Romantic Concerns About Toxicity and Public Health: Literary Exploration of Contaminated Environment and the Significance of Literature in Historical Toxicology

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ABSTRACT
Poems of William Blake, William Wordsworth, S. T. Coleridge, Lord Byron, P. B. Shelley, and their contemporaries are freighted with allusions to the contaminated environment during the industrial revolution and post Tambora eruption (1815), reflective of socio-environmental realities of the Romantic period and their concerns about public health. This paper endeavors to examine Romantic poetry and assess early 19th-century toxic English landscapes to comprehend how environmental contamination was culturally perceived during this period. The study follows a critical convergence design between historical toxicology and Romantic literature for the synthesis of scientific analysis to reveal the thematic preoccupations of Romantic writing. Findings of the study demonstrate substantial references to the impact of direct release of industrial toxins into atmosphere and Tambora eruption's toxic fallout. Literary engagements such as these foreground profound socio-ecological ramifications of toxic pollutants and offer richer insights for modern environmental policy-making and sustainable development. The study also follows an interdisciplinary approach to serve as a resource for the integrative analysis presented here and benefit the future research from its insights in filling out the understanding of how early 19th-century poets approached industrial and volcanic pollution.

1. Introduction

According to C. P. Snow, humanists and scientists have historically endeavored to assert the dominance of their respective domains, the "humanities" and the "science" with a profound lack of understanding, mutual hostility, and a significantly distorted perception of each other (Snow, 1959). Humanists criticize scientific approach for its perceived reductionism and insufficient ethical considerations while scientists often dismiss the humanities as lacking empirical rigor and practical utility. Presently, science and the humanities are regarded as two distinct "cultures" that are perceived as incompatible with one another (Snow). This "great divide" poses a symbolic barrier in addressing global issues and results in a practical, intellectual, and creative deficit for human civilization (Snow).

Scientist and biologist Edward Osborne Wilson in Consilience: The Unity of Knowledge (1998) argues that knowledge is a unified, undivided entity and that collaboration between science and the humanities can enhance and improve society. Bridging the division between the humanities and sciences can lead to a synthesis of knowledge through the establishment of a common foundation, a concept Wilson refers to as "consilience," which literally means the amalgamation of knowledge (Wilson, 1998). In his writing, he submits, "the greatest enterprise of the mind has always been and always will be the attempted linkage of the sciences and humanities" (Wilson). Wilson differentiates between two forms of intellectual achievements in his book. He thinks that the attainment of science is "discovery" and humanities is determined by "scholarship" and "wisdom." Because these two domains lack harmony, "many excellent scientists are narrow, foolish fellows," and "many wise scholars are considered weak scientists" (Wilson). Building on E.O. Wilson's theory of "consilience," modern toxicology, although a new scientific discipline, can be viewed with a retrospective lens in Romantic-era poems as the poets, without the knowledge of scientific jargon, spoke of the negative consequences of industrial toxins on the natural world and human society. This interdisciplinarity provides a historical perspective in addition to new insights into England's cultural reception of industrial toxicity during the first half of Industrial Revolution.

Romantic poetry emerged as a prominent literary movement in the late 18th and early 19th centuries. It decisively trounced the restrictive conventions of Neoclassicism encouraging an expansive and dynamic focus on emotions, nature, individualism, and the imaginative faculties (Lilian, 2018). This movement emanated as a response to the escalating rationalization of society and represented a shift towards subjectivity, spontaneity,

