their views after acquiring new information than for those who cling to views they held thirty years ago" (SF, 571 ). Hence, being wrong in a case like *State of Fear* is not the end of the road; for, the executive director explained openly that most of AAPG members admit that the Global warming is real. This is why the Award was not a policy statement of the Association in defense of Crichton's scientific view as much as a recognition for his efforts to get Eco-centric concepts into a public debate.

The controversy over *State of Fear* is not a matter of making misrepresentations against certain thoughts and ideas here, but rather, it is a struggle for presenting scientific views and different attitudes regarding the existing ecosystem. In his "State of fear or state of oblivion?" Peter Ricketts argues that literary works like *State of Fear* have great influence on the people's minds and behaviors; this

is why, “as scientists we must look at how we can communicate our knowledge, expertise and insights to broader community, and not just to our academic and scientific peers” (Ricketts, 2).

In conclusion, *State of Fear* takes its place within the line of opposition to the certain environmental conceptions that started to publicize during the last two decades. The novel has been met, to some extent, with disapproval especially from many environmentalists’ viewpoint; however, using scientific conceptions with reference to the fossils fuel in this novel shows how profound the impact of scientific themes on contemporary literature. It can be argued that demonstrating the scientific-literature dichotomy has the potential to present facts with a more sensitive perspective to the humans-nature relationship, in particular, to distance any possible retreat of civilization and human ingenuity in the absence of practicable visions about the sustainability.

### **3.1.2 Last light**

In view of the fact that fossils fuel is the propellant energy of many civilizations and without it, lots of cities around the world could be hardly recognizable, the world has to seize the opportunity of scientific advancement and re-imagine itself before the era of oil comes to an end. The central question in this thesis is whether the Eco-fiction works are potent to depict the far-reaching consequences of peak oil policies that started to affect both the earth ecosystem and civilization. It is important in this regard to evaluate selected Eco-fiction that foreshadows a depletion of oil reserve as the initial sign to a post-technological age. Significantly, literary works that started to emerge during the last two decades like Alex Scarrow’s *Last Light* (2007) takes this position when it demonstrates the far-reaching consequences of depleting the oil reserves as the initial signs to a post-technological age since the science and reason dogmatize that themes with relevance peak oil are inevitable within the next decades.

Published in the wake of the political alterations that are taking place in the Middle East region since the beginning of the 21<sup>st</sup> century, the premise in Alex Scarrow’s novel suggests apocalyptic situation occurs within one week - during this short period of time, the world witnesses a global oil crisis. The

catastrophic events are seen from the eyes of an oil expert, his family, and the British government. From the first day, simultaneous attacks take place in several major oil centers that immobilize all the activities linked to oil production from all around the world. The people do not know what is going on or to what extent it is worse, thinking that the situations will go back to normal in few days. As precautionary procedures, the authorities recommend the British prime minister to declare the state of emergency, besides taking immediate measures within them calling off the public transportations and civil aviation.

Although the scenario of *Last Light* is exciting, people find within its themes a disastrous fate when the ruling systems do not take into consideration the social consequences of a sudden shortage in oil reserve in the absence of alternative source of energy. According to Frank Kaminski, the evocative title of Scarrow's novel is a denotation to the last moments before the electricity goes off, however, it serves as a connotation to the cruel or unkind world (Kaminski, 2008). The events of the novel unfold between the Middle East and England when some terrorist groups deliberately conduct a full-scale attack against the oil stations so as to halt any supply to the west.

From the snippets they were picking up from the BBC World Service and the more detailed reports coming from local stations. . . . It seemed as if the unrest that had started first thing this morning in Riyadh had spread right across the Arabian peninsula. (LL, 42)

*Last Light* introduces the protagonist Andy Sutherland as petroleum Engineer who is sent in an assignment to the Middle East with a group of western contractors. The passage has enough references to indicate that it took place recently due to the unrest that afflicted this unstable area recently.

The predicament begins when Andy comes upon intentional violence acts conducted in several countries and started to imperil the oil infrastructure of the whole region.

With the troubles rapidly destabilising Saudi Arabia, the world had just lost the regular supply of somewhere between a quarter and a third of its daily oil needs. . . . 'Who're you calling?' asked Mike.

'I'm phoning home,' Andy replied. (LL, 33)

Amid the escalation of riot acts that extend within days to afflict England as a result of the fuel deficiency, the protagonist struggles to make his way out the Middle East and join the family.

For their part, the Sutherlands pass through severe consequences of this global disturbance, while an assassin hunts the family members because of what the father might unveil about the identity of the Eco-terrorists and the real reason behind this large-scale panic; thus, the terrorists are ready to silence anyone to keep their secrets.

‘I nearly had the target. But someone warned her at the last moment.’

‘Yes. We know this. She received a call from her father. He now suspects we may be after her.’

