

The cover features several stylized, light green leaf motifs scattered across a pale yellow background. Each motif consists of a short stem with two leaves pointing in opposite directions.

WORLDS ENOUGH AND TIME

**Explorations of Time in
Science Fiction and Fantasy**

Gary Westfahl, George Slusser, David Leiby

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Worlds Enough
and Time _____

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W orlds Enough *and Time* _____

Explorations of Time in
Science Fiction and Fantasy

Edited by Gary Westfahl,
George Slusser, and David Leiby

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Introduction: The Quarries of Time

Gary Westfahl

“Time is the funniest thing, sir. It ties a man in knots.”
— Clifford D. Simak, *Time and Again*¹

One trait that distinguishes human beings from other animals is our keen and far-ranging awareness of time. After the invention of language, people possessed the unique power to convey knowledge and narratives to their descendants, first through oral traditions and later in written records. Absorbing the accumulated wisdom of distant ancestors, early human civilizations came to conceive of the past as a distant realm quite different from their mundane present—a Golden Age when humans walked with gods and magical events were part of everyday life. Cultures all over the globe developed rich mythologies filled with fabulous stories occurring in this idealized past. And as a mirror image to these ancient worlds, some religions projected a future when the ancient paradise would be restored, suggesting that time itself moved in an immense cycle analogous to the monthly cycles of the moon and annual cycles of the seasons.

In later, more secular times, the myths and legends of a Golden Age have metamorphosed into the literary genre now known as fantasy. It is a truism to suggest that virtually all fantasies, either explicitly or implicitly, take place in an imagined past and are infused with tropes and props from various ancient and medieval cultures. One foundation of fantasy appears to be a longing to return to the past, accompanied by the sense that the passing of time has brought humanity only decline and degeneration. This leads to numerous stories of people magically transported to romantic or idealized past eras, as in Katharine Burdekin’s *The Burning Ring*, Diana Gabaldon’s Outlander novels, and the play and film *Berkeley Square*. There are also visions of lands separate from our own reality where time moves more slowly or stands still, such as J. M. Barrie’s Neverland; the timeless town of the play and film *Brigadoon*; J. G. Ballard’s “The Garden of Time,” where plucking magical flowers can temporarily suspend the passing of time; and the

strange zone of “eternity” in Flann O’Brien’s *The Third Policeman*. And without the trappings of scientific rationales, fantasies can wistfully contrast worlds of what happened with worlds of what might have happened, as in Alan Brennert’s *Time and Chance*, where a man who looks back ruefully on his decision to abandon an acting career for marriage and a family encounters his unmarried *döppelgänger* who decided to stay the course and become a successful actor in an alternate world.

If the literature of fantasy derives from an ancient human awareness of the past as a distinct world, one might argue that the literature of science fiction derives from a more recent awareness that the future might become another distinct world, not merely a continuation of the present or reinstatement of the past. Science suggested that time moved in a linear, not cyclical, fashion, so that humans had the power to create new and different societies as a result of scientific and social progress. Paul K. Alkon’s *Origins of Futuristic Fiction* traces the growing number of texts in the eighteenth and nineteenth centuries that imagined such future civilizations, and envisioning such places led inexorably to tales about present-day humans traveling there.

While science fiction is sometimes regarded as a literature primarily focused on space travel, then, one can argue that time travel is actually its principal fascination, and that the genre first emerged in response to a growing interest in the future more than a growing interest in outer space. While the nineteenth-century writers viewed as the genre’s progenitors did not all write about traveling through space, they all produced stories involving distant and unfamiliar futures, or even the transportation of people or documents to or from the future, such as Mary Shelley’s *The Last Man*, Edgar Allan Poe’s “Mellonta Tauta,” Jules Verne’s “In the Twenty-Ninth Century,” Edward Bellamy’s *Looking Backward, 2000–1887*, and Mark Twain’s “From the *London Times* of 1904.” The growth of science fiction in the early twentieth century accompanied no new breakthroughs in astronomy, but rather the growing realization that time could be characterized as the universe’s fourth dimension, creating the possibility of time travel achieved through scientific means—a concept brilliantly exploited by H. G. Wells’s *The Time Machine* and other works of its era. And virtually all authors associated with science fiction during the subsequent century produced tales of time travel, indicating that the conquest of time is a theme just as ubiquitous in the genre as the conquest of space.

