Victorian Science and the Imperial Imagination: Dickens, George Eliot, and Tennyson from Mid-Century Realism to the Fin de Siècle

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Abstract- The Victorian imagination was forged amid contradictions: telescope and scripture, imperial cartography and parish life, machinery and soul. This paper argues that literature was not a passive reflection of these tensions but their primary site of negotiation, where epistemological shocks were transformed into the frameworks of modern consciousness. In Dickens, the city becomes a socio-biological organism, legible through sanitation, statistics, and reform. *Bleak House* portrays London as both dependent on and resistant to the machinery of social engineering. Eliot, by contrast, develops a novelist's anthropology: *Middlemarch* grafts Comtean positivism and evolutionary thought onto provincial life, turning realism into a mode of empirical moral inquiry that links private struggle to collective destiny. For Tennyson, the crisis was metaphysical rather than social. *In Memoriam* enacts a lyric struggle between contemporary geology and biology's materialist conclusions, and a need for spiritual assurance, or a negotiation later refracted through imperial mission in his public verse. Tracing these strategies into the fin de siècle, the paper contends that aestheticism and decadence extended, rather than repudiated, the mid-Victorian confrontation with science, empire, and belief. Victorian literature thus surfaces as a site on which Britain's scientific modernity and global dominance were debated, celebrated, and contested, and where the imaginative and discursive construction of the modern world was shaped.

Keywords: ***Victorian Studies, Literature and Science, Imperial Imagination, Modernity and Empire, Fin de Siècle Culture***

1. INTRODUCTION

Also known as the age of equipoise, the Victorian era, the long nineteenth century, surged with a storm of political upheaval, industrial acceleration, and intellectual unrest that fractured inherited certainties and necessitated new forms of thought. Before William Whewell coined the term "scientist" in 1833 (published in 1840), the designations "natural philosopher" and "man of science" prevailed. The former cast inquiry into nature as a branch of philosophy, mediated through speculative reflection. The latter carried the aura of the detachment and cultivated neutrality of the ideal Victorian gentleman (Miller 256-57; Gilmour 115). Thus, over time, what had been "natural philosophy" and "natural history" was refashioned into the modern sciences. Lord Kelvin's 1846 inaugural lecture as professor of Natural Philosophy at the University of Glasgow exemplifies the mid-Victorian effort to stabilize disciplinary boundaries within the sciences. He distinguished between two domains of scientific inquiry. He described natural history as the systematic observation and classification of facts, while natural philosophy, in contrast, sought to derive general laws through inductive reasoning based on the materials gathered by natural history (Lightman and Zon 115). This distinction reorganizes knowledge into discrete yet hierarchized domains. This study contends that this process was not insulated from literature; rather, literature and science mutually informed and reshaped each other, participating in the same cultural negotiations over authority. At stake was the Victorian drive to consolidate scientific legitimacy.

Science crystallized as a professional enterprise, claiming unprecedented cultural authority. But this ascent was never autonomous. Science moved through the circuits of politics, industry, and education, and insinuated itself into the very grammar of social life. More than a method of study, science became an "imaginary" through which Victorians redefined nature, history, and the precarious place of the *human* within them. Bernard Lightman, in his Introduction to *Victorian Science in Context*, "Victorians of every rank, at many sites, in many ways, defined knowledge, ordered nature, and practiced science" (1). Far from being confined to

laboratories, scientific activity permeated everyday life and cultural institutions.

The nineteenth century saw both intellectual ferment and global ambition, structured around what Andre Gunder Frank has described as the relationship between imperial "metropoles" and their colonial "satellites" (Frank 10). That said, the industrial modernity in Victorian England and its peripheries moulded daily life through the introduction of steam power, electricity, and the expansion of railways. These technological advancements altered not only the physical world (in transportation, communication, and urbanization) but also the rhythms of work, leisure, and social interaction. It all coincided with the vast territorial reach of the British Empire, which connected London drawing rooms to Indian botanical gardens, African geological surveys, and the distant colonies that supplied both material resources and cultural imaginaries (Goss et al. 3).