‘That makes things a little more difficult.’ (LL, 99)

Having those anonymous assassin characters in the fiction, coupled with their multinational terrorists’ network and the full-scale attack they conduct in the Middle East may imply a kind of conspiracy theory according to the author’s vision.

Scarrow’s novel does not emphasize on the technical problems when the rates of oil reserves decline due to the policy of peak oil production; rather, on the social consequences of any halt in fuel supplies that could be catastrophic. For instance, the Author exposes through the contention of the protagonist Andy and his family members to reconnect how the society is disintegrating in such crises, and how ordinary people like the Sutherlands find it is difficult to accept that the societal norms they were brought up by no longer exist. At this point, the author describes the astonishment of Andy’s daughter Leona who casts a critical eye on the scenes of disorder when she cites:

It was clear it had been looted; windows were smashed, shopping trolleys and hand baskets were tangled everywhere and the ground was covered with discarded packaging, cardboard boxes, spilled, crushed and spoiled food. (LL, 188)

At this part, the author makes another reference to the lawless and looting acts that take place everywhere. Daniel and his girlfriend try to shelter themselves

when they find themselves alone at one of the abandoned but cleared out buildings. Here, Daniel seems to be astonished of what happens to the city, he turns to Leona and says, “It’s been totally cleared out,” said Dan quietly. “This is so-o-o like that New Orleans Katrina thing” (LL, 188). That is, the scenario in *Last Light* is apocalyptic in such a way that its central premise exemplifies how the communities’ norms and lifestyle are starting to fade away when the electricity, fuel and water supply come to a halt, leading to the escalation of rioted events everywhere.

The protagonist fails at the beginning to convince the others about the extent to which the issue of peak oil production is disastrous and how they have to build up enough supply of edible matters, water and a convenient place to shelter when necessary.

‘Listen sweetheart, I’d like you to go home to London, right now.’

‘What?’

‘Leona . . . I’m asking you!’ he replied, his voice beginning to develop that tone; the one that ultimately. led to a bollocking if you pushed him hard enough. (LL, 36)

Yet, Leona and her mother Jenny are, somehow, in a better position to control their reactions, even amid extraordinary situations.

At Norwich, a conversation takes place between Leona and her new boyfriend Daniel who looks up unrealized to the consequences of such an unprecedented accident. From the first while, Daniel starts to inquire about what could happen in the aftermath when he asks, “We’re suddenly going to run out of electricity or something?” asked Daniel, . . . ‘Yeah,’ she replied, ‘I think that’s what’ll happen” (LL, 94). Hence, the plot in *Last Light* is about the emergence of a wide-scale crisis of oil when a terrorist group holds the global sources of fuel hostage and not a result of the depletion of oil formations at the long run as Andy used to foreshadow. However, the Sutherlands look more than the others to grasp the immense of the crisis and better to deal with it when it starts.

Likewise, in several scenes, as the riot and lawless acts spread out dangerously and the situations get worsened, the novel characters keep mention, “this can’t happen here,” as in the conducted dialogue between Leona and her boyfriend



Daniel when she state, “I know. You just don’t think that would happen here, you know, until it does” (LL, 187). Moreover, Scarrow uses the word ‘Apocalypse’ repeatedly to indicate that themes with relevance to the iconic Peak oil production could be catastrophic in a manner may resemble the scenes in *The Day After Tomorrow* or the other zombie movies. Meanwhile, Andy’s wife Jenny seems to be “half-expecting“ when she tries her best to survive the lawless acts that pose a threat to everyone.

Jenny twisted in her seat and studied the pavilion anxiously, half-expecting a swarm of people to suddenly emerge from it and charge them down, hell-bent on pulling them out of the car and ripping their throats out. My God, doesn’t this feel just like that . . . Like one of those crazy zombie movies? (LL, 242)

Despite the fact that the central character knows previously what the shortage of oil might bring about, but she does not imagine the extent to which the disorder is reaching to when the government fails to take similar alerts seriously or impose order. As a response to this failure, Jenny looks very much frustrated when she states, “My God, this is how it is after only four days’ (LL, 242).

Through *Last Light*, Scarrow tries to make analogy between the oil-powered economy during the last two centuries and the so called ‘Roman slave economy’ during the old ages when people became used to manage their daily affairs easily as if they have slaves to do the jobs for them. This sense is noticed during a talk about how Jenny’s husband sees this crisis, she replies:

He said oil was like the twentieth-century version of the Roman slave economy. We’ve grown used to having it. . . . It makes power, it’s used to fertilise crops, in pesticides, to make medicines, every kind of plastic. . . . basically we use oil in absolutely everything. (LL, 218)

Similar notions can be inferred from James H. Kunstler’s *World Made By Hand*. Kunstler’s novel visualizes the social life in the aftermath of a global war that wipes out tens of major cities and turns the world into a Post-technological age. Likewise, Scarrow wrote his *Afterlight* which goes in line with *World Made By Hand* in imagining how the world looks like and how the people cope with a

post-petroleum era. *Afterlight* depicts the old modes of life go back when the flow of fossil fuel that keeps the modern life stops once and for all.

