Virginia Woolf entangles time and topography in Mrs. Dalloway to reveal that her characters inhabit a relative London. Marking the Great War as the historical event dividing an old world order from the new, she creates characters who spend the day reminiscing about their youth before the war or who still suffer the lingering effects of mechanized combat. While they navigate an increasingly complex and commercialized environment, she locates them at specific landmarks as Big Ben and St. Margaret’s chime the hour, creating a dynamic, interactive setting aligned with her characters’ thoughts. Woolf styles a narrative that unfolds from a diversity of viewpoints, contrasting a Victorian period that adhered to the ideas of the Enlightenment with a modern period in which individuals experience a relationship between space and time in accord with Albert Einstein’s special and general theories of relativity.

Keywords: Virginia Woolf / Albert Einstein / relativity / topography / WWI

As numerous critics have made clear, Virginia Woolf was fascinated by science. Not only did she feel compelled to write about the technology it produced, such as the gramophone and the airplane, but several prominent scientists appear by name in her work as well. When Isa Oliver peruses the Pointz Hall library in Between the Acts, she comes across books by Arthur Eddington, Charles Darwin, and James Jeans (BA 20). Albert Einstein appears in Mrs. Dalloway when Mr. Bentley considers the achievements of humankind (MD 28), and again in A Room of One’s Own when Woolf references his theories directly.

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Remarking upon the limited economic opportunities available to women and the obligation imposed upon them to rear children, Woolf writes, “Now if [Mary Seton’s mother] had gone into business[, instead of bearing thirteen children,] we could have been sitting at our ease [...] and the subject of our talk might have been [...] physics, the nature of the atom [...] or relativity” (Room 21). In fact, discoveries in twentieth-century physics in particular seem to complement Woolf’s own beliefs and aesthetic and to manifest in her work both thematically and structurally. In To the Lighthouse, for example, as Mr. Ramsay ruminates on the realist-idealist debate and struggles with the limitations of formal logic and causality, Mrs. Ramsay appears to slow time and to blur the boundaries separating subjects and objects. In The Waves, Woolf’s characters exhibit a form of collective consciousness as though interconnected by a vast energy field, and she weaves separate narrative threads together accordingly to form a single, continuous braid.

Thus, in light of Woolf’s apparent interest in physics, several critics attempt to unveil her level of awareness regarding popular physical theories. Ann Banfield examines the influences that Woolf’s father Leslie Stephen and her contemporaries Bertrand Russell, Roger Fry, G.E. Moore and Alfred North Whitehead had upon her and concludes that two versions of epistemology, one being the “direct apprehension of [a knowledge of the external world] through the senses and the other scientific knowledge, chiefly modern physics” were what “Woolf [...] came to know as philosophy” (6). Holly Henry, Michael North, Peter Bowler, and Michael H. Whitworth offer detailed accounts of the popularization of science in Britain during the early to mid-twentieth century, and North, Whitworth, and Henry further illuminate Woolf’s personal associations with prominent scientists and science writers. Henry asserts, “Woolf’s fiction and essays reveal that she read best-selling, non-technical science texts covering cosmology, relativity, and the new physics [...]. She also] became part of a network of intellectuals many of whom published multiple non-technical science books on advances in mathematics, the new physics and in cosmology” (14–15). Woolf’s intellectual pursuits and her social and professional contact with prominent members of the scientific community afforded her an intimate knowledge of the advancements taking place in the field of physics.

Scholars trace the ways in which her knowledge of physics shapes and/or complements her writing. Allen Thiher contends that Woolf’s characters ponder the implications of modern science and struggle to fit human experience into the rationalist paradigms it offers, and, like Whitworth and Gillian Beer, he notes a striking connection between the leitmotif of waves permeating Woolf’s writing and the wave-particle duality of matter purported by quantum physicists. Mark Hussey maintains that Woolf’s view of reality has much in common with physicist David Bohm’s conception of the “implicate order” (“Cosmology” 81), while Sharon Stockton deftly situates Woolf’s work within a modernist zeitgeist, explaining how the author’s treatment of perspective accords with “shifts from Newton to Einstein, from Charcot to Freud, and from mid to late empire” (104). Surprisingly, however, although each of these critics agree that Woolf
was conversant with Albert Einstein's theories of relativity, they do not offer a pointed analysis of his potential contribution to her understanding of space and time or of the influence this understanding may have had on her presentation of the modern condition.

Einstein published his special theory of relativity in 1905, but he did not publish his general theory until 1916, when the Great War was already well underway. And although Woolf famously proclaimed that the world changed "in about the year 1910" ("Brown" 194)—which has become a popular point of origin for the modernist period—in her works of fiction such as *Jacob's Room*, *Mrs. Dalloway*, *To the Lighthouse*, and *Between the Acts*, the Great War serves as the definitive historical event dividing an old world order from the new. As the war came to an end, Britain began to come to terms with a very different understanding of reality. Dora Marsden claimed in *The Egoist* in April of 1918 that "[t]he hour [...] has struck when our conceptions of physics must necessarily be overhauled. And not only those of physics. There must also ensue a reissuing of all the fundamental values" (51). A year later, in May 1919, a solar eclipse fully confirmed the validity of Einstein's general theory when Arthur Eddington verified that the sun's gravitational field did in fact bend the light from distant stars. This affirmation of the curvature of spacetime instigated a flurry of newspaper and magazine articles and galvanized public interest in a way that was simply not possible in 1916.