The deeper generic origins of science fiction are more hotly debated than those of fantasy, but two broadly acceptable premises may account for the genre’s connections to time and time travel. First, while Hugo Gernsback was unsuccessful in his efforts during the 1920s and 1930s to make science fiction primarily a forum for presentations of scientific facts and explorations of new scientific concepts, he legitimized the notion that science fiction is a “literature of ideas,” allowing some later authors to create stories that focused more on scientific speculations than literary values. Second, however, science fiction is principally an outgrowth not of scientific textbooks and journals but of previous literary genres such as the travel tale, melodrama, utopia, Gothic horror, and satire. For both reasons, time travel has emerged as a central trope in science fiction.

Considered as topics for scientific inquiry, time and time travel open up innumerable avenues for speculation. If time travel to the past is allowed, one encounters the famous Grandfather Paradox: If you went back in time to kill your grandfather and prevent your own birth, would you instantly eliminate yourself from existence, create a parallel universe where you did not exist, or find yourself mysteriously unable to carry out the cosmos-changing murder? Such questions were argued in the letter columns of Gernsback's *Amazing Stories* during the 1920s, at a time when scientists generally dismissed time travel as impossible, and they are still argued today, at a time when physicists like Kip Thorne can envision in some detail precisely how the Theory of General Relativity would allow for the construction of time machines by manipulating wormholes in space. Contemporary writers can stay within the boundaries of scientific plausibility and explore such possibilities as alternate universes generated by time travelers altering the past, time loops in which a person with a time machine endlessly repeats the same sequence of events, or the creation or discovery of universes where time moves backward or at a dizzyingly rapid velocity.

Considered as a valuable device in generating narratives, time travel would be attractive to writers of many different temperaments. After all regions of the Earth had been exhaustively explored, allowing no room for posited lost civilizations in deep jungles or on remote islands, writers who simply yearn to create new travel tales about imagined realms can employ a time machine or time portal to instantly transport protagonists to inaccessible regions of the past, like the prehistoric times visited in Michael Bishop's *No Enemy but Time*, to strange futuristic environments, like the exotic future of John Taine's *The Time Stream*, or to parallel universes where differing historical events have generated significant different present-day worlds, as in the television series *Sliders*. If writers wish to produce exciting melodramatic adventures, time travel opens up a vast and multifaceted new arena for tales of good guys battling bad guys who range back and forth in time through our universe or alternate universes each striving to preserve their own existence, as seen in Jack Williamson's *The Legion of Time*, Clifford D. Simak's *Time and Again*, Fritz Leiber's *The Big Time*, and John Barnes's *The Timeline Wars*. And for writers who seek to depict a utopia, time travel can imbue their visions with special impact by placing the ideal society in the future, rather than a faraway island or planet, so that authors can portray their utopias as natural outgrowths of their own cultures, provided that recommended policies are followed. Thus, when Bellamy transported a nineteenth-century man into an ideal future America in *Looking Backward*, he immediately inspired the formation of "Bellamy Clubs" dedicated to making his dream a reality.

While such colorful and positive visions are a part of science fiction, the genre has a darker side as well, which can also make effective use of time travel. For writers seeking to make a satirical point about the inadequacies of our own society, time travel can bring visitors from other eras into our world or transport modern protagonists into other eras; thus, Twain's *A Connecticut Yankee in King Arthur's Court* illustrates the violence and brutality of modern civilization by having the

time-traveling Hank Morgan transform stately Camelot into a bloody war zone. For the effect of horror, time travel can bring ancient menaces back into the world, as Robert Bloch's "A Toy for Juliette" places the murderous Jack the Ripper into a tranquil future city; exile protagonists into eternal timelessness, as in Harlan Ellison's "Jeffy Is Five"; or force time travelers into endlessly repeating time loops, as in Philip K. Dick's "A Little Something for Us Tempunauts." To convey the grim warning of dystopia, time travel can inadvertently lead to a totalitarian society, as occurs in Ray Bradbury's "A Sound of Thunder," or shock time travelers with disheartening visions of pampered future humans drifting into helplessness and extinction, as observed in Wells's *The Time Machine* and later works like John W. Campbell, Jr.'s "Twilight" and Brian W. Aldiss's "Ahead."