and the elevation of personal experience as fundamental to poetic expression. One of the significant characteristics of Romantic poetry is its profound veneration of nature, which is often portrayed as a source of inspiration, existential refuge, and even a vehicle for transcendental insight (Lilian). For Romantic writers, the natural world was not merely an external backdrop for their compositions, but a vital force intertwined with the inner life of the individual, reflecting, and amplifying the emotional and imaginative currents that shaped human experience. Romantic poets endorsed individual experiences, intensity and complexity of human emotions, and imagination as the highest forms of truth and source of knowledge (Lilian). They celebrated the inner depths of human consciousness. Their belief in the profundity of feelings and transformative power of creativity as authentic begetters of wisdom and insight represents a radical break from the poetics of the Neoclassical tradition which valued the primacy of order, restraint and rationality (Lilian). The exploration of positive and negative aspects of human emotions reflected the Romantic movement's extensive interest in the inner workings of the mind and soul (Ferber, 2010). Romantic poetry transcends mere artistic expression in favor of an obligation to the themes of nature, emotions, and individuality crafting an aesthetic, intellectual and compelling body of work (Ferber). It became an instrument for critical philosophical analysis. It critiqued contemporaneous socio-political systems and literary norms. The lasting influence of Romantic poetry is a testament to its competency, making it one of the most influential and enduring literary movements in the history of literature. Its themes continue to resonate, providing timeless insights into the existential dilemmas and emotional complexities that define human experience.

Romantics' considerably relied on nature and human emotions as sources and themes for their compositions (Lilian, 2018). However, contrary to widespread belief, their poetry vigorously debated contemporary environmental and social challenges. Their emphasis on imagination did not negate the realism in their works. Notably, they remonstrated against the Industrial Revolution, major political changes across Europe, and documented the aftermath of the eruption of Mount Tambora (1815) (Ferber, 2010). Significant social and technological changes during the Industrial Revolution led to rapid urbanization, exploitation of natural resources, and environmental degradation pressed Romantics to mark a contrast between industrialized towns and the pastoral landscape (Ferber). They critiqued the negative impact of industrialization and expressed their concern for the environment through their poetry which resonates throughout the works of Willian Blake, William Wordsworth, John Clare, and Samuel Taylor Coleridge (Ferber). The eruption of Mount Tambora in 1815 led to a global disruption in the climate known as the "Year Without a Summer" (1816) (Boers, 1995). It resulted in a decrease in global temperatures, unseasonable snow, rainstorms, thunderstorms, widespread crop failures, famine, economic distress and around 100,000 deaths attributable to the eruption's direct and indirect impact (Reid, 2015). The impact of the eruption is vividly archived in the works of Lord Byron, P. B. Shelley, Mary Shelley, and Thomas Campbell. Romantic poets also employed symbolic language to address social and political issues. The use of nature as a symbol for emotional and social states allowed poets to critique contemporary issues indirectly.

Toxicology is a scientific discipline which governs the study of the principles underlying the action and effects of chemical substances on humans and other living organisms, and the broader ecosystems (Schrager n.d.). It includes examining the harm and damage a substance can inflict and how impeding toxicity is achievable. The discipline includes environmental toxicology, clinical toxicology, forensic toxicology, chemical toxicology, regulatory toxicology, occupational and veterinary toxicology (Schrager). The 16th century Swiss physician Theophrastus von Hohenheim (Paracelsus) credited with the classic toxicology maxim, "All things are poisonous and nothing is without poison; only the dose makes a thing not poisonous" is regarded as the progenitor of modern toxicology, based on his rigorous research to understanding the impact of substances on the body (Ottoboni, 1991). In parallel, Mathieu Orfila is similarly recognized as a seminal figure in modern toxicology, having provided its first formal exposition in his treatise Toxicologie générale (1813) ("National Library of Medicine," n.d.). Historically, toxicological inquiry dates to figures such as Dioscorides, a Greek physician under Emperor Nero who attempted the earliest classification of plants by their toxic and therapeutic properties (Hodgson, 2010). A work attributed to the 10th century author Ibn Wahshiyya called the Book on Poisons which describes various toxic substances and poisonous recipes that can be made using magic (Levey, 2017). A 14th century Kannada poetic work attributed to the Jain prince Mangarasa, Khagendra Mani Darpana, which talks about several poisonous plants (Bhat & Udupa, 2013). Although the Romantic poets lacked scientific understanding of environmental toxins, they nonetheless grasped the harmful nature of industrial byproducts. Allusions to the toxic effects of industries pervade their works, reflecting an early awareness of the impact of industrial toxins.