Many of her literary contemporaries and Woolf herself captured the multifaceted transformations of a postwar era wherein Einstein's popularized theories continually circulated both as fact and as metaphor, unsettling the centuries-entrenched beliefs in the absolute, mechanistic workings of the universe, along with the concomitant cultural practices closely associated with these beliefs. Just as Einstein proposed that the identity of any single entity could only be understood in relation to all others or, in essence, that the universe should be conceived as a vast web of interrelationships, Woolf presents the properties of space and time in her fictional texts not as though they were a static stage for events (the Newtonian and Victorian approach), but as though they operated interactively. *Mrs. Dalloway* is the first text in which her characters' spatiotemporal perceptions are directly linked to the setting they inhabit, and I will argue here that Woolf entangles time and topography to highlight Britain's transition into a postwar era that is distinctly relative.

As Woolf's characters roam the streets of London thinking about their lives before the war, Big Ben recalls them to the present. Clarissa Dalloway starts her day at home in Westminster thinking, "What a lark!" (*MD* 3). Recollecting how opening her windows always felt that way and then remembering when she was eighteen that she also sensed "that something awful was about to happen" (*MD* 3), she soon begins her journey along Bourton Street to purchase flowers at a florist on Bond Street. Continuing to reflect upon her past, she tries to bring to mind exactly what Peter Walsh said years before. The imminent strike of Big Ben makes her feel an "indescribable pause" (*MD* 4), however, just before it causes her to focus upon the modern city around her:
There! Out it boomed. First a warning, musical; then the hour, irrevocable. The leaden circles dissolved in the air. Such fools we are, she thought, crossing Victoria Street. For Heaven only knows why one loves it so, how one sees it so, making it up, building it round one, tumbling it, creating it every moment afresh; but the veriest frumps [. . .] do the same; can’t be dealt with by Acts of Parliament for that very reason: they love life [. . .] and the strange high singing of some aeroplane overhead was what she loved; life; London; this moment of June. For it was the middle of June. The war was over . . . (MD 4–5)

Located at the north end of Westminster Palace, Big Ben—the bell and the clock tower that houses it—serves as the official timepiece of London. It carries the “leaden” weight of authority as it announces the beginning of the day that will span the entire length of the novel it will frequently punctuate. As Clarissa crosses the street named for the iconic, historically emblematic queen, she contemplates the city’s hustle and bustle, and Big Ben’s marking of the “irrevocable” hour appears to denote all of London’s inevitable and unidirectional passage into the future. Later in the novel, her husband Richard Dalloway has a very similar experience. While returning home from Lady Bruton’s with flowers he has purchased for Clarissa, he looks at Queen Victoria’s memorial in front of Buckingham Palace. Clearly recalling Britain’s Victorian period, he decides, “he liked continuity; and the sense of handing on the traditions of the past. It was a great age in which to have lived” (MD 117) shortly before he considers that “here he was, in the prime of his life, walking to his house in Westminster” (117). As soon as he situates himself in his current place in time, Big Ben strikes its “warning, musical; then the hour irrevocable” (117). Throughout her novel, Woolf consistently distinguishes between the past on which her characters ruminate and the present in which they now live by situating them in specific spots on the map and by frequently marking the hour.

For Clarissa in particular, Big Ben not only recalls her to the present day, but as soon as it chimes, she imagines that she modifies the city about her, suggesting a new way of conceiving space. From her perspective, Clarissa is the focal point around which the cityscape transforms, and she is the agent that causes this transformation. She is the one “making” the city, “building” it, “tumbling” it, and “creating it every moment afresh” (MD 4). Her environment does not simply morph on its own while she passes it by. Rather, its transmutation is inseparable from her passing.

Historically, scientists considered both space and time to be invariant and universal values unaffected by the motions of objects. According to Sir Isaac Newton, it was not these values that changed when measured by different observers, but the speed of light that was inconstant. He also believed that light propagated through a material medium and decided that an unperceivable ether must exist that would allow for a mathematically viable theory of absolute space and time, conceiving of the ether as a type of material grid that persisted as a perpetual presence and present or “as a kind of stage for physical happening”
(Einstein 165). Contrary to Newton’s notion of the inconsistent velocity of light, a series of experiments performed by Albert Michelson and Edward Morley in the 1880s indicated that “the speed of light in empty space is the same regardless of the speed and direction of the light source” (Cropper 201). Based on these findings, Einstein would later surmise that a material ether did not exist, and that while the speed of light remained the same regardless of the relative motion of its source, the properties of space and time inevitably fluctuated for individual observers.

In *Mrs. Dalloway*, Clarissa imagines this variable relationship while she transverses London. As Big Ben proclaims a new hour (and a new era), Clarissa immediately crosses Victoria Street and perceives the city and life itself as modifying moment to moment from the individual’s subjective point of view. According to the general theory of relativity, space is defined in relation to the discrete objects that occupy it. Objects curve the spatiotemporal dimensions around them as they move. Similarly, Clarissa imagines London instantaneously reconstructing itself in relation to her as she walks its streets. For Clarissa, space is not static but dynamic, and although she seems to be the only one to notice it, the setting throughout the novel appears highly elastic. This apparent elasticity reflects Woolf’s deliberate decision to entangle her characters’ sense of spatiality with their sense of temporality.