Amid the intensifying crises of lawless acts, murder and rape that start to spread out in Jenny's city, some of the characters seem to be convinced that the oil supply will be resumed once again and that "things will get back to normal soon," However, Jenny's opinion sounds different. The central character believes that the global economies will descend rapidly and there will be no turning back.

'Who says things will go back to normal?'

'Of course they will,' he replied, 'things always right themselves.'

'I think things will be different after this.'

'Yeah? How do you mean?'

'I don't know . . . I just think . . . well, there's something my husband Andy used to say.' (LL, 218)

Jenny remains on her opinion that things will not be the same as before, and this is evident through the words of Jenny at the end of the novel and after the death of her husband when she states, "Oil lines were being fixed and a trickle of oil was getting through. But things were too broken, too messed up," since many things can be retrieved at this world except the death of the dearest ones which cannot be compensated (LL, 340).

Jenny's opinion seems to be in contrary to what the terrorists view because they do not care about the lives of others but their interests. This fact can easily be inferred through the conversation that takes place between Andy and the terrorist before they kill each other. Before the fight gets started, the assassin threatens to kill Leona and says, "I really don't give a shit about her life. I've killed much younger, much more innocent victims" (LL, 336). This is why the assassin does not seem to be concerned about the losses in lives or the magnitude of damage caused by their terrorist act. That is, the killer believes that oil will be re-pumped and "things will get back to normal soon" if the goals are achieved when he says, "They will ensure the oil flows again, when the time's right" (LL, 335).

Although the oil supply comes to a halt in *Last Light* as a result of subversive reasons, peak oil policies may trigger similar themes. According to Matt Savinar, the yearly global demand for oil is soaring in proportion to the rates of production (Savinar, 1). As a result, the prices will rise dramatically; leading to the collapse of many countries that rely on oil in industry. Savinar considers that a deficiency of about 10 to 15 percent between the supply and demand would be enough to destroy the economies of many countries. He concludes that these crises will trigger wars over the natural resources (Savinar, 1). The critic's statement can be seen as a reference to the Japanese air forces that bombed the US fleet stationed at Pearl Harbor after the imposition of oil embargo on Japan by US President Franklin D. Roosevelt during the World War II (Stephen Carlson, 2014). Another reference is inferred from the expansion of Hitler's army to the east during Barbarossa military operation for the aim at controlling the oil fields in Baku (Robert Kirchubel, 2013).

Consequently, the novel portrays in a disastrous manner the fragility of the oil-based civilization, in addition to its vulnerability to a sudden decline in any moment. In *Last Light*, Scarrow describes England as unprepared for such a critical situation, besides; the government does not take prompt measures to contain the situation at its time. This sense can be inferred during a belated meeting for the Prime Minister and his cabinet held at the Whitehall when one of the assembled members informs his boss that England has fuel reserves for no more than couple weeks.

‘Two weeks? That’s all we have in our strategic reserves?’

‘Our strategic reserves actually only contain about a week’s worth of oil at normal everyday consumption rates,’ replied Malcolm Jones, the Prime Minister’s Strategic Advisor, and confidant. (LL, 49)

In response to this straitened attitude, the Prime Minister agrees to set up food and fuel ration, impose road closures and curfew, in addition to withdraw the armed forces from some spots of the world and enforce the immediate martial laws at the major cities.

The Prime Minister has to give reasons for withdrawing his armed forces from some of the Middle East countries in addition to the other measures he takes. In

a delivered speech, the prime minister tries to justify all the measures he takes as precautionary procedures against any terrorist threat may take place, and not in response to the sudden shortage of fuel.

His appalling naivety yesterday, in attempting to appeal to some nebulous notion of a nascent Dunkirk spirit, had successfully thrown the country into a premature state of chaos. (LL, 192)

According to one of Scarrow's character, the wave of panic and chaos that start to invade the city may take place when the people look unfamiliar with similar crises, thus, they don't value highly the too much information their Prime Minister exposes to the press and media.

In the light of such tense situation envisaged by *Last Light*, the Prime Minister desperately tries to arouse the sentiments in his citizens to call for the "spirit of Dunkirk" to overcome the difficult times they are passing through. The "spirit of Dunkirk" has become a denotation to being strong with the hard times and difficulties; a signifier to the civilian sailors and the British navy who participated side by side to conduct a mass-scale evacuation of the British troops and rescue them from the German siege in France during the World War II (Alice Palmer, 2016). This spirit of the brave sailors who gave escape for the British troops across the English Channel may also serve as a reminder message about the British attempts for securing a long journey of petroleum tankers across the sea to save the nation.