2. Materials and Methods

The principal corpus of this research includes selected texts of the Romantic period including poetry and prose that highlight the issues of ecology, human and nature conflict, and destruction of nature in general. These works are selected for their contribution to the study of environmental issues and since they embody the romantic connotation of nature. Selected works of the renowned Romantic poets like William Wordsworth, Samuel Taylor Coleridge, Percy Bysshe Shelley, Lord Byron and, lesser-known works about environmental change are the primary sources. Besides, the analysis will be supported with secondary sources from historical toxicology, ecocriticism, and Romantic criticism. A range of articles, books and essays, devoted to the problems concerning literature and ecology as well as the history of toxicology, will underlie the theoretical structure of the article.

Based on the title, the multidimensional methodology would involve a literary-historical approach combined with elements of ecocriticism and historical toxicology for textual analysis. The primary approach is paying considerable attention and analyzing the selected works in order to explore the issues of environmental degradation, and its representation. Attention will be devoted to the use of such language, images, and metaphors which convey the ideas of environmental degradation due to toxic substances. The literary-historic approach investigates how Romantic literature was produced in the events of history, particularly within the context of environment related challenges and contamination during the Romantic period. Also, ecocriticism deals with literature and the environment and more precisely how literature portrays the ecological crisis, nature, and human interrelations with the nonhuman world. It would investigate how Romantic poets and writers viewed the issue of industrial toxicity and post Tambora environmental toxicity reflecting broader concerns about human interaction with the environment. Historical Toxicology, interdisciplinary in nature, would rather look at toxins, pollution, and contamination from the confinements of history in as far as literary representation is concerned.

3. Results and Discussion

Although the Romantic poets lacked scientific knowledge about environmental toxicity, however, deterioration of the environment due to Industrial pollution remained in their keen observation. Their writings often mention how the Industrial Revolution exploited nature and people, and how the Tambora eruption worsened environmental damage leading to early thoughts on climate change (Rahaman and Aftab). Their environmental consciousness and heightened sensitivity foresaw the impending ecological destruction. The Industrial Revolution began in Britain around 1760 and lasted into the early 19th century. It changed agrarian economies into large-scale industrial ones, with machine-based manufacturing and factories. The first Industrial Revolution (1760–1830) saw the rise of the textile industry, steam engines, and key inventions like the spinning jenny and power loom. Factories spread during this time, and people moved from rural areas to cities to find work in industries.

William Blake opposed the growing number of factories and dehumanizing effects of the Industrial Revolution on society. He often wrote about the environmental damage and toxic pollution caused by industrialization. His poem “And did those feet in ancient time” (1804) is from the preface to his epic Milton: A Poem in Two Books. The poem is an enthusiastic lament of industrialization and its undesirable effects while yearning for a better relationship between man and the environment. Blake laments the loss of England’s green mountains “On England’s pleasant pastures seen” (Sampson, 1905) and “pleasant pastures” to clouded hills “Shine forth upon our clouded hills?” (Sampson) which can be described as a blighted or veiled view of the otherwise idyllic nature because of toxic pollution and industrial degradation that overshadows the natural landscape. He uses a stark metaphor for factories and the industrial units, “dark Satanic mills” (Sampson) that dominate the landscape. This line represents the destructive impact of industrial toxins and the mills symbolize the dehumanization and loss of connection to the earth. In Blake’s “The Chimney Sweeper” (1789) from Songs of Innocence and “The Chimney Sweeper” (1794) from Songs of Experience, he highlights the exploitation and suffering of child laborers, specifically chimney sweepers, during the Industrial Revolution. The former has a direct reference to “soot” that is Carbon dust emitted into air as a result of incomplete fuel combustion (Omidvarborna et al., 2015) which represents the direct engagement with pollution symbolizing an impact on the child and environmental decay. The poems signify the overshadowing effects of the pollution due to industrial toxins. “Earth’s Answer” (1794) again employs the imagery of “darkness” and “grey despair” (Sampson) suggesting environmental ruin due to industrial toxins released directly into the atmosphere. Moreover, Blake’s “London” (1794) turns out to be a critical indictment of late 18th-century industrial pollution and urbanization by revealing the interconnectedness of environmental degradation and human suffering. An overarching sense of bleak despair flows from a bleak description of the city. His “The Tyger” (1794) is like a cautionary tale which points to the

dismal implications of the neglect of environmental stewardship in the name of progress due to industrialization. By duality in thought, the poem nudges the reader toward the need for sustainability in a relationship with nature. "Holy Thursday" (1789) and "Holy Thursday (1794) again discuss the issues of environmental degradation and the worsening of human life due to industries.