The perspectival shifting of space in respect to time becomes readily apparent when we examine the various peregrinations of nearly all of Woolf’s major characters. Andelys Wood observes that “specific landmarks locate the characters in a network of spatial and temporal relationships as they walk through London” and “readers who attempt to follow both time and place cues will find discrepancies, even impossibilities: nearly all the walks that clearly structure the novel must take considerably longer than the time so precisely allotted to them, as Woolf, herself an experienced London walker, surely knew” (19). Wood offers a comprehensive look at several of the journeys particular individuals take. She observes that Peter Walsh leaves Clarissa’s house at 11:30 [. . .] “in time with the flow of the sound, the direct downright sound of Big Ben striking the half-hour” (52) [;] he walks up Whitehall, follows a young woman from Trafalgar Square across Piccadilly, Oxford Street, and Great Portland Street, dozes off on a bench in Regent’s Park, and wakes again just as a clock strikes “the quarter to twelve” (77). Peter, a man of fifty-something, has covered more than two miles in less than fifteen minutes: no wonder he needs a nap. (Wood 21)

Wood also points out that Richard’s trip home from Lady Bruton’s is a “physical impossibility” (24). Tracing Clarissa’s morning stroll, John Sutherland proposes that to have returned home by 11:00, she would have needed to take a taxi (222). Very few of the motions that occur in the novel follow the dictates of common sense, but this is because none of these walks occur within the fixed spatiotemporal dimensions readers have a tendency to ascribe to them.
Instead of making multiple blunders in an otherwise scrupulously crafted novel, Woolf creates fluid spatiotemporal dimensions to draw attention to the fact that her characters inhabit a relative setting. Just as time and space are dynamic qualities in Einstein’s conception of the universe, Woolf’s London is incredibly interactive and not always in apparent step with the characters who live there. The relationship between Clarissa, Peter, and Richard and their surroundings may be dynamic, but it is not chaotic. As readers, we tend to assume that Big Ben and the people who roam London’s streets share the same perspective of time and space, and we might additionally surmise that because the characters are walking through the city that, if anything, they are moving at a slightly faster pace than their presumably stationary environs. Nevertheless, the characters’ thoughts suggest the opposite. They are consumed by their lives before the war while Big Ben persists in announcing the present hour in a London that has moved on despite them. The characters are not traveling too fast. In a metaphorical sense that aligns with the structure of Woolf’s narrative, they are traveling too slow.

In a fully relative London, Woolf’s slow-moving characters would perceive their own sense of time ticking by at a faster rate than Big Ben’s. According to Einstein, time passes more quickly for a relatively stationary observer (in this context, Woolf’s characters that remain mostly stuck in the Victorian past) than it does for an observer moving at a more rapid pace (modern London). In accord with relativity, Woolf’s characters would perceive that they take a greater amount of time to stroll the streets by their wrist watches than Big Ben would seem to denote to readers. From their subjective points of view, characters’ accounting of time and distance would appear wholly rational even if it were incongruous in relation to the city’s most famous clock. Readers who note apparent discrepancies do so because they affiliate themselves with Big Ben and base their calculations on a single, accelerated system moving at a much different speed than the characters themselves. Consequently, they assign a unilateral point of view to an otherwise diverse multitude.

Nevertheless, Woolf’s Londoners are no longer in sync with a single perspective of time and space because they no longer inhabit a mechanistic London. Big Ben can represent an authoritative sense of the modern present, but it cannot reasonably dictate a universal point of view. Woolf’s central characters are caught in a historical transition that is moving apace more rapidly than they are. As they struggle to keep up, many of them move into a new era almost begrudgingly, even as the harbingers of that new era call out to them.

As Clarissa continues her shopping trip, Woolf captures the size and consumerist habits of a growing and increasingly mobile middle class. Spotting a motorcar transporting an unknown member of the royal family, Clarissa is disturbed by thoughts that it might be the Queen who is being held up by traffic. Woolf writes, “[t]he British middle classes sitting sideways on the tops of omnibuses with parcels and umbrellas, yes, even furs on a day like this, were, she thought, more ridiculous, more unlike anything there has ever been than one could conceive; and the Queen herself held up; the Queen herself unable to pass” (MD 17). Despite
the momentary stalemate between royalty and the crush of consumers, the police ensure that the omnibuses make way for the motorcar, and as the motorcar passes, it causes "[s]omething [.] that no mathematical instrument [.] could register [.] yet [.] in all the [.] shops strangers looked at each other and thought of the dead; the flag; of Empire [.] For the surface agitation of the passing car [.] grazed something very profound" (MD 18). Momentarily, the middle class is not only moved physically by the upper class, but moved emotionally as well.

Woolf accentuates the absolute unity of the public's response to the motorcar by situating it within a very specific perceptual framework. The presence of the motorcar compels everyone on the street to identify with a common nationality and history:

At once they stood even straighter [.] and seemed ready to attend their Sovereign [.] as their ancestors had done before them. The white busts and the little tables in the background covered with copies of the Tatler and syphons of soda water seemed to approve [.] and to return the frail hum of the motor wheels as the walls of a whispering gallery return a single voice expanded and made sonorous by the might of a whole cathedral. (MD 18)

The reaction to the motorcar is a collective one. Every pedestrian in the street responds in the same way: "as their ancestors had done before them." Despite the initial mystery regarding the occupant of the vehicle, all the characters share a single perspective of the event, and the upper and middle classes seem united as a "single voice."