These brief comments cannot, and are not intended to, epitomize all the narrative possibilities that time and time travel bring to fantasy and science fiction. But one further point should be made. The gaudy magical effects of fantasy, and to an even greater extent the machinery and jargon of science fiction, can be intimidating and alienating to many readers. Dragons, spaceships, and robots may seem utterly divorced from people's everyday concerns and problems. But considerations of time strike closer to home. All humans experience time on a daily basis, engaged in their own measured time travel from yesterday to tomorrow, constantly recalling the past and planning for the future, feeling that time at various moments either moves too fast or moves too slowly. Stories about disruptions or dislocations in time can thus seem more intimate, more personal, than other fantastic narratives. And when readers think about which stories reveal the most about their authors's personalities and attitudes, the answers are often stories about time and time travel—Isaac Asimov's "The Ugly Little Boy," Octavia E. Butler's *Kindred*, Orson Scott Card's *Pastwatch: The Redemption of Christopher Columbus*, William Gibson's "The Gernsback Continuum," Robert A. Heinlein's "By His Bootstraps," Mary Shelley's "The Mortal Immortal," and Theodore Sturgeon's "Microcosmic God" being only a few works that come to mind.

Two other stories that belong on that list—Philip K. Dick's "A Little Something for Us Tempunauts" and Clifford D. Simak's *Time and Again*—invite discussion as examples of how time travel stories can both stimulatingly play with scientific ideas and establish visceral, personal connections between author and reader.

In Dick's story, three American time travelers find themselves trapped in an endlessly repeating time loop. They live through one week while the world mourns their deaths and scientists attempt to figure out a solution to their problem; they are then captured by a time machine and transported back in time one week; upon their return, an explosion kills all three of them, leaving bodies to be buried, but also preserves an identical set of three living men who will again experience the same week of events leading up to the same return, the same explosion, and the same subsequent week of events. They finally realize, of course, that it is not simply they, but the entire world around them, that are trapped in this unending cycle. Such perpetually replicating time loops are one of the paradoxical phenomena now thought to be sanctioned by the Theory of General Relativity, although physics

cannot explain how one might create such a loop; Dick's idea of a causal explosion resulting because "No two objects can occupy the same space at the same time" is as plausible as any.²

Yet scientific considerations were clearly not Dick's priority in writing this story; rather, the situation he develops serves as a powerful metaphor for the ways that people can trap themselves in repetitive cycles, making the same bad decisions over and over again, creating the sense that they are constantly moving but getting nowhere. The story begins with the adverb "Wearily" (259), ends with the phrase "The dreadful and weary miracle of eternal life" (282), and conveys throughout an overwhelming feeling of exhaustion and frustration:

We're in a closed time loop, he thought, we keep going through this again and again, trying to solve the re-entry problem, each time imagining it's the first time, the only time . . . and never succeeding. Which attempt is this? Maybe the millionth; we have sat here a million times, raking the same facts over and over again and getting nowhere. He felt bone-weary, thinking that. And he felt a sort of vast philosophical hate toward all other men, who did not have this enigma to deal with. (262; author's ellipses)

Given what we know of Dick's life in the early 1970s, as he spiralled downward into paranoia and frustration, this reads almost like a journal entry, and Dick manifestly identified with the plight of his time travelers, as he confessed in an afterword to the story in *Final Stage*: "In writing this story, I felt a weary sadness of my own and fell into the space (I should say time) that the characters are in, more so than usual." He proceeds to explain the value of science fiction: "We, when we're depressed, are fortunately imprisoned within our heads; once time-travel becomes a reality, however, this self-defeating psychological attitude could spell doom on a scale beyond calculation. Here again, science fiction allows a writer to transfer what usually is an internal problem into an external environment" (283). Indeed; and the time travel story in this case allowed Dick to convey an individual human predicament on a grand and evocative scale.

The work of a very different author in a very different mood—a natural optimist approaching the peak of his career—Clifford D. Simak's *Time and Again*, first published in magazine form under the title *Time Quarry*, may qualify as the quintessential Simak novel. Six thousand years in the future, a space traveler named Asher Sutton discovers that every creature in the universe is accompanied throughout its life by an invisible being, referred to as its "destiny," which subtly oversees and guides the creature in the right directions. After visiting the home world of these beings, Sutton intends to write a book explaining what he has learned, which will begin:

We are not alone.

No one ever is alone.