From a historical toxicology perspective, a scientific exploration of air quality due to elemental pollution in Romantic period aids in comprehension of the fervent use of "darkness imagery." With steam engines, growing chemical industries, and efficient power generation from coal, unregulated for nearly 100 years (McGuire, 2020), the by-products, pollutants, and waste from these sources were directly released into the atmosphere and nearby water bodies which were a source of drinking water, bathing and cleaning water, irrigation outside industrial cities (Barrett, 1999; Pontin, 2012). The uncontrolled discharge of poisons had a detrimental effect on the quality of the air, which led to its documentation in Romantic works with allusions to darkness and soot.

William Wordsworth, being a principal contributor to Romanticism, as he honestly believed in the mutual interaction of nature and humans, expresses grief about the separation of this bond in his poem "The World is Too Much With Us" (1807). In this work, Wordsworth laments that people have become more distanced from nature since they have abandoned it for materialism. He mournfully laments that humans have given their hearts away in search of acquisition and consumption, defiling their original holy intentions to nature with the obsession of the wealth and acquisitions. Wordsworth in "On the Projected Kendal and Windermere Railway" (1844) vehemently opposed the projected railway that was to "violate" the virgin beauty of the Lake District. Writing as a social activist, Wordsworth sincerely presented his argument against it. Aware of the destruction of the natural landscape due to smoke and toxins emitted from the steam engines used by the railways, Wordsworth strongly stood against the project. He composed poems and forwarded letters to the Board of Trade and House of Commons, requesting them to halt the construction. He refers to railways as "rash assault" (Wordsworth, 1919), saying that no such place in the English land was safe from such invading moves. In his poem titled "Steamboats, Viaducts, and Railways" (1833), Wordsworth acknowledges the practical values of the machines referred to in the title, but he stresses the disastrous effects which these machines had, especially as concerns the poisonous substances that were poured into the atmosphere. The verse "Motions and Means, on land and sea at war" (Wordsworth) does indicate the penetrative powers of industrialization, meaning that it affects the land and the water. This line suggests a struggle between modern industrial activity and the "old poetic feelings" (Wordsworth), which awaken to us a pre-industrial, natural landscape filled with beauty and inspiration. Therefore, Wordsworth's apprehension of a changed environment of the future hinges upon his fears concerning waste, by-products, and runoff that such industries would produce. He was afraid that a non-regulated industrial process would not only compromise the aesthetic and the ecological integrities of the landscape but would also impel to counter the age-old bond between human beings and nature. In another poem, "London" (1802), Wordsworth refers to the England as "a fen / Of stagnant waters" (Wordsworth) which is again a direct reference to the contaminated water bodies of England. Although Wordsworth's "Composed upon Westminster Bridge, September 3, 1802" (1802) revels in the beauty of the city and its material elements at the early morning, the fact that there is "smokeless air" (Wordsworth) somehow hints at how the atmosphere has become otherwise during other times of the day. This phrase constitutes an indirect criticism implying that the city's ordinary state of air has been contaminated by industrial smoke and other pollutants, a state of affairs suspended in the stillness of dawn.

A sophisticated ecocritical reading of Samuel Taylor Coleridge's "The Rime of the Ancient Mariner" (1798) uncovers his concern over the emerging industrialization in the Romantic era. In the poem, it is the Mariner representing humanity and its industries, who kills the Albatross, a bird that is an emblem of nature itself. This senseless violence on nature leads to the death of 200 sailors from thirst. The destruction that is caused, therefore, is a repercussion of environmental degradation. The Albatross, in the poem is referred to as "Christian soul" (Coleridge, 1912). This description makes the bird one imbued with sanctity and purity, reflective of the Romantic poets' reverence for nature as a force divine and moral. The killing of the Albatross, therefore, symbolizes the merciless attack on nature by the growing tendrils of industrial toxicity, while the following environmental disturbances around the ship depict the wide ecological aftermath. In much-noted lines, "Water, water, everywhere / Nor any drop to drink" (Coleridge), abundance is thrown side by side with scarcity; it quite obliquely mentions the contamination of drinking water alluding to the toxic industrial runoff poisoning England's waters. Describing the colors of sea water as similar to "witch's oils" (Coleridge) with shades of green, blue, and white, the poet metaphorically invoked industrial toxins and chemical pollutants which were fast transforming natural bodies of water into spaces of ecological damage (Omidvarborna et al., 2015).