Shortly afterward, however, an airplane overhead replaces the unifying presence of the motorcar, and the middle class reemerges as a separate entity aligned with a very different and relative perceptual framework. Everyone directs their attention to the airplane, and the crowd's response indicates a resurgence of separateness within the collective. Various characters have their own interpretation of the letters being written in the sky: "A C was it? an E, then an L? [.] a K, and E, a Y [.] 'Glaxo,' said Mrs. Coates [.] 'Kreemo,' murmured Mrs. Bletchley [.] 'It's toffee,' murmured Mr. Bowley" (MD 20–21). North explains that this instance of skywriting in the novel reflects the very first demonstration of skywriting that occurred on Derby Day in 1922. The Daily Mail promoted itself by scrawling its name in the sky and then proceeded to report on the incident in an article that claimed: "Sky-writing [.] impress[es] large numbers of people simultaneously with the trademark or slogan to be advertised" (qtd. in North 83). The author of the article insisted that "everyone within an area of a hundred square miles—and there were millions—gazed spellbound at this fascinating sight, and there was a general chorus of 'Daily Mail'" (qtd. in North 83). Noting that none of Woolf's characters agree on what the plane is actually writing, North contends that "[n]ot only does Woolf erase the Daily Mail itself from the site of its greatest triumph, but she also demolishes the unanimity and simultaneity on which skywriting staked its extravagant claims" (83). Although the forces of the free market exemplified by the airplane overshadow the aristocracy, they cannot
facilitate yet another absolute or univocal point of view. The modern airplane stimulates a diversity of interpretations, each of which is unique to the individual. More than simply depicting a metaphysical relativity associated with the largest growing class in Britain, the scene points to Einstein’s theories directly. The motorcar that conveys royalty momentarily engenders a uniform reaction. The airplane represents a more recent feat of engineering, and it stimulates a manifold response. Woolf does not offer an objective rendering of the airplane that would enable readers to take in and interpret the scene from a single, privileged point of view. Instead, her narrative technique presents a conglomerate of different referential frames, each one as seemingly valid as any other.8

Tellingly, modern physics gets the last word:

Away and away the aeroplane shot, till it was nothing but a bright spark; an aspiration; a concentration; a symbol (so it seemed to Mr. Bentley, vigorously rolling his strip of turf at Greenwich) of man’s soul; of his determination, thought Mr. Bentley, sweeping round the cedar tree, to get outside his body, beyond his house, by means of thought, Einstein, speculation, mathematics [. . .] away the aeroplane shot. (MD 28)

The airplane is an impressive artifact of scientific achievement, but Mr. Bentley values it more as a symbol of man’s soul. Nearly all of his associations with the solid object, save one, are intangibles. He playfully attempts “to get outside his body [. . .] by means of thought” which leads first to Einstein. Whitworth asserts that “Bentley might associate Einstein with disembodiment purely because of his reputation as a pure thinker” (186), but Mr. Bentley also seems to be decisively moving away from materialism in general.

Woolf’s meticulous attention to geographic detail elicits a contrast between Mr. Bentley’s musings about modern science and more traditional practices and principles. Whitworth speculates that “by placing Mr Bentley at Greenwich, and the aeroplane above it, [Woolf] alludes to Einstein’s role in changing ideas of space and time” (186). All earthly time is measured relative to Greenwich Mean Time and all space is defined in relation to the Greenwich Meridian. However, Woolf’s positioning of the airplane above this location hints at a much newer understanding of its fundamental associations. If the prime meridian represents the conventional maritime use of a two-dimensional grid to navigate a three-dimensional surface, the airplane above it recalls the geodesics used by modern pilots. Parallel lines of longitude and perpendicular lines of latitude reflect Euclidian geometry, but geodesic arcs mirror the curved geometry proposed by mathematician Georg Friedrich Bernhard Riemann whose ideas Einstein adopted for his general theory of relativity.9 Because Woolf does in fact interrupt Mr. Bentley’s stream-of-consciousness to provide readers with information about her character’s exact location, it seems that once again she wants her readers to take notice. She does not simply present a character who ponders Einstein because he is an iconic figure. Rather, Woolf draws attention to older scientific ideas to show how Einstein’s newer theories have affected the way her characters interpret their world.
After introducing Mr. Bentley, Woolf provides us with an individual possessed of a very different understanding of the scientist's role in society and who seems to function as a foil to Mr. Bentley. Whitworth contends that "[t]he First World War saw [...] the identity of science being strongly contested. For some, it was identified with utilitarian and mechanistic thought; for others, with high-minded seeking after truth" (113). Because he sees the airplane as a "symbol [...] of man's soul" (MD 28), in the sense that it represents humankind's aspirations to pure thought, Mr. Bentley falls into the second category.

In contrast, just before the airplane flies over Ludgate Circus and vanishes from the narrative, there appears

a seedy-looking nondescript man [...] who stood on the steps of St. Paul's Cathedral, and hesitated, for within was what balm, how great a welcome, how many tombs with banners waving over them, tokens of victories not over armies, but over, he thought, that plaguy spirit of truth seeking which leaves me at present without a situation [...] Why not enter in, he thought, put this leather bag [...] before an altar, a cross, the symbol of something which has soared beyond seeking and questing and knocking of words together and has become all spirit, disembodied, ghostly—why not enter in? (MD 28)

This unnamed stranger seems to consider man's soul as well, though he conceives of a specter of the dead instead of an animating spirit of the living. Because this unnamed character blames "plaguy [...] truth seeking" for his own unemployment, it's possible that Woolf imagined him to be gainfully employed as an applied scientist during the war inventing and manufacturing lethal wartime technologies. Supporting this possibility is the fact that the stranger conflates death with nationalism by insinuating that soldiers have not sacrificed themselves to defend their country's sovereignty, but, philosophically at least, they died defending against the corrupting, immaterial "spirit of truth-seeking." Alternately, and ironically, the stranger implies that they perished in defense of the very objects that killed them.

Just as Mr. Bentley's place on the map resonates with his thoughts, the stranger's place on the map may inform his ideas as well. Another famous London landmark, St. Paul's Cathedral, was rebuilt at the peak of the Enlightenment by Sir Christopher Wren. In addition to being an architect, Wren was an astronomer and physicist who lectured on Johannes Kepler's discovery of elliptical planetary orbits and tested the theories of René Descartes alongside Robert Boyle. In his *Principia*, Newton names Wren as one of the "greatest geometers of our times, [who] did severally determine the rules of the collision and mutual rebound of hard bodies, and much about the same time communicated [his] discoveries to the Royal Society" (qtd. in Summerson 55). Thus, St. Paul's recalls the Age of Reason and mechanism.