Not since the first faint stirring of the first flicker of life on the first planet in the galaxy that knew the quickening of life, has there ever been a single entity that walked or crawled or slithered down the path of life alone. (105; author's italics)

The revelations in that book will in the future trigger a vast war through space and time between humans, determined to maintain their control over the galaxy, and the androids they created, who will take Sutton's words as evidence of their rights to complete equality. While androids from the future work to protect Sutton so that he can write the book he plans to write, humans from the future seek to kill him, so the book will never be written, or attempt to influence him to write a slightly different book more amenable to claims of human superiority.

Reading *Time and Again*, we recognize first that Simak is an author constantly preoccupied with the mental time travel that all people engage in. Like other Simak heroes, Sutton repeatedly goes over past events in his mind, reliving them, pondering their implications, trying to clarify and sort things out for himself and for readers; he also plans for the future, carefully crafting and refining his plans before taking action. In this novel, one of Sutton's priorities is to figure out the ramifications of time travel. Just as Simak seeks to philosophically embrace all living creatures as equally important and worthwhile, he also seeks through Sutton to reconcile the conflicting theories regarding the potential paradoxes of time travel. He is inclined to reject the notion that altering the past might generate parallel universes: "Alternate futures? Maybe, but it didn't seem likely. Alternate futures were a fantasy that employed semantics twisting to prove a point, a clever use of words that covered up and masked the fallacies" (164). He instead wishes to believe in a single, unalterable past, but recognizes that time travelers would necessarily possess some power to alter past events. He commonsensically settles upon a compromise position, concluding that time can be altered, but only in small and subtle ways: "The past cannot be changed, he argued with himself, in its entirety. It can be twisted and it can be dented and it can be whittled down, but by and large it stands. . . . somewhere, somewhen he had written a book. The book existed and therefore had happened, although so far as he was concerned it had not happened yet" (194–195). Then, recognizing the inevitability of his message being promulgated, Sutton enjoys ten peaceful and recuperative years working on a twentieth-century Wisconsin farm, calmly returns to the future to confront his chief nemesis, and finally travels to a faraway planet to live with an old family robot while he writes his history-making book.

Thus, while time travel brings only pain and weariness to Dick's heroes, time travel brings a sense of serenity and fulfillment to Simak's protagonist. As time goes on, he confidently believes, benevolence will inexorably win out over evil, and traveling through time cannot prevent, and might even hasten, its final victory. In Simak's universe, one might say, kindness is the sword that cuts the Gordian "knots" of time paradoxes that the novel references (229), and Simak's answer may strike readers as both scientifically defensible and personally satisfying.

The fact that imagined time travel can generate stories as starkly divergent as Dick's and Simak's suggests just how potent and far-ranging this narrative device can be, and the chapters in this volume will further demonstrate the astonishing vitality of time travel as a theme in science fiction and fantasy. In the first section, "Time's Arrows," George Slusser and Robert Heath, Richard Saint-Gelais, and

David A. Leiby explore in various ways the forms and complexities of time travel narratives, while Andrew Sawyer investigates the fascinating subtopic of stories involving the reversal of time. In the second section, "Timescapes," contributors consider broader aspects of the interface of time and literature: Kirk Hampton and Carol MacKay survey visions of humanity's far future, Susan Stratton ponders time in the context of posited psychic powers, Susan Kray contemplates the relationship between time and Jewish people in fantasy and science fiction, and Jefferson M. Peters employs a famed manga series to assess Japanese attitudes toward time. In the final section, "Time Capsules," contributors focus on particular works that provocatively deal with time, with Pekka Kuusisto's exegesis of the cosmology in Dante's *The Divine Comedy*, Larry W. Caldwell's examination of historical time in George Orwell's *Nineteen Eighty-Four*, Andrew Gordon's consideration of time travel as reincarnation in Ken Grimwood's *Replay* and two films, Bradford Lyau's appraisal of Stephen Baxter's *The Time Ships* as a commentary on projected limits of scientific inquiry, and Erica Obey's analysis of Diana Gabaldon's *Outlander* novels and other time travel romances. A concluding bibliography lists science fiction novels and stories, films and television programs, and nonfiction works related to time and time travel.