From an ecocritical perspective, John Keats' "Ode to a Nightingale" (1819) reflects deep desire to break away from the alienation from nature, contaminated environment, and the tyranny of industrial toxication. He envies the pure joy and freedom of the nightingale that is completely free from human suffering and environmental toxicity. The urge to become a bird and fly with the nightingale is the desire to shatter the shackles of industrial toxicity, once again relishing life in natural abundance.

In John Clare's "The Flitting" (1820) a deep sense of displacement and estrangement from nature, symbolized in the loss of green fields and in describing summer as a "stranger" (Clare, 1908) is present. When the word "stranger" is written in relation to summer, it either alludes to the impact of an industrialized landscape, which shook the tender and comforting parts of natural life. The verse, "Green lanes that shut out burning skies" (Clare) alludes to the harshness of industrial contamination because of the free release of the elemental toxins in the environment which are known to raise temperatures. Throughout the poem, Clare repeatedly laments the loss of his pastoral home and the degradation of the natural landscape, which could be interpreted as resulting from the encroaching forces of industrialization.

Letitia Elizabeth Landon's "The Factory" (1835) pens a poignant comment on the toxic pollution going on in the Romantic age. Opening this poem, the very first stanza sets an image of a "dark funereal shroud," (Landon, 1859) ushering in a sense of foreboding and gloom that pervades the town. The shade is not a seasonal weather phenomenon but a product of the poisonous smoke and pollution that factories produce. The second stanza directly alludes to smoke mixing with the air, "The smoke that rises on the air," connecting it to despair as a "shadow flung by the despair" (Landon), an indication of toxicity in environment and symbolizing a pervasive sense of lack of hope.

As the toxic effects of the Industrial Revolution grew more intense during its later phase after the Romantic era, literary resistance to these changes became more pointed and obvious. This movement is best represented through the publication of works like Charles Dickens' Oliver Twist (1839), Elizabeth Barrett Browning's "The Cry of the Children" (1843), Thomas Hood's "The Song of the Shirt" (1843), Charles Dickens' Great Expectations (1861), D. G. Rossetti's "Jenny" (1870), Thomas Hardy's Far From the Madding Crowd (1874), and Gerard Manley Hopkins' "God's Grandeur" (1877), Edwin Arlington Robinson's "The Mill" (1920). These work that strongly attacked contamination of the environment via industrialization and its influence upon human existence.

The eruption of Mount Tambora was one of the biggest volcanic eruptions ever recorded in human history, with huge quantities of tephra and ash belched out, dispersing debris as far as 1,300 kilometers away ("Mount Tambora Volcano," 2020). In the immediate aftermath, the pyroclastic flows destroyed areas in the immediate surroundings, while ash covered West Java and South Sulawesi. It was followed by tsunamis in the Indonesian archipelago. The particles from the ash were brought forth for years, while the pumice rafts floated several miles from the volcano itself. The devastation led it to be dubbed the "Pompeii of the East" (Wood, 2014). Casualty number is actually estimated between 71,000 and 100,000 from direct deaths to starvation and illness (Reid 2015; Tanguy, 1998). The eruption triggered a global climatic anomaly, which notably peaked in the "Year Without a Summer" of 1816, triggering crop failure, famine, and social revolution in Europe and North America (Wood, 2014; Stothers, 1984). This also affected the Indian monsoon, which made crop failures worse and exacerbated the spread of disease (Evensen & Peterson, 2010). The scientific estimation of the Tambora eruption discharge is over 30 km3 magma and about 51–58 Mt SO2 into the atmosphere (Stothers, 1984). The SO2, combined with OH or H2O in the stratosphere, produced about 93–108 Tg sulphate aerosols. As the aerosols are the same size as the visible light, it backscattered the incoming solar light, and global temperatures dropped (Robock, 2000). Such excessive atmospheric toxicity was witnessed by Lord Byron, P. B. Shelley, and Mary Shelley during the year without summer (1816) when they made a journey to Geneva, Switzerland. Mary Shelley's travelogue History of a Six Weeks' Tour (1817) is an important document to study climatic conditions during their trip and poetic compositions of P. B. Shelley and Lord Byron. The weather as described by Mary Shelley in her travelogue exactly mates the climate imagery of Byron and Shelley.