It may be conjecture to suggest that Woolf's stranger is an applied scientist or that his location reflects his belief in Enlightenment mechanics, but circumstantial evidence allows that this is a distinct possibility. In *Three Guineas*, where
Woolf tackles the topic of preventing war, she cites the Marquess of Londonderry and Winston Churchill, who each express essentially the same concern that even though man's scientific knowledge has increased, his proclivity for destruction has not correspondingly decreased (TG 72–73). She quotes these famous figures just prior to warning women against creating educational institutions for the disenfranchised that follow the same modus operandi as male educational institutions, "unless," she argues sardonically, "you share the opinion of the professors of the Church of England that death is the gate of life—Mors Janua Vitae is written upon an arch in St. Paul's—in which case there is, of course, much to recommend it" (TG 74). Distinguishing the scientific attainment of knowledge for its own sake from the potentially devastating ramifications of adopting an amoral stance when applying this knowledge, Woolf in Three Guineas may offer a way for us to retrospectively understand her intentions regarding the brief inclusion of Mr. Bentley and the stranger in Mrs. Dalloway. If Woolf does want us to perceive Mr. Bentley as a seeker of truth and the stranger as an unemployed warmonger, then she seems to champion the more modern and, as of yet, purely cognitive theories of relativity over a destructive and defunct materialism. Consequently, in the protracted scene involving a motorcar and an airplane, she seems to position class conflict, capitalist consumerism, and the contestable future of scientific praxis within a radically changing sense of spatiotemporal perception that only fully comes to light in the aftermath of WWI.

Woolf further explores the idea that spatiotemporal perception has undergone a change since the war by introducing a shell-shocked central character who is incapable of situating himself in a circumscribed presence in space or a present moment in time. The irrevocably damaged Septimus Warren Smith fails to integrate back into a society that is no longer mechanistic, in part because he experiences a boundless sense of spatiality. To a greater degree than any other character, he feels himself connected to everything around him. While sitting in Regent's Park, a verdurous environment antithetical to the obliterated landscape of the No Man's Land he's used to, he feels as though "[h]is body was macerated until only the nerve fibres were left. It was spread like a veil upon a rock [. . . ]; Red flowers grew through his flesh" (MD 68). He conceives of himself and the objects within his vicinity as permeable. The trees in the park where he and Rezia sit before his appointment "were alive. And the leaves being connected by millions of fibres with his own body, there on the seat, fanned it up and down; when the branch stretched he, too, made that statement" (MD 22). Whereas Septimus was trained to be aggressive and unsympathetic during the war, he now experiences a profound and peaceful empathy. Whereas he was once confined to the narrow space of the trenches, he now reaches out to the environment around him and has the inexplicable experience of completely merging with it, all the while rebounding from his violent past to such an extent that he is unable to find his place in present day London.

Instead of regimenting his life by the clock, Septimus resists adapting to a sense of incremental time, spanning the distant past and seeing into the future.
He reveals his divisionless sense of duration just before his appointment with Sir William Bradshaw. His wife, Rezia, says, “It is time” (MD 69) for them to go and see the doctor, and for Septimus, “The word ‘time’ split its husk; poured its riches over him [. . .] like shavings [. . .] and flew to attach themselves to their places in an ode to Time; an immortal ode to Time” (MD 69–70). The dead Evans appears to him from behind a tree, and Septimus “rais[es] his hand like some colossal figure who has lamented the fate of man for ages in the desert alone [. . .] and with legions of men prostrate behind him he, the giant mourner, receives for one moment on his face the whole” (MD 70). Taking in what seems like the entire history of humankind in a single instant, Septimus’s temporality is both nonlinear and expansive. In an attempt to snap him out of his trance–like state, Rezia insists, “The time, Septimus [. . .] What is the time?” (MD 70). Septimus responds by asserting, “I will tell you the time,” but he is “smiling mysteriously [. . .] smiling at the dead man in the gray suit” and never actually states the present hour (MD 70). Septimus, who can also “see into the future, when dogs will become men” (MD 68) cannot validate the clock. This may be a symptom of his posttraumatic stress disorder, but it further removes him from the conflict that caused it. Stephen Kern explains that the “delicate sensitivity to private time [. . .] had no place in the war. It was obliterated by the overwhelming force of mass movements that regimented the lives of millions of men by the public time of clocks and wrist watches, synchronized to maximize the effectiveness of bombardments and offensives” (288). Therefore, Septimus’s refusal to acknowledge a single, socially shared conception of the present hour may stem from his associations of it with combat.

Not surprisingly, it is Big Ben that provides the answer to Rezia’s question by informing her (and the rest of London) that it is quarter to twelve. Ultimately, Septimus’s disconnection from a present moment in time and a precise location in space proves untenable in a relative universe where all subjects and objects occupy unique spacetime coordinates.¹¹ In the immediate aftermath of Septimus’s suicide, through the window out of which he jumped, Rezia hears Big Ben striking “one, two, three” and tellingly notes, “how sensible the sound was” (MD 150). Unable to reintegrate into modern society, Septimus is condemned to slip back into the historical abyss of a war that divides an older Newtonian order from the new order proposed by Einstein.