However, mentioning the city of Dunkirk in *Last Light* could also be a reference to the disintegration state of the governmental institutions and their lack of control. This impression can be easily inferred when the author points out through Andy's observation to the incoherent state of the military forces, which brings to mind the scenes of Dunkirk seventy seven years ago.

He could see soldiers streaming wearily out of military and civilian jets. . . . With so many men in uniform, looking lost, weary and confused, it was what the ports along the south coast of England must have looked like on the morning after Dunkirk. (LL, 188)

It can be understood that the weakness of regulatory situation and the lack of adequate preparedness in relation to any urgent situation such as the interruption

of fuel supplies can bring into light themes like what is presented in *Last Light*. In whatever manner, this reference shows how the wheel of technology is tied up to a few pipelines and tankers that extend from unstable and distant parts of the world.

It is clear that the Geological controversy about the serious impacts of the iconic peak oil on the continuity of civilization and the world of nature have provided much inspiration to fictional works like John Seymour's *Retrieved from the Future* (1996), Andreas Eschbach's *Ausgebrannt* (2007), James Howard Kunstler's *World Made by Hand* (2008) and Alex Scarrow's *Last Light* (2007) that can be regarded as kind of "cautionary" as much as "speculative" fiction works (Frank Kaminski, 2008). At this point, Scarrow refers in the author's note that he was surfing the internet and came across the peak oil issue at many web-sites and articles and especially Matt Savinar's "Life after the oil crash: Deal with Reality, or Reality will Deal with You" before he turns this issue into a fictional work (LL, 343 ).

According to Scarrow's, there is a great deal of debate among the geologists and the experts in petroleum industry about the amount of untapped oil in its formations. In the last part of the novel, Scarrow simplifies the idea of Peak oil to the readers when he states that Peak oil "refers to the point at which all the easy-to-extract oil has been sucked out of the ground leaving only the really hard to get to, very expensive to refine" (LL, 342). The most optimistic views according to Scarrow, is that the availability of oil reserves will not be sufficient for more than fifty or sixty years.

The notion about reducing the reliance on oil is clear in Scarrow's fiction when the author refers that despite the oil supply resumed, the Sutherland family ends up in a rural community trying to revive and learn the daily skills that used to be practiced for a long time before the oil age begins and this may be the case if the world does not take serious steps to switch to clean and sustainable alternatives of energy. Through Jenny, Andy's last addressed message is that the carbon age is over (LL, 340). On his part, the author characterizes the people as indifferent to this considerable issue when he considers that *Last Light* is about "how lazy and vulnerable we've allowed ourselves to become. How reliant on the system we are. How little responsibility we are prepared to take for our

actions, for ourselves, for our children” (LL, 342). This is why; Scarrow’s novel may highly assist in launching a quite warning about the consequences of the over-reliance of fossils fuel on the long run.

As a prophetic novel, it can be argued that *Last Light* is objectively concerned with a systematic shift from the existing but transient energy of fossils fuel to other sustainable means of power supplies. From this perspective, *Last Light* depicts the iconic peak oil as a serious challenge for the course of civilization and the world of nature as well. In her *New International Voices in Ecocriticism*, Oppermann states, "Fossils that are turned into oil are themselves a result of inconceivable and meaningless natural catastrophe" (121). Richard G. Miller and Steven R. Sorrell argue in their “The future of oil supply” that at the present time, there are currently oil policies that do not afflict harm of the environment, but the procedures and actions cannot be easily imposed on all the countries equally. This is why; the optimal use of oil in a way that does not destroy the environment poses a great challenge for most of the countries (Miller, 24).

Thematically, it is comprehended that both of *State of Fear* and *Last Light* have reference to the fall of civilization when they attribute the perils of ending the Holocene era to the environmental challenges and the lack of sustainable energy. In addition, they point out other reasons linked to terrorist attacks that may expose to danger the whole societies. As an example, through *Last Light*, Scarrow is successfully promoting for the diversification of energy choices including the fossils fuel when *Last Light* depicts the governments’ as unprepared to take precaution procedures, within them, keeping their essential oil reserves intact for the urgent cases. And despite the fact that *State of Fear* advocates for the expansion of oil industry, the themes and the considerable information it conveys could stir up the senses on many Eco-centric conceptions that are continuously being addressed within the scientific bodies like the importance to scale down the reliance on gases emitter fuel to reasonable levels. These approaches are significant, but perhaps the most significant scale to re-imagine the future is that of the communities and at an Intercultural dimension.

It becomes clear that through Eco-fiction works like *Last Light* and *State of Fear*, literary discourses could have an active engagement in the public debate

on the seriousness of issues like the depletion of oil and climate change. The real change on the ground requires the interaction of international platforms, media, press and websites to promote creative Eco-centric narratives and literary texts in movies since the audiovisual technologies are the most efficient way to address issues of environmental relevance. In this sense, Chris Palmer argues, “The public needs to know, and filmmakers have a responsibility to take on those issues. Conservation films can play an important role in producing an informed and active citizenry, which is what keeps our democracy thriving” (Palmer, 2002).