Within this context, science underwent an intense professionalization during the Victorian era. As Ellis notes, this professionalization was inseparable from the cultivation of a particular character: scientists were expected to be "independent, rational, and self-controlled," qualities mirrored in contemporary ideals of elite masculinity and ingrained through scientific training. The rise of professional science in Britain owed much to the flow of knowledge and ideas across borders, connecting it to wider international networks. Traditional natural philosophy evolved into distinct laboratory-based disciplines and specialized societies, e.g., the British Association for the Advancement of Science, founded in 1831, and journals facilitated the circulation of empirical knowledge (777-91). As Chakrabarti and Worboys show, fields such as geology, biology, and anthropology surfaced as instruments of imperial governance, not only as areas of inquiry. They simultaneously supplied the technical expertise and ideological rationale on which British expansion depended (9-31).

Victorian literature, however, did not function merely as a passive reflector of scientific and imperial developments. Novelists and poets actively engaged, not surprisingly, with contemporary knowledge. They translated abstract theories and experimental data into forms that were accessible, ethically resonant, and emotionally compelling. For example, Levine argues that novelists, say, Charles Dickens and George Eliot, transformed scientific theory into novels and raised moral dilemmas (334). According to Glendening, late-Victorian novelists (Hardy, Stoker, Wells, Conrad, and the like), influenced by Darwinism, did not insist on its objective certainties. They responded to evolutionary thought by reflecting on the cultural anxiety (7). There is a consensus among scholars of today that, since the 1870s, science has been central to the empire. Formal institutions and researchers were set up to serve colonial goals, such as improving crops, mining resources, public health, and governance. Science also helped spread ideas of European superiority, giving moral or cultural reasons for imperial rule. Many scientific fields, especially biology, environment, medicine, human and social sciences, were most deeply affected by this overlap of science and empire (Chakrabarti and Worboys 30). Thus, literature served as a bridge between technical expertise and public understanding, and rendered imaginative frameworks through which readers could interpret the implications of industrialization, evolutionary theory, and colonial encounters. This liaison between literary form, scientific inquiry, and imperial ideology demonstrates that literature was an essential medium through which cultural attitudes toward progress, power, and human agency were negotiated.

Among the foremost figures in this dialogue are Charles Dickens, George Eliot, and Alfred, Lord Tennyson. Dickens's personal library did include major scientific works: *Darwin's Origin of Species* (1859), Lyell's *Antiquity of Man* (1863), and several volumes of Buffon's *Natural History*. Also, works like Cuvier's *Animal Kingdom*, books on astronomy, geology, treatises, and lay-scientific texts were there. His reading was not purely superficial. He had a "scientific curiosity," and sometimes subtly blended scientific ideas into his fiction. Dickens's novels, from *Bleak House* to *Hard Times*, transform urban spaces into laboratories where the forces of industrial science, statistical reasoning, and social reform are dramatized (Lal 75-82). His work simultaneously celebrates technological innovation and critiques the mechanistic reductionism that threatens to depersonalize human experience (Sussman 147).

The French philosopher Auguste Comte (1798-1857), the founder of sociology and a philosophy called Positivism, proposed that both the human individual and society as a whole progress through

three distinct intellectual stages in their understanding of the world. He believed this was a natural and inevitable law of human development: (i) the age of theology or Fictitious Stage, in which events are explained by the will and caprice of supernatural beings (gods, spirits, or a single deity), (ii) the age of metaphysics or Abstract Stage where supernatural beings are replaced by abstract, personified forces or essences (like Nature, Reason, Fate, or "Rights"), and (iii) the dawning age of positive science when humanity stops searching for ultimate origins and causes (Chase 5-6). Instead, it focuses on observing phenomena, discovering the scientific laws that govern their relationships, and using those laws to predict outcomes and improve human life. In 1851, George Eliot captures Comte's core argument that the old ways of thinking, relying on faith or abstract philosophy, have taken humanity as far as they can. They lead to endless debate and conflict without producing reliable, agreed-upon knowledge. She echoes the immense optimism of the era (the Industrial Revolution was in full swing):

> *"Holding, with Auguste Comte, that theological and metaphysical speculation have reached their limit, and that the only hope of extending man's sources of knowledge and happiness is to be found in positive science, and in the universal application of its principles; they urge that the thinkers who are in the van of human progress should devote their energies to the actual rather than to the retrospective" (28).*

There was a powerful belief that the scientific method could be applied to society itself (through sociology, economics, and psychology) to solve social problems like poverty, crime, and disease. The grand ambition of Positivism was about creating an entirely new, rational way of organizing human life, government, and morality based on observable facts and data. George Henry Lewes was among the first English adherents of Comte's positivism; his early sympathy toward positivist thought would almost inevitably have piqued George Eliot's curiosity. He became Evans' husband in every meaning of the word except the legal sense (Smith 171). George Eliot, informed by the philosophy of Comte and the naturalistic insights of Darwinian evolution, mixes scientific rationality with ethical inquiry and creates narratives that deal with the causal and moral dimensions of human action.