Although Clarissa does not share Septimus’s sense of a divisionless time and space, she too resists the exacting proportions that his doctor advocates, conceiving of a spatiotemporal frame of reference more accommodating of individual experience. Her ideas about space and time have much in common with her feelings about religion and romance. Unlike Miss Kilman, who loves religion, and Peter, who’s made a religion of love, Clarissa finds their single-mindedness unsettling. As opposed to Miss Kilman, Clarissa has “evolved [an] atheist’s religion of doing good for the sake of goodness” (MD 78), and she also “[n]ever tried to convert anyone herself [. . . because] she [. . .] wish[es] everybody merely to be themselves” (MD 126). Clarissa seems wary of organized religion because it threatens her sense of autonomy. This relates to her rejection of Bradshaw, “the
priest of science" (MD 94), who “[w]orshipping proportion […] not only prospered himself but made England prosper” (MD 99). The narrator goes on to assert that Britain’s imperial and economic fortune relies on a self-serving program of religious conversion, contending that “proportion has a sister, […] a Goddess even now engaged—in […] India […] and] Africa […] At Hyde Park Corner […] she stands preaching; […] walks penitentially disguised [sic] as brotherly love through factories and parliaments; offers help, but desires power” (MD 100). Clarissa rejects Peter’s notion of romantic love for the same reason that she rejects Bradshaw’s rigid and domineering sense of proportion (a sense of proportion the narrator links to empire). Clarissa feels that Peter, who has “a turn for mechanics” (MD 49), possesses a sense of love that would destroy them both and rob her of her freedom.12 She thinks that “she had been right […] not to marry [Peter]. For in marriage a little licence, a little independence there must be between people […] which Richard gave her, and she him” (MD 7-8). Clarissa values her independence above the traditional values of either religion or a marriage that would fully subsume her identity under her husband’s.

As she does with economics and war, Woolf positions religiosity and even Clarissa’s feminist sensibilities within the space–time framework that conspicuously governs the postwar present in her novel. When Clarissa ponders the actions of her elderly neighbor, she reveals that her core beliefs about the human condition are enmeshed with a belief that corresponds to the fundamental tenets of Einstein’s relativity. After she returns home from her shopping trip, she looks out her window and settles her gaze on her neighbor who is also inside her own house and at her own window. During this epiphanic moment when Big Ben strikes the half hour, Clarissa watches

the old lady […] move away from the window, as if she were attached to that sound, that string […] She was forced, so Clarissa imagined, by that sound, to move, to go—but where? […] Why creeds and prayers and mackintoshes? when, thought Clarissa, that’s the miracle, that’s the mystery; that old lady, she meant, whom she could see going from chest of drawers to dressing table […] And the supreme mystery which Kilman might say she had solved, or Peter might say he had solved, but Clarissa didn’t believe either of them had the ghost of an idea of solving, was simply this: here was one room; there another. (MD 127)

In this scene, Clarissa, who favors St. Margaret’s clock, characterizes Big Ben as a mechanical force. She conceives of the sound of the chime as a “string” that pulls at and compels her neighbor to act. The description of Big Ben as “forc[ing … her neighbor] to move, to go” evokes Newton’s laws of motion that dictate how different forces affect the movement of any given object. Since neither Miss Kilman’s religion nor Peter’s love allow for individual, disparate viewpoints, Clarissa affiliates them with an absolute worldview and rejects them outright.

Although she perceives that her elderly neighbor is directed by mechanistic laws, Clarissa doesn’t feel compelled to go anywhere. Just as she does at the beginning of the novel when she crosses Victoria Street, she experiences a sense of
relative space: “here [is] one room; there another” (MD 127). Of course, Clarissa’s declaration foreshadows the many insights about spatiality that Woolf provides in *A Room of One’s Own*. It also, as Helen Southworth contends, reveals that Clarissa comprehends a genuine sense of otherness and understands that “her life runs concurrently to that of others and, most importantly, that her life is defined in relation to these other lives” (50). Southworth’s assertion is apt in the metaphysical sense she intends and in a purely physical sense as well. Without an absolute time and space, Clarissa could only be defined in relation to different subjects and objects. Regardless, Clarissa’s understanding of the answer to “the supreme mystery” is quite simply that everyone possesses a unique space. That this assertion is meant to contradict a religious and romantic stance that promotes conformity to a single point of view, and that Clarissa makes it while conceptualizing time in mechanistic terms, indicates that Woolf is once again linking changes in society and thought to the profound paradigmatic shift in the laws of physics.

In the paragraph that follows, Woolf alludes to a relative sense of time and offers St. Margaret’s chime as a viable alternative to Big Ben’s authoritarian pronouncements. She writes, “but here the other clock, the clock which always struck two minutes after Big Ben, came shuffling in with its lap full of odds and ends, which it dumped down as if Big Ben were all very well with his majesty laying down the law [. . .], but she must remember all sorts of little things besides” (MD 128). St. Margaret’s clock is out of sync with Big Ben and undermines its complete authority by offering a different account of the present hour. This raises the question: which timepiece is correct? This is the wrong question to ask, however, because it ignores the more profound implications involved in making St. Margaret’s such a conspicuous feature of the setting. After all, if either Big Ben or St. Margaret’s is correct in all contexts, then time is absolute and one of the clocks is simply broken or neglected. This seems unlikely considering that St. Margaret’s declarations of the hour are as regular as Big Ben’s. Just after Peter ruminates on Clarissa’s rejection of him, the narrator personifies St. Margaret’s and addresses the issue of its accuracy. Woolf writes, “Ah, said St. Margaret’s [. . .]. I am not late. No, it is precisely half-past eleven, she says. Yet, *though she is perfectly right*, her voice, being the voice of the hostess is reluctant to inflict its individuality. Some grief for the past holds it back; some concern for the present” (MD 49, emphasis added). Since neither Big Ben nor St. Margaret’s appear to be wrong in their declarations of the hour, their disparate demarcations propose a new way of conceiving reality. St. Margaret’s does not challenge Big Ben’s authority because it asserts a different present moment; rather, her dilatory chime draws attention to the idea that there are *multiple* present moments, thus introducing the concept of relative simultaneity.