After all, the success of any literary work as the means of expressing scientific thoughts and ideas relies on its power to convince. Hence, the goal of this approach is, at heart, to show that literary works like *Last Light* and *State of Fear* can do so, thereby, they provide a clear vision about the necessities of life to encounter any impending scenario.

#### 4 CONCLUSION

During the latest decades, significant literary works that are correlated with maintaining the environmental balance and the depletion of oil reserve started to gain wide popularity amid serious challenges the world is facing today since the nature is one of the most important factors that affect the humans. This environmental equilibrium has shifted to be detrimental lately when the industrial progress turned to exploit the natural resources in irrational ways that led, in many cases, to ecological disasters and reflected directly on the lives of human beings.

The Eco-centric attitudes in literature that are correlated with themes of termination of existence or mass-destruction is not limited to the depletion of natural resources or the large-scale pollution and climate change, but extends to include many crises connected with geopolitical issues like the diminish of food, water, and the increase of world's population. However, the only way to explain the inattentiveness to ecology is that in the absence of factual fiction works to serve a purposeful and objective orientation, the extremeness in apocalyptic narratives will drive the people to a state of oversaturation or boredom as in the case of the electric car that seems to be killed in its cradle.

The indifference of people to significant topics such as the climate change, pollution and the extensive use of fossils fuel has turned these issues to mere utopian tales when the fiction writers' lack of scientific visions or a discreet plots to persuade. Therefore, the need to maintain a public opinion regarding momentous issues like Climate Change or the approaching Petro-Apocalypse puts pressure on contemporary writers to give the impression of being realistic. In other words, the fictional and non-fictional writers need to acquaint themselves with the sophistication of Geo-engineering conceptions to appear to be authentic as much as prophetic. That is, to present predictive analyses by visualizing what the world will be like if the modes of life couldn't cope with the upcoming change.



It can be understood that the feebleness to influence the communities environmentally will be reflected passively on the ability of the public opinion to pose far-reaching policies or at least, to direct the progress in science and technology to the public interest. To that end, there is a need to reconsider the sub-genre of Eco-fiction with reference that started to shape the contemporary narratives. Considerably, Eco-fiction has the potentiality to dramatize the actual impacts of any Petro-Apocalypse or the lack of necessary measures to preserve the ecology, so that people can take their active role when the radical change is required to address similar crises.

Consequently, the significance to be had in *Last Light* is that it is heavily “peak oiler” oriented. Through this novel, Scarrow portrays in a disastrous manner the fragility of societies, and their vulnerability to a sudden disintegration in any moment when the amount of oil reserves reaches to a turning point and the oil supply comes to halt. That is, *Last Light* addresses a warning message about the perils behind the extensive exploitation of natural resources and how close the fall of oil-based civilizations could be if the oil-production curves started to fall down in the absence of competent insight and strategy to switch to a renewable source of energy.

On the other hand, despite the fact that as an Eco-fiction, *State of Fear* aims at first to entertain, the brilliance of Crichton has made from his novel as a starting gate to educate and prompt critical thoughts about the relevance of Geosciences in any Eco-fiction work. By far, the novel serves to contemplate about themes of disrupting nature by technology and industrialism; considering that the novel is overwhelmed by debated scientific concepts with reference to the end of Holocene and the decline of ecosystem due to the carbon emitter fuel. Moreover, Crichton sheds light on the “politico-legal-media” as a reference to a complex of the prominent class in their societies, in which the ruling system is depending on to popularize twisted conceptions and impose certain approaches.

By analyzing apocalyptic themes with reference to Geosciences and the suggested solutions in selected Eco-centric literary works, the thesis supports the conclusion that having hard science in literary works would be influential to fictionalize the societal collapse and the looming environmental crises with regard to the overuse of fossil fuel. This approach could be of great help, if

associated, in addition to the objective narratives, a scenario planning that offers pragmatic endings and raise the awareness to attain the unanimous support; thereby, undermine the possibility of triggering apocalyptic scenes on a large scale and similar to what *State of Fear* and *Last Light* imply. On that account, this research emerges to evince that the different perspectives surrounding *State of Fear*, in addition to the premise in *Last Light* that demonstrates futuristic threats of depleting the oil reserves on societies may constitute a good paradigm of Eco-centric narratives.