Tennyson, in works such as *In Memoriam* and his later imperial odes, negotiates the tensions between geological deep time, evolutionary theory, and spiritual belief. His poetry reflects the emotional and intellectual challenges posed by contemporary science. For example, in Canto 56 of the elegy, Tennyson's grief for Hallam prompts a few meditations on nature. The poet is trying to reconcile scientific observations (that many "seeds" produce only one mature organism; many lives are lost, many species go extinct) with his religious faith and belief in personal immortality or worth beyond biological survival. This is part of the larger struggle of In Memoriam — the tension between faith, religious belief, and scientific understandings of life, death, and nature.

This paper contends that the literary strategies of Dickens, Eliot, and Tennyson exemplify the transposition between empirical knowledge, imaginative representation, and imperial consciousness in Victorian culture. Their writings do not merely depict or comment upon scientific and imperial developments; they actively shape how these forces were understood and experienced. Moreover, by tracing the intellectual and aesthetic paths of these authors into the fin-de-siècle, the study demonstrates how Victorian literature provided a template for subsequent cultural critiques and aesthetic movements, negotiating both the promises and anxieties of modernity. In examining the interactions between literary artistry, scientific thought, and imperial ideology, this paper highlights the central role of literature in mediating the ethical, epistemological, and imaginative challenges of the nineteenth century.

2. THE SCIENTIFIC AND IMPERIAL MILIEU

2.1 Professional Science and Public Spectacle:

The early Victorian decades marked a decisive transformation in the practice and perception of science. Traditional "natural philosophy," once pursued by gentlemen scholars, increasingly gave way to specialized, laboratory-based disciplines. The founding of the British Association for the Advancement of Science in 1831 exemplified this professionalization, promoting both rigorous empirical research and public engagement. Science became a cultural spectacle: public lectures, mechanics' institutes, and widely circulated periodicals made complex discoveries accessible to a growing literate audience. The expansion of steam-

powered printing and affordable periodicals ensured that debates over geological theory, electricity, and chemistry could reach not only London elites but also provincial towns. Figures such as Michael Faraday achieved celebrity status, blending experimental rigor with theatrical demonstration at the Royal Institution. This era thus cultivated a dual culture of science—rooted in meticulous observation yet designed for public consumption—which deeply influenced contemporary literature, offering writers both inspiration and cautionary frameworks for engaging with knowledge.

2.2 Empire as Laboratory:

The British Empire functioned simultaneously as a source of knowledge and a stage for scientific experimentation. Colonial territories supplied the raw materials, specimens, and observational opportunities that underpinned the expansion of Victorian science. The botanical gardens at Kew, for instance, relied heavily on plant specimens collected from India, the Caribbean, and other colonies, enabling studies in botany, agriculture, and medicine that were both practical and theoretical. Similarly, geological surveys in Africa, India, and Australia provided mineral samples and fossil evidence that advanced paleontology, sedimentology, and the emerging theories of deep time and evolution. Anthropological studies, meanwhile, attempted to classify and systematize colonized populations, producing knowledge that often justified imperial administration and hierarchies, while reflecting Victorian assumptions about civilization and progress. This reciprocal relationship between empire and science shaped not only empirical knowledge but also cultural imagination. Victorian writers absorbed and interpreted this worldview, in which knowledge and imperial power were deeply intertwined.

The colonies became both a laboratory and a symbolic space, offering plants, minerals, fossils, and human "types" that fed metropolitan theories of biological, cultural, and social development. Literature of the period—novels, essays, and poetry—frequently engaged with these imperial-scientific networks, translating empirical discoveries into ethical, aesthetic, and imaginative forms. Authors like Charles Dickens, George Eliot, and Alfred Tennyson incorporated elements of imperial observation into their work, reflecting on the moral, social, and philosophical implications of Britain's global reach. In doing so, Victorian literature not only documented the scientific and imperial enterprise but also interrogated its ethical dimensions, exploring the responsibilities and anxieties that accompanied the accumulation of knowledge and power across continents.