Lord Byron's compositions frequently reflect on the environmental havoc and toxic after-effects of the Tambora eruption (1815), which effectively disturbed the natural and human world. The most recurrent theme in his poems is that of "environmental darkness" or "diminished sunlight." In his poem "Darkness" (1816), Byron vividly illustrates the deleterious effects of sulfur dioxide (SO2) on sunlight, where, as put graphically in it he described the sun as extinguished: "The bright sun was extinguish'd, and the stars / Did wander darkling in the eternal space" (Byron, 1905), casting both stars and the earth into a desolate, eternal void. Moreover, Byron underscores psychological impact the environmental disaster has on humankind; men lose their way and

succumb to fear of death of the sun, reduced to praying selfishly for light: "and all hearts / Were chil'd into a selfish prayer for light" (Byron). In "The Prisoner of Chillon" (1816) the imagery of darkness is employed by Byron as prison itself symbolizes the overall gloom of 1816, known amongst those times as the "Year Without a Summer." The prison is described as an ill-lit place where even the feeble light of sunshine appears lost, "Dim with a dull imprison'd ray, / A sunbeam which hath lost its way" (Byron). Such a weak and diseased light hinders the recognition of other inmates' faces, "We could not see each other's face, / But with that pale and livid light / That made us strangers in our sight" (Byron). This theme continues in Manfred (1816-1817), as the loss of light symbolizes existential despair: "The lamp must be replenish'd, but even then / It will not burn so long as I must watch" (Byron), portraying desperation in the sense that the sun no longer gives light to the moon. In the "Darkness" (1816), Byron also refers to the moon as the "mistress of seafarers," but in the final apocalyptic ending of the poem, he evokes an image of a universe in which the moon is dead, sailors are dead on the ocean floor, and their ships rot in waters static: "The moon, their mistress, had expir'd before" (Byron). Thus, Byronic apocalyptic vision is filled with themes of darkness and cosmic desolation representing a collapse of the human society and their environment due to toxic atmosphere.

P. B. Shelley's Hymn to Intellectual Beauty, composed in 1816 and published in 1817, explores the elusive nature of the Spirit of Beauty, which imbues all aspects of existence such as thoughts, objects, or forms with a sacred and radiant essence: "Spirit of Beauty, that dost consecrate / With thine own hues all thou dost shine upon / Of human thought or form, – where art thou gone?" (Shelley, 1914). This Spirit, Shelley laments, has deserted life, turning it into an empty, desolate "valley of sorrow" (Shelley). Since Shelley composed this poem during the toxic summer of 1816 in Switzerland, the Spirit of Beauty can indeed be viewed as a metaphorical representation of the sun. Traditionally known to be the producer of natural beauty, the sun was hidden from view that summer through atmospheric disturbances like "mist" and "atmospheric ash" caused by sulfur dioxide emissions that followed the eruption of Tambora (Stothers, 1984; Skeen 1981). This atmospheric toxicity aside from impairment of visibility of the sun, impacted severely on vegetation, human life, and animals. Natural beauty and foliage disappeared, whereas reduced sunlight helped to create a feeling of environmental and existential depression. Shelley's rhetorical question "where art thou gone?" (Shelley, 2014) thus can be read as a lamentation over the loss of sunlight, imbricated within the poem's own thematic concerns. His use of adjectives, such as "dim" to identify the darkened state of the world reflects his own emotional and environmental setting. The beauty is further enhanced by the poet's lament that the sun cannot give rainbows all day long; this deepens the metaphoric meaning, mourning the ample darkness caused by the sulfur dioxide. This reading puts more emphasis on Shelley's involvement in the environmental crisis of 1816.