## REFERENCES

- Abdurrahmani, T** “Eco-criticism and Nature Writing .The Trails of the American Approaches.” *European Journal of Social Sciences Education and Research*.Vol.2, No.1, Sept-Dec. 2014.
- Aldo, L** “The Role of Wildlife in a Liberal Education.” *The River of the Mother of God and Other*, ed. Susan L. Flader and J. Baird Callicott (Madison: University of Wisconsin Press, 1991): 301-305, 303; originally published in *Transactions of the 7th North American Wildlife Conference*, April 8-10, 1942 (Washington: Wildlife Management Institute, 1942): 485-489.
- Armbruster, K. and Kathleen W.** *Beyond Nature Writing: Expanding the Boundaries of Ecocriticism*. Charlottesville: University press of Virginia, 2001.
- Asimov, I.** *I. Asimov: A Memoir*. New York: Doubleday, 1994.
- Baratta, C.** *Environmentalism in the Realm of Science Fiction and Fantasy Literature*, Newcastle: Cambridge Scholars Publishing, 2012.
- Barber, E.** "Geoengineering: Reality or Science Fiction?" *Student Environmental Resource Center*, N.p., October 29, 2015.
- Black, R.** "What We Talk About When We Talk About Ecocriticism" *ASLE*. New York University, October 6 1994
- Brigham, J.** et al., “Petroleum Geologists' Award to Novelist Crichton Is Inappropriate.” *Eos*, Vol. 87, No. 36, Sept. 5, 2006.
- Buell, L.** *The Future of Environmental Criticism: Environmental Crisis and Literary*. Malden, USA: Blackwell Publishing, 2005.
- Caldeira, K. and Keith, D. W.** “The need for climate engineering research.” Jeremy Moss. *Climate Change and Justice*, United Kingdom: Cambridge University Press, 2015.
- Carlson, S.** “The Japanese Attack On Pearl Harbor Was About Oil.” *Task & Purpose*. Dec. 8, 2014. <http://taskandpurpose.com/japanese-attack-pearl-harbor-oil/>
- Carson, R.** *Silent Spring*, New York: Houghton Mifflin, 1962.
- Carson, R.** *Silent Spring with an Introduction by Vice President Al Gore*, Richmond: Houghton Mifflin, 1994.
- Carson, R.** *The Edge of the Sea*. Boston: Houghton Mifflin, 1955.
- Carter, D.** *Literary Theory*, Great Britain: Cox & Wyman, 2006.
- Castree, N.** et al., “Changing the Intellectual Climate.” *Nature Climate Change* 4, September (2014): 763-8.

- Chakrabarty, D.** "The Climate of History: Four Theses." *Critical Inquiry*, Vol.35, No 2: 197-222, 2009.
- Chorafas, D.** *Energy, Environment, Natural Resources and Business Competitiveness: The fragility of interdependence*. London: Routledge, 2011.
- Crichton, M.** *State of Fear*. New York: Avon Books, 2004.
- Critchfield, R.** *Finding Your Own Truth: A Consultation to the Journey of Self*. USA: Xlibris Corporation., March 1, 2010.
- Dallmayr, F.** "Return to Nature? An Ecological Counterhistory." *Journal of Ecocriticism* 4.2 (2012): 83-84. *Wiley Interdisciplinary Reviews: Climate Change*. 7 Feb. 2016. Web. 24 Sept. 2016.
- DiSalvo, D.** "Scientists Published An Article On 'Chemtrails' (They Aren't Real)." *Forbes*. Aug. 14, 2016. <http://goo.gl/jO2mSq>.
- Donway, W.** "State of Fear' by Michael Crichton Could Be the '1984' of Climate Alarmism." *WUWT*, September 29, 2016. (<http://www.thesavvystreet.com/state-of-fear-gets-hotter-with-global-warming/>)
- Edwards, C.** "Peak Oil in the Popular Imagination," *Alluvium*, Vol. 4, No. 4 (2015): n. pag. Web. 7 September 2015. <http://dx.doi.org/10.7766/alluvium.v4.4.02>.
- Franzen, Carl. "Arctic will be basically ice-free by summer 2050, NOAA study says." *The Verge*, Apr 12, 2013, 6:01p. (<http://www.theverge.com/2013/4/12/4217786/arctic-ice-free-summer-2050-noaa-study>)
- Fritz, R.** "Courtesy Communicates Best." *AAPG*, April 2006.
- Fromm, H.** *The Nature of Being Human: From Environmentalism to Consciousness*. Baltimore: Johns Hopkins University Press. 2009.
- Garrard, G.** *Ecocriticism*. New York: Routledge, 2004.
- Gibbens, S.** "Why a Warming Arctic May Be Causing Colder U.S. Winters," *NATIONAL GEOGRAPHIC*, JULY 11, 2017. <http://news.nationalgeographic.com/2017/07/global-warming-arctic-colder-winters-climate-change-spd/>
- Glotfelty, C.** "Introduction: Literary Studies in an Age of Environmental Crisis." *The Ecocriticism Reader: Landmarks in Literary Ecology*, Eds. Glotfelty, Cheryll and Harold Fromm. Athens: The University of Georgia Press, 1996. xvxxxvii. Print.
- Gore, A.** *Earth in the Balance: Ecology and the Human Spirit*. New York: Rodale, 2006 (1992).
- Hambrick, K.** "Destroying Imagination to Save Reality: Environmental Apocalypse in Science Fiction." Chris Baratta. *Environmentalism in the Realm of Science Fiction and Fantasy Literature*, Newcastle: Cambridge Scholars Publishing, 2012. (<http://www.cambridgescholars.com/download/sample/58675>.)