3. CHARLES DICKENS: URBAN SCIENCE AND SOCIAL EXPERIMENT

Charles Dickens occupies a unique position at the intersection of popular entertainment, social critique, and scientific observation. His novels vividly capture the textures and contradictions of industrial London, portraying streets laden with soot, sewage, and disease—a literary landscape that functions as an "urban natural history." In *Bleak House* (1853), the omnipresent fog that shrouds Chancery Court is more than mere atmospheric description; it metaphorically enacts contemporary miasmatic theories of disease, illustrating how environmental and social conditions intertwine to affect human health. Dickens's interest in public health and sanitation, informed by his association with reformers such as Edwin Chadwick, shapes the novel's depiction of bureaucratic inefficiency and epidemic management, blending empirical observation with narrative drama.

In *Hard Times* (1854), Dickens critiques the mechanistic rationalism that had begun to dominate Victorian education and social thought. As Dickens demonstrates in *HT*, the effects of science, industry, and the mechanic arts affect the ways in which individuals envision themselves and their environment. One kind of change is a new found emphasis on facts, calculations, production, and efficiency. Describing Thomas Gradgrind, owner of the Coketown textile mills, Dickens calls him "A man of realities… a kind of cannon loaded with the muzzle with facts… [and] a galvanizing apparatus…" (Ormiston & Sassower 41). The character of Gradgrind embodies the dangers of a purely utilitarian worldview, one that reduces human beings to statistics and moral life to calculation. Dickens does not reject scientific progress; he advocates for technological improvements such as improved sanitation and gas lighting. Yet he warns against a society governed exclusively by "fact," where human empathy and ethical reflection are subordinated to data.

Buckland quotes Secord's argument that sharing knowledge itself helps to establish scientific authority. Through lab experiments, fieldwork

adventures, or scholarly papers, scientists address specific audiences from the outset, and calibrate what counts as believable, objective, and solid evidence by what those audiences will accept (424). Dickens's narrative strategy oscillates between panoramic social observation and personal ethics. It is a clear indication of the Victorian tension between empirical detail and imaginative understanding (Garratt 161-63). Dickens often includes positive images (railways, gaslight, etc.), but his enthusiasm is tempered by moral cost. In this sense, Dickens functions as a social scientist of feeling who demonstrated that conscientious attention to social conditions must be toned down by sympathy and moral imagination. His work exemplifies the mediation among literature and scientific knowledge, and humanistic inquiry. His quill converted raw data of urban life into emotional and ethical awareness, and criticized industrial and bureaucratic modernity at the same time.

4. GEORGE ELIOT: EVOLUTION, POSITIVISM, AND ETHICAL REALISM

If Dickens dramatized the social implications of science, George Eliot (Mary Ann Evans) probed its philosophical and ethical dimensions. Eliot's lifelong partnership with the polymath George Henry Lewes, a prominent advocate of Comtean positivism and early experimental psychology, immersed her in contemporary debates on epistemology, evolutionary theory, and moral philosophy. The publication of Darwin's *On the Origin of Species* (1859) reinforced a naturalistic worldview that Eliot, as Dan Taylor contends, had already been seeking through German higher criticism and Spinozist ethics (27-48). Her novels encourage realism or, in other words, a literary confrontation with causality, observation, and ethical responsibility (O'Gorman 114-15).

Her novel *Middlemarch* (1871–72) is a brilliant example of what has been termed Eliot's "scientific sympathy." The narrative constructs a web of interdependent lives that mirrors the complexity of an ecological or social system. Similarly, the omniscient narrator maintains a perspective akin to the detached observer in experimental science, carefully recording the interplay of causes and consequences. Characters like Dr. Lydgate embody the promise and challenges of medical modernity: dedicated to empirical research, yet vulnerable to social pressures and ethical dilemmas. Through scrupulous observation, Eliot's narrative exposes patterns of human behaviour while simultaneously focusing on moral reflection. This explains her conviction that literature could function as a form of ethical inquiry parallel to scientific investigation. She referred to her own works as 'experiments in life' (Paraschas 134).