The notion of an absolute present allows that individuals in two different locations may perceive the same event, or two or more separate events, as occurring simultaneously without having to specify their own particular point of reference, but the very concept of simultaneity is defined more precisely by Einstein in his
special theory of relativity. In light of this theory, Max Born declares that “the concept of simultaneity is a fallacy” (226). He maintains,

It is regarded as self-evident that there is sense in the statement that an event at point $A$ [. . .] and an event at point $B$ [. . .] are simultaneous. It is assumed that concepts like “moment in time,” “simultaneity,” “earlier,” “later,” and so forth, have a meaning in themselves a priori which is valid for the whole universe. This was Newton’s view, too, when he postulated the existence of an absolute time or duration of time [. . .] which was to pass “equably without regard to anything external.” But there is certainly no such time for the quantitative physicist. (Born 226)

Modern physicists dismiss the idea of absolute simultaneity in part because of the finite speed of light. Since light is not infinitely fast, observers in different locations will perceive the same event at different times. A person next to a lightning strike, for example, may perceive that it happens at noon, whereas a person across the galaxy (with exceptional eyesight, of course) may not perceive the lightning striking until, say, four o’clock. Neither individual is wrong about when the lightning strike occurred; they simply exist within different frames of reference. According to Einstein, “[e]very reference-body [. . .] has its own particular time; unless we are told the reference-body to which the statement of time refers, there is no meaning in a statement of the time of an event” (31). Hence, the special theory of relativity not only allows for diverse interpretations of what constitutes the present moment, it requires them.

In her novel, Woolf demonstrates this principle not only by having her characters take seemingly impossible walks through the setting, but also by placing different time pieces within that setting. St. Margaret’s doesn’t really contradict Big Ben’s declaration of the present. Rather, St. Margaret’s highlights a new conception regarding the meaning of “the present.” Big Ben can legitimately pronounce the hour like it has always done, but in the modern era it can no longer assert that hour as universal.

Ironically, perhaps, St. Margaret’s is the most progressive clock in the novel, for it represents the most relative point of view; it is both Clarissa’s clock and the clock most closely associated with the diverse urban masses. Peter ruminates that the sound of St. Margaret’s “glides into the recesses of the heart and buries itself in ring after ring [. . .] like something alive [. . .] coming down the stairs on the stroke of the hour in white. It is Clarissa herself” (MD 50). Ellen Bayek Rosenman articulates the behavioral affinity between Clarissa and St. Margaret’s: Clarissa is the consummate hostess in the novel, and St. Margaret’s “encourage[es] the hostess’ duties with its own hostess-like accommodation” (80). Just as Clarissa brings individuals together at her party from all walks of life (quite literally), St. Margaret’s, too, seems to be the clock of the people. It sounds

[v]olubly, troubulously, [. . .] coming in on the wake of Big Ben, with its lap full of trifles. Beaten up, broken up by the assault of carriages, the brutality of vans, the eager advance of myriads of angular men, of flaunting women, the domes and spires
of offices and hospitals, the last relics of this lap full of odds and ends seemed to break, like the spray of an exhausted wave. . . (MD 128)

As a distinctive feature of the Houses of Parliament, it is perhaps fitting that Big Ben must ultimately accommodate the teeming multitudes represented by St. Margaret’s.

At the end of the novel, the hostess Clarissa brings together everyone from the outsider Peter, who has come all the way from India and now serves to loosely connect Clarissa to the ends of the British Empire, to the Prime Minister himself. Bradshaw shows up, and even in his absence, Septimus makes an appearance as well. As the narrative circles back to where it began in Westminster, all the disparate personalities, classes, and spatiotemporal points of view momentarily mingle at Clarissa’s party. In this final scene, Woolf shows that every diverse perspective she presents in her novel can only be defined in light of its relationship to every other perspective.

Woolf presents a complicated and highly interconnected British society now governed by the tenets of relativity. Such a profound shift in the spatiotemporal order away from the older Newtonian perspective seems to affect all of Woolf’s characters. Woolf depicts a London comprised of individuals in motion with respect to one another. The narrative itself meanders with them, following before breaking off, and then slipping back and forth in between and in and out of their thoughts and through the streets in the wavelike manner of St. Margaret’s chime. Each person has his or her own interpretations of the events taking place around them, and, in agreement with Einstein’s postulates, the very fabric of the physical world adjusts itself accordingly. As Woolf introduces a number of different perspectives, she does so with incredible attention to their underlying conditions. Everything is connected in some way to everything else—the sky above to the ground below to the sea beyond, to the characters that walk the streets, to the clocks, to the economy, to the Empire, to the War. All of these elements are in turn influenced by one another. With careful attention to precise geographic detail, Woolf presents a panoply of diverse viewpoints that reflect a changing social climate in Britain’s postwar era. She captures its modernist spirit by situating her characters and the landmarks that surround them within a recently discovered spacetime continuum.

Notes

1. Numerous critics have examined the impact of technology on Woolf’s art, including Holly Henry, Mark Hussey, Melba Cuddy-Keane, Makiko Minow-Pinkney, Bonnie Kime Scott, and Michael Tratner.