- Howell, E.** "Earth's Core 1,000 Degrees Hotter Than Expected," *Live Science Contributor*. April 25, 2013.
- Hubbert, M. King.** "Energy Resources," *National Academy of Sciences*, Pub.1000-D, p.57,1962.
- Hulme, M.** *Why We Disagree About Climate Change: Understanding Controversy, Inaction, and Opportunity*. UK: Cambridge University Press, 2009.
- IPCC,** "Intergovernmental Panel on Climate Change: Working Group III." *Special Report: Emissions Scenarios – Summary for Policy Makers*. 2000.
- IPCC,** "Summary for Policymakers in Climate Change: The Physical Science Basis." *Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Eds. Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller., United Kingdom : Cambridge University Press, 2007.
- Jeetendrasingh, B.** "Ecocritical Theory: It's Relevance in the Present Day Context." *Proceedings of National Seminar on Postmodern Literary Theory and Literature*, Jan. 27-28, 2012, Nanded. [http://www.academia.edu/2485497/Eco-Critical\\_Theory\\_or\\_E-Theory\\_Some\\_Newer\\_Perspectives](http://www.academia.edu/2485497/Eco-Critical_Theory_or_E-Theory_Some_Newer_Perspectives)
- Kaminski, F.** "THE POST-OIL NOVEL: A CELEBRATION!" *Resilience*, May 12, 2008. <http://www.resilience.org/stories/2008-05-12/post-oil-novel-celebration/>
- Kirchubel, R.** *Operation Barbarossa: The German Invasion of Soviet Russia*. UK: Osprey Publishing, 2013.
- Kozlovsky, Y A.** *The Superdeep Well of the Kola Peninsula*. tr. I.P. Lavrushko, G.A. Bylevski, Yu. Ya. Prizov, and D.E. Stolyarov, Munich: Springer-Verlag, 1987.
- Kreider, T.** "Our Greatest Political Novelist." *The New Yorker*, September 6, 2015.
- Kunkel, B.** "Dystopia and the End of Politics." *in Dissent*, 55.4, Fall, 2008. <https://www.dissentmagazine.org/article/dystopia-and-the-end-of-politics>
- Kunstler, J.H.** *World Made By Hand*. New York: Grove Press, 2008.
- Kyoto P.** "United Nations Framework Convention on Climate Change, (unfccc.int/kyoto\_protocol/items/2830.php.) Accessed: Sept. 26, 2016.
- Lahsen, M.** "Technocracy, Democracy, and U.S. Climate Politics: The Need for Demarcations." *Science, Technology, and Human Values*, Vol. 30, No. 1, Winter 2005.
- Lear, L.** *Lost Woods: The Discovered Writing of Rachel Carson*, Boston: Beacon Press, 1998.
- Love, G.A.** *Practical Ecocriticism: Literature, Biology, and the Environment*. Charlottesville: Virginia University Press, 2003.
- Lyon, T. J.** *This Incomparable Land: A Guide to American Nature Writing*. Minneapolis: Milkweed Editions, 2001. ISBN 1-57131-256-0
- McClenney, W.** "Earth Changes: The End Holocene?" *SOTT.net*, 29 May 2014. ([www.sott.net/article/279874-the-end-holocene](http://www.sott.net/article/279874-the-end-holocene).)