The toxic elements emitted in the air due to this volcanic eruption resulted in global cooling leading to unusual snow, heavy rain coupled with thunderstorms, windstorms, and freezing temperatures. In the compositions of Lord Byron and Percy Bysshe Shelley, this profound effect of atmospheric toxicity comes forth very well. Drawing a clear parallel to the global cooling, Byron's "Prometheus" (1816) employing an archetypal-interpretive analysis of the historical climatology suggests the themes of human survival and the act of Prometheus stealing fire: "Thy Godlike crime was to be kind" (Byron, 1905), as a necessity for a stable climate. Moreover, in "Darkness" (1816), Byron describes the earth as "rayless, and pathless, and the icy" (Byron) which refers to his experience of surviving in frigid temperatures. In Manfred (1817), Byron reveals his apprehensions of human survival through the Second Spirit since Mont Blanc's ice is destructive: "The Glacier's cold and restless mass / Moves onward day by day" (Byron). The Tambora-induced atmospheric toxicity also adversely affected the vegetation cycle, causing crop failures everywhere, resulting in famine. Byron creates a climatic backdrop in "Darkness" (1816) that triggers famine: he manages to positively qualify the associations of climate with starvation via vivid imagery. Dramatic depictions of desperation have made this famine stronger. This is clearly seen as people kill wild animals and the venomous snakes for survival purposes. For example, "Came tame and tremulous; and vipers crawl'd / And twin'd themselves among the multitude, / Hissing, but stingless—they were slain for food" (Byron). Furthermore, Byron further elaborates on the survival story of famine through the description of human mortals being fed upon by corpses and ultimately dying because of hunger: "Of famine fed upon all entrails—men / Died, and their bones were tombless as their flesh" (Byron). This evocative description thus conveys Byron concisely describing the after-effects of the atmospheric toxicity causing famine and the grave existential threats ensued due to environmental contamination.

Shelley's "Mont Blanc" (1817) demonstrates the association of ice with the snakes that watch their prey (humans) from a distance. Here, he describes glacier formation as a "City of Death" (Shelley, 1914), consisting of tall ice walls, intransigent and hostile to the human world: "Teach the adverting mind. The glaciers creep / Like snakes that watch their prey, from their far fountains" (Shelley). This hostile imagery speaks well to

depicting the severity of the weather, a direct result of the toxins and volcanic ash from the eruption into the atmosphere from the Tambora volcano.

Thomas Campbell's "The Last Man" (1823) has multiple references to the "dying sun" and its fading sunlight. The poem opens with the speaker predicting the death of the sun "All worldly shapes shall melt in gloom, / The Sun himself must die" (Campbell, n.d.) and when it happens, everything in this world will vanish into darkness. Commenting further upon the intensity of sunlight, Campbell labels the sunbeams as "sickly" resulting in pale and exhausted appearance of the earth: "The Sun's eye had a sickly glare, / The Earth with age was wan" (Campbell). Additionally, he speaks of famines that affected the people commenting there is no sound of humans or anything else in the cities and that people have died all around the world because of wars, plagues, and famines: "In plague and famine some! / Earth's cities had no sound nor tread" (Campbell). Through his poetic language, Campbell captures the essence of the environmental contamination, illustrating how the Tambora eruption led to profound changes in weather patterns and agricultural productivity.