Eliot's engagement with science also resonates with Victorian imperial concerns. Nancy Henry claims that "[T]he empire was an inherent if abstract part of that reality and thus was present even in Eliot's domestic fiction" (8) and that, similar to other thinkers of her time, George Eliot believed the empire to be a remedy for domestic poverty and unemployment (15). In *Middlemarch*, Will Ladislaw perceives the empire as an idealized employment opportunity. Rosemarie Bodenheimer writes that Eliot created a "full-blown study of young men in search of elusive vocations," and that in the characters of Will Ladislaw and Fred Vincy she "rewrites Thornie's story of failure in two different ways" (50-1). Thornie was George Henry Lewes's son. Her writings reflect approaches that came from colonial ethnography. Animals in captivity, particularly lions, became symbols of British exploration and power, functioning as metonymic illustrations of Eliot's knowledge of British conquest throughout the empire (Henry 18). However, unlike some contemporaries, her fiction resists imperial triumphalism and advocates for empathy. By portraying human agency within a network of causes and effects, Eliot challenges both scientific reductionism and colonial arrogance. She flashes a literary vision of the coexistence of ethical responsibility, empirical understanding, and imaginative insight. Eliot's is a distinctively Victorian synthesis, where narrative realism and moral inquiry illuminate the intersections of knowledge, culture, and social ethics. It positions her work as a central site in the dialogue between literature, science, and empire.

5. ALFRED, LORD TENNYSON: POETRY AT THE EDGE OF SCIENCE

Alfred Tennyson, appointed Poet Laureate in 1850, gave lyrical expression to the acute anxieties and aspirations of a society confronting the rise of scientific materialism. His long elegy, *In Memoriam* (1850), while mourning the death of his close friend Arthur Hallam, simultaneously meditates on geological deep time and the unsettling implications of species extinction. The famous line, "Nature, red in tooth and claw" (Tennyson, "Memoriam": 373),

epitomizes the tension between a benevolent, providential worldview and the apparent brutality revealed by paleontology and the emerging Darwinian theory of evolution. Tennyson's poetry thus negotiates the Victorian struggle to reconcile faith with scientific discovery, portraying nature as both sublime and morally ambiguous.

J. M. I. Klaver takes Tennyson to exemplify the ambivalent reaction to nineteenth-century scientific progress. As an avid amateur, he welcomed the new scientific findings, yet he sensed an increasing tension between reason and spirit. He also recognized the poetic potential in scientific discoveries: his engagement with astronomy lent many poems a sense of infinite space; his interest in geology suggested a vast, almost incomprehensible expanse of time. These notions of space and time become central in his search for both man's and God's place within the creation (169). Tennyson's fascination with the universe and marine biology provided him with rich metaphors of cosmic vastness and microscopic complexity.

Poems such as "The Kraken" envision futures shaped by technological and scientific progress. Before Lyell, the Earth was widely believed to be only a few thousand years old, as per Biblical chronology. Lyell's *Principles of Geology* (1830-1833) argued that the Earth was millions of years old, shaped by slow, gradual processes like sedimentation and erosion. This created the concept of the deep time in which humanity was a very recent and insignificant arrival. The entire setting of the poem is a Lyellian "abysmal sea." The Kraken has lain there "for ages" surrounded by "huge sponges of millennial growth and height." This vocabulary of immense, non-human timeframes is directly borrowed from the new geology. The Kraken itself is a creature of this deep time, representing a primordial past that predates and is utterly indifferent to human existence. Theories like those of Jean-Baptiste Lamarck and the controversial work *Vestiges of the Natural History of Creation* (1844, published anonymously) suggested that life developed from simpler, primordial forms. The deep sea was often imagined as a place where ancient, "lower" life forms still resided. His later imperial odes, written for events like the Indian and Colonial Exhibition, celebrate Britain's global dominance and achievements (Black 146-47). Yet even within these patriotic compositions, Tennyson's verse retains a note of ambivalence, acknowledging that material power, however grand, cannot secure spiritual certainty or ethical clarity. Tennyson's writing illustrates literature's ability to close the gap between scientific facts and the ambiguities of human life. In doing so, it provides readers with the dual rewards of enjoyment and deep thought.