- McDiarmid, B.** "Our Story," *Greenpeace International*, Oct. 1, 2015. <http://www.greenpeace.org/international/en/about/our-story/>
- Miller, R.G. and Steven R. S.** "The future of oil supply." *Philosophical Transaction of The Royal Society*, Dec. 5, 2016. <http://rsta.royalsocietypublishing.org/>
- Mooney, C.** "One of the biggest icebergs in recorded history has broken off from Antarctica," *Chicago Tribune*, July 12, 2017, 1: 09 PM. <http://www.chicagotribune.com/news/nationworld/ct-antarctica-iceberg-20170712-story,amp.html>
- Moss, J.** *Climate Change and Justice*, United Kingdom: Cambridge University Press (2015), p. 48.
- Nordhaus, T and Michael S,** *Break Through: From the Death of Environmentalism to the Politics of Possibility*. New York: Houghton Mifflin Company 2007 and Mariner Books. 2009.
- Oppermann, S and Serenella L.** "Introduction: The Environmental Humanities and the Challenges of the Anthropocene," *Environmental Humanities: Voices from the Anthropocene*. London: Rowman & Littlefield International, Dec. 15, 2016.
- Oppermann, S.** "Ecocriticism: Natural world in the literary viewfinder." *Hacettepe University Journal of Faculty of Letters*, December 1999, 29-46.
- Oppermann, S.** *New International Voices in Ecocriticism*. London: Lexington Books, 2015.
- Palmer, A,** "Dunkirk: The Defeat That Inspired a Nation." *Student Library Research Awards*, Paper 19. 2016. [http://repository.wellesley.edu/library\\_awards/19](http://repository.wellesley.edu/library_awards/19)
- Palmer, C.** "Conservation is too important not to be made entertaining." *International Wildlife Film Festival and Media Center circular*, June 2002.
- Rayner, S.** *To Know or Not to Know? A Note on Ignorance as a Rhetorical Resource in Geoengineering Debates*, Oxford: Climate Geoengineering Governance Working Paper Series: 010, 2014.
- Ricketts, P** "State of fear or state of oblivion? What coastal zones are telling us about Global Change and why we need integrated coastal and ocean management on a global scale," *Integrated Coastal Zone Management*. Erlend Moksness et al., Singapore: Blackwell publishing, 2009.
- Rigby, K.** *Ecocritical Theory: New European Approaches*. Eds. Goodbody, Axel and Kate Rigby, Charlottesville and London: University of Virginia Press, 2011.
- Rigby, K.** "Ecocriticism." *Introducing Criticism at the 21st Century*. Ed. Julian Wolfreys. Edinburgh: Edinburgh UP, 2002. 151-78.
- Rigby, K.** "Writing in the Anthropocene." *Australian Humanities Review*, 42, November (2009): 173-87. Accessed 26 Sep 2016.
- Roach, J.** "Kilimanjaro's Snows Gone by 2022?" *National Geographic News*, November 2, 2009. (<http://news.nationalgeographic.com/news/2009/11/091102-kilimanjaro-glaciers-disappearing-ice-cap-snows.html>)

- Robinson, K.S.** *Forty Signs of Rain*. New York: Bantam Books, 2004.
- Robinson, K.S.** "Imagining Abrupt Climate Change: Terraforming Earth." *Red Mars*, New York: Bantam Books, 1993, Amazon Shorts, 2005.
- Rose, P.** "President Reflects On Past Fiscal Year." *AAPG*, June 2006.
- Savinar, M.** "Life after the oil crash: Deal with Reality, or Reality will Deal with You."  
[http://www.igpp.ucla.edu/public/mkivelso/refs/PUBLICATIONS/http\\_w\\_w.lifeaftertheoilcrash.pdf](http://www.igpp.ucla.edu/public/mkivelso/refs/PUBLICATIONS/http_w_w.lifeaftertheoilcrash.pdf) (accessed Feb.25, 2005).
- Scarrow, A.** *Last Light*. London: The Orion Publishing Group Ltd, 2007.
- Schliephake, C.** *Ecocriticism, Ecology, and the Cultures of Antiquity*. Maryland: Lexington Books, 2017.
- Shiller, J.W., Paul D. McCarthy and Mark A. Shiller.** "Dealing with the Economic Cost of Climate Change Mitigation: A Perspective from the Automobile Industry," *Global Climate Change: The Economic Costs of Mitigation and Adaptation*. Ed. James C. White, New York: Elsevier Science Publishing Co., Inc. 1991.
- Simon, J. L.** *Hoodwinking the Nation*. New Brunswick and London: Transaction Publishers, 2000.
- Sontag, S.** "The Imagination of Disaster." *Against Interpretation and Other Essays*, New York: Farrar, Strauss & Giroux, 1966.
- Steffen, W., et.al.** "The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?" *Ambio* Vol. 36, No. 8, December 2007.
- Taylor, A..** "Bhopal: The World's Worst Industrial Disaster, 30 Years Later." *The Atlantic*, DEC 2, 2014.
- Westfahl, G.** *Hugo Gernsback and the Century of Science Fiction*. Jefferson, North Carolina: McFarland, 2007.
- Wright, J.** *Because I was invited*, Indiana: Oxford University Press, 1975.

## RESUME

Name Surname: Mofeed Bahjat Sabri

Place and Date of Birth: 12/October /1966

E-Mail: mofeed\_bahjat@hotmail.com



### EDUCATION:

- Bachelor degree: 1990, Baghdad University, College of Sciences, Department of Geology.
- Bachelor degree: 2004, Baghdad University, College of Languages, English Department.
- Master degree: 2017, Istanbul Aydin University, Institute of Social Sciences, English Language and Literature Program.

### PUBLICATIONS/PRESENTATIONS ON THE THESIS:

- Sabri, Mofeed Bahjat. "Beyond Holocene: The question of Peak oil in Eco-fiction." *International Journal of Business and Social Sciences*. October 2017.