Scientific data is often incomprehensible to the masses, which makes awareness about complicated issues such as environmental contamination hard to comprehend. One significant way of bridging this gap, however, is through the use of literature - traditional or modern forms of it - to communicate such pressing concerns. Literary writers do not merely elaborate upon that which is already known; it is their innovative and profound understanding of those issues that has frequently spurred the creation of timely awareness and action, with easy solutions for real-world environmental challenges. Rachel Carson's Silent Spring (1962), although a work of non-fiction, is written in the style of a novel, is a landmark exposition of the cause of harm from pesticide use. Resulting changes in environmental policy include the creation of the United States Environmental Protection Agency, which was founded in 1970. Identically, Dr. Seuss's The Lorax (1971), so accessible in children's literature, voices urgency regarding the necessity of environmental concern and acts to be taken for it. Its imagery concerning deforestation had been one of those which impressed generations with the need to save natural resources. Kim Stanley Robinson's Red Mars (1992) is the first book in his Mars Trilogy. In this novel, the author discusses the colonization and terraforming of Mars. Science-based scenarios are included to provide insight on creating human survival on another planet; that is a speculative but educative framework for tackling environmental challenges. Such is the case of Paolo Bacigalupi's dystopian novel, The Water Knife (2015), which deplores the realities of water scarcity and climate change that are very prevalent today. This dystopian novel provokes critical thinking with provocative scenarios about the implications of resource depletion for water management in the context of environmental crises. His The People of Sand and Slag (2004) implicitly critiques the long-term health consequences of adapting to pollution rather than addressing it (Malik & Chander, 2018). Further examples of such works are Tatsuo Hori's The Wind Rises (1936-38), Frank Herbert's Dune (1965), Octavia Butler's Parable of the Sower (1993), Paolo Bacigalupi's The Windup Girl (2009), Kim Stanley Robinson's New York 2140 (2017), Richard Powers' The Overstory (2018) which collectively demonstrate the power of literature to transcend scientific language barriers and generate watershed awareness and action on all environmental issues.

Other than an informative role, the further significance of literature in historical toxicology is that it provides a historical perspective on how various societies perceived and reacted to the impact of toxins on environment and public health distinctly at various times in history. For example, in the industrial revolution period, works such as Charles Dickens's Hard Times (1854) portrayed grim realities of pollution and its impact on human health and environment. Such literary understandings placed in the larger ethos of modern practice and theory reveal the challenges of bygone societies with toxic waste and environmental contamination. In addition, creative literature typically provides sociocultural perspectives on toxification. Rachel Carson's Silent Spring (1962), for instance, powerfully shaped public opinion on pesticides and environmentalism, and showed the increasing sensitivity and apprehension about ecological issues in 1960s. Such literary and historical contexts are, therefore, conducive to an understanding of how perceptions about it have been evolving through time. Literature also throws light on the ethical concerns and social concerns associated with toxic exposure, providing a more informative approach toward toxicology. For instance, in an ethical way, Upton Sinclair's The Jungle (1905) focused public attention not only to the unsanitary conditions of the meatpacking industries but also questioned corporate responsibility towards public health. Literature raises the consciousness of the impact on society and the environment by highlighting dangerous substances and their effects on vulnerable populations. Creative works also become effective tools of communication and education towards better understanding and exciting the public with issues concerning toxicity. The psychological and emotional influence of the toxins on an individual as well as the community can be found through exploring the representation in art and literature. It may complement the scientific data with quality understanding and encourage inter and multidisciplinary

collaborations as well as innovative solutions by incubating new perspectives within toxicology, eventually playing a reflective, informative role in society's engagement with environmental issues. In conclusion, literature and art not only reflect societal attitudes toward toxins, environmental issues, and public health but also serve as vital tools for fostering awareness, ethical discourse, and innovative solutions. By bridging the gap between science and the human experience, they inspire meaningful engagement with the complexities of toxicity in our world.

4. Conclusion

The consilience between historical toxicology and Romantic literature is indispensable in the assessment of the toxic environments of early 19th century England, both in the first half of the Industrial Revolution and after the Tambora eruption (1815). By mapping scientific data on the imaginative and thematic concerns of the Romantic writers, a more nuanced understanding emerges on how environmental contamination was culturally perceived during this period. Works of William Blake, S. T. Coleridge, William Wordsworth, Lord Byron, P. B. Shelley, and other poets are replete with allusions to the impact of industrial waste that causes environmental contamination affecting public health. All such references play an informative and reflective role: they enlighten about the socio-environmental consequences of toxic pollutants, and they provide valuable insight for contemporary policy-making and developmental strategies. It is via depiction of polluted landscapes in creative ways that Romantic poets help us frame models mitigating pollution while offering a psychological lens through which to view human responses to environmental crises, fostering innovative solutions, in thought and in action.

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