6. TOWARD THE FIN DE SIÈCLE

According to Karl Beckson, periods centring on the end of a century have always inspired both fascination and fear; the close of a century often triggers existential dread over endings and the uncertain future. Nonetheless, the specific transition into the 1900s was characterised by a powerful sense of optimism. This was incited by transformational advances exemplified by faster locomotives, steamships, photography, and electric lighting that changed the world so completely that people living then already felt they were in a "modern" age (xi-xii). By the 1880s and 1890s, the earlier Victorian confidence in the synthesis of science, morality, and empire began to fragment. The fin-de-siècle ushered in aestheticism, decadence (the term "decadence" derives from the Latin *de+cadera*, meaning to fall away from, and in most traditions, decadence is used to mean cultures that have declined from robust civilizations), and early modernist scepticism (Saler 61), typified by writers such as Oscar Wilde and Thomas Hardy. Ledger and Luckhurst note a shift in scientific focus, as new disciplines such as experimental psychology, sexology, and eugenics turned their attention to the human mind, body, and heredity rather than the external natural world (xiii). Despite these shifts, the influence of Dickens, Eliot, and Tennyson remained tangible. Hardy's *Tess of the d'Urbervilles* inherits Eliot's subtleties of evolutionary fatalism (Knoepflmacher and Tennyson 271); Wilde's epigrams echo Dickens's combination of social satire and performative narrative; the imperial spectacle of the 1890s still resonates with the ceremonial grandeur celebrated in Tennyson's laureate odes. The fin-de-siècle also revealed a darker convergence of science and empire. Anthropometry, racial science, and eugenics attempted to classify colonial populations into hierarchical categories, providing pseudo-scientific justification for imperial domination. Technological innovations, e.g., the machine gun, the telegraph, etc., pushed Britain's ability to control far-flung territories, yet they simultaneously disclosed the moral ambiguities of imperial authority. The era

witnessed a shift from the optimistic "natural theology" of early Victorian science to a pervasive sense of anxiety: empirical progress no longer guaranteed ethical clarity, and knowledge of the world often revealed uncomfortable truths about power, inequality, and mortality.

In literature, these tensions were mirrored by increasingly experimental forms and tones. Writers negotiated the ethical, aesthetic, and philosophical challenges posed by scientific advances, technological innovation, and imperial expansion. The fin-de-siècle, therefore, represents both a continuation and transformation of Victorian engagements with science and empire, signalling the transition toward modernist uncertainty while remaining grounded in the moral and imaginative frameworks established by Dickens, Eliot, and Tennyson.

7. CONCLUSION

Victorian literature functioned as a "third culture," bridging the gap between scientific empiricism and moral imagination. Charles Dickens transformed urban life into a complex laboratory of social observation, dramatizing both the potential and the perils of scientific knowledge while warning against the dehumanizing effects of utilitarian rationalism. George Eliot's philosophical novels exemplify a disciplined yet sympathetic realism, showing how narrative could reflect, interrogate, and critique the ethical and epistemological dimensions of evolutionary theory and positivist philosophy. Alfred, Lord Tennyson's poetry, ranging from *In Memoriam* to his imperial odes, oscillates between cosmic awe and spiritual longing, capturing the emotional and intellectual tensions of a society negotiating the decline of theological certainty alongside the promises of scientific and imperial mastery.

Collectively, these writers demonstrate that Victorian engagements with science and empire were far from uncritical or purely celebratory. Literature provided a site of ethical and epistemological negotiation, where the promises and dangers of technological, scientific, and imperial authority were interrogated and humanized. The fin-de-siècle inheritors of this tradition confronted a world in which imperial ambition and scientific enterprise were inseparably intertwined, yet increasingly subject to cultural skepticism and moral reflection.

Revisiting Dickens, Eliot, and Tennyson calls for the applicability of the Victorian model for contemporary dialogue between the sciences and the humanities. Their work illustrates that empirical discovery and imaginative insight are not mutually exclusive but mutually enriching, offering frameworks for ethical engagement, critical reflection, and cultural understanding. In an era of rapid technological change, environmental crises, and renewed debates over the social responsibility of science, the Victorian synthesis of literature, science, and empire provides a compelling template for cultivating curiosity, empathy, and moral discernment in the modern world.

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