In producing this volume, we recognize that valuable contributions to this field of study have already been made by works such as Bud Foote's *The Connecticut Yankee in the Twentieth Century* and Paul J. Nahin's *Time Machines: Time Travel in Physics, Metaphysics, and Science Fiction*. Still, time and time travel in science fiction and fantasy remain subjects in need of thoroughgoing analysis, given the ubiquity of time travel in literature and its growing prominence in scientific thought. Without claiming to be exhaustive in our coverage, we hope that this volume will inspire other scholars to visit the rich quarries of time, where many more treasures are ready to be unearthed.

Notes

1. Clifford D. Simak, *Time and Again* (New York: Ace Books, 1951), 229. Later page references in the text are to this edition.

2. Philip K. Dick, "A Little Something for Us Tempunauts," in Edward L. Ferman and Barry N. Malzberg, editors, *Final Stage: The Ultimate Science Fiction Anthology* (1974; New York: Penguin Books, 1975), 263. Later page references in the text to the story and to its authorial afterword are to this edition.

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Part I

Time's Arrows

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Arrows and Riddles of Time: Scientific Models of Time Travel

George Slusser and Robert Heath

To Count the Clock that Tells the Time

What is time? We must have some sense of what time and the passage of time is before we can characterize time travel in science fiction stories. The steady tick-tock of a clock demonstrates the passage of time, but how is that passage meaningful in terms of physical laws? Indeed, to use time as a unit to measure travel, one would need to know how to modify its passage. The dictionary defines time as a period, but this is not especially helpful. One might say that “time is what happens when nothing else happens,” or “time is that which prevents everything from happening simultaneously,” or perhaps “time is how long we wait for something to happen.” The most scientific definition is that time is the cumulative sum of a series of repetitions of a periodic event, something that happens over and over, in a regular manner. In the tick-tock of a clock, the escarpment forces some of the energy contained in a wound-up spring to be transformed into the repetitive back-and-forth motion of a pendulum. Each back-and-forth movement is measured by the movement of the circle of an arm, the second hand. After sixty seconds the hand repeats itself, but causes the minute hand to move 1/60th of a rotation, and so on. Before the invention of the clock, the daily passage of the sun across the sky or the rhythm of the human pulse were used to measure the passage of time—both are periodic events with characteristic periods of repetitions. Today, the vibrations of atoms generate a periodic event that is counted. But have we progressed in our definition of time as it applies to time travel?

The formation of a periodic event and the counting of that periodic event are crucial to the measurement of time—but are they crucial for our understanding of the formation of time in the physical universe? Here we must deal with the direction and rate of such metaphors as the “flow” of time. Using a different (yet equally directional) metaphor, Stephen Hawking argues that there are at least three different “arrows of time”: the thermodynamic arrow, the cosmological arrow, and the psychological arrow. Given these different realms of displacement, how can

something be said to “travel” in time? We all travel in time at a velocity of one second per second of time. That is, each second we and everything associated with us in our field of perception have “moved” one second in time. This is not what is meant by time travel in sf. Time travel is the ability to move forward in time at a “velocity” greater than one second per second, so that, like H. G. Wells’s *Time Traveller*, over a few minutes of your clock time you move centuries of time forward or positively into the future. On the other hand, you can move negatively but rapidly backward in time in order to visit your past. But how is this to be done?

Insofar as “time happens” in stories of time travel, let us return to Hawking’s arrows of time to classify these stories. Essentially, we will deal with two arrows: the thermodynamic arrow and psychological arrow. The cosmological arrow of time seems to underlie stories of spacetime displacement, like Poul Anderson’s *Tau Zero*. On this macroscale, the initial explosion and direction of entropy increase drives the period from the “big bang” to the “heat death,” giving us the time direction for the entire universe. Local time reversal through a “time machine” could be possible, but the ultimate end of the universe could not be influenced from inside. Writers like Anderson, however, use this end of time not as a final end, but rather as a hesitation in the movement of travelers who leap through the end to a new beginning, witnessing the “big bang” and finding that the universe repeats itself very much like before.

The thermodynamic arrow underlies many time travel stories. It is posited that time is related to how energy is transferred from one system to another without loss of usable or storable energy. The thermodynamic arrow of time is due to energy transformations within, and entropy increase of, the universe. From another angle, entropy has been linked to the organization of a given system. As the system becomes more disorganized, the entropy of that system increases. This increase in entropy is said to follow the natural movement of time. A vase falls from the table and shatters. The organization of the vase is decreased, time moves normally, and the entropy of the vase has increased. In this field, all events are linked. The broken vase does not reassemble on the ground and leap back to the table fully formed. Time and