2. Perhaps the reason why scholars have shied away from making a more formalized attempt at critiquing Woolf’s work in regard to Einstein’s stems from Woolf’s own professed ambivalence. Although Einstein makes several appearances in her fiction and nonfiction, she is loath to credit him as a source of inspiration. In 1938, after American literature student Elizabeth Nielson approached Woolf to discuss what Woolf described as “Einstein, and his extra mundane influence on fiction” (Diary 5:
Woolf wrote Nielson a letter claiming that she had "not read Einstein; [that she] should not understand it" (qtd. in Henry 2). Although Woolf may have never perused Einstein's papers directly, as Henry, Beer and many others point out, she mingled socially with a variety of scientists and science writers interested in relativity and read James Jeans's and Arthur Eddington's popular texts on the subject. Several other critics contend that making a direct correlation between Woolf's ideas and Einstein's may be unnecessary. Wayne Narey asserts that "whether Woolf had a cursory or fairly developed knowledge of Einstein's work is moot; the point is she may have used that understanding because it coincided with her own approach to fiction [...]. The association between the scientist and the author may be a similar, fortuitous vision of perception in two gifted people" (35-36). Julia Briggs contests that "Woolf did not require Einstein's theories to legitimate her sense of the relativity of time" (125). Although these critics make valid points, I believe that overwhelming evidence suggests that Woolf's claim to not understand Einstein's theories is a misleading exaggeration. Not only is her exposure to and interest in his ideas well-documented, there are too many exacting parallels between her work and the physicist's to be strictly coincidental.

3. Robert Boyle's experiments with an air pump in the 1660s demonstrated that although sound could not travel through a vacuum, light could. This fact upset the prevailing notion that there existed a material medium through which sound waves and light waves propagated. Stephen Shapin and Simon Schaffer suggest that Boyle conceded the possibility of an ether in part to satisfy his plenist critics (46). Shapin describes the nature of Newtonian time in relation to the ether as "self-contained, and without reference to local and bounded human experience [...]. divorced from [...] the subjective" (62), a concept Clarissa challenges as soon as she crosses into the modern city.

4. Stephen Hawking explains that according to the tenets of general relativity, "space and time are [...]. dynamic quantities: when a body moves, or a force acts, it affects the curvature of space and time" (33). For Einstein, the force of gravity could not be a type of instantaneous tractor beam like it was for Newton because then it would be a force that traveled faster than the speed of light—the fastest speed possible in the special theory of relativity. He discovered instead that objects in space curve that space and create a gravitational field. If we imagine a bowling ball in the middle of a bed sheet pulled taut and suspended, then we have a sense for how an object curves space around it. If a person were to roll a marble across the sheet, the marble would immediately be affected by the sheet's curvature and spiral inward until it collided with the bowling ball, much as a meteor falls to Earth when it passes into its field of gravity (Greene 68-70).

5. Several scholars have suggested that the apparent temporal incongruities in Woolf's novel reflect Henri Bergson's understanding of the disparity between clock-time and the psychological experience of time. However, it seems unlikely that Woolf's goal was to emphasize Bergson's ideas in her novel. Shiv K. Kumar notes that [a]ny attempt to establish Virginia Woolf's relationship with Bergson through Mrs. Karin Stephen, Proust, T. S. Eliot, and the Bloomsburies, the post-impressionists or the symbolists would hardly offer any fruitful results. It may be repeated here that she had never read Bergson, nor would she have admitted his indirect influence on her work. This view is also corroborated by both Leonard Woolf and Clive Bell. "I don't think that Virginia Woolf ever read a word by Bergson or Karin Stephen's book, *The Misuse of Mind*," writes Leonard Woolf, and so does Clive Bell affirm, "I doubt whether Virginia Woolf ever opened a book by Bergson." (67)

6. Normally, the very real effect of motion on our experience of time is so miniscule that it goes unnoticed unless it occurs at velocities approaching the speed of light or within a strong gravitational field. Woolf seems to intentionally exaggerate the effect of motion on perception in order to draw attention to it.

7. As Karl Pearson explains, "Our measurements of space and time are conditioned by our assigning to ourselves the velocity zero, and by our basing our metrical space and time on phenomena in bodies at rest relative to ourselves" (383). Eddington explains that according to Einstein's discoveries, not only is time relative but also "frames of space are relative. Distances, lengths, volumes—all quantities
of space—reckoning which belong to the frames—are likewise relative [...] Absolute distance, not relative to some special frame, is meaningless" (21).

8. As N. Katherine Hayles attests, according to Einstein's theory "any perspective from which we might actually view the world is made partial and contingent [...] Relativity implies that we cannot view the universe from an Olympian perspective. Necessarily and irrevocably we are within it, part of the cosmic web" (49).

9. William H. Cropper explains that "Einstein became aware that space and time are peculiarly warped in accelerating systems; Euclidean formulas such as the calculation of the circumference-to-diameter ratio for a circle as π are slightly in error [...]. As it happened, a complete theory of non-Euclidean spaces, developed in the 1850s by Bernhard Riemann, provided just the right mathematical tools for Einstein to construct a theoretical edifice that linked geometry and gravitation. At the same time, he found a generalized equation of motion that was also determined in the Riemann manner by the geometry" (202).

10. Simon Gunn and Rachel Bell point out that the number of professional scientists in Britain quintupled between 1881 and 1911 alone (22). The overwhelming majority of them would have joined the ranks of applied scientists.

11. Often misinterpreted in the metaphysical sense as being radically subjective, Einstein's relativity requires that the relationship between time and space and the speed of light remains "invariant in all inertial frames" (Isaacson 132). In fact, Einstein considered calling his theory "Invariance Theory" for this very reason, an appellation that would have perhaps evoked a very different cultural response and understanding.

12. It's interesting to note that despite Peter's own facility with mechanics, he thinks, "the future of civilisation lies [...] in the hands of young men like that; of young men [...] with their love of abstract principles" (MD 50). Relativity is, of course, famously abstract. In regard to Einstein's theories, Niels Bohr asserts, "our whole space-time view of physical phenomena, as well as the definition of energy and momentum, depends ultimately upon [...] abstractions" (77).

Works Cited


Tratner, Michael. "Why Isn't *Between the Acts* a Movie?" *Caughie* 115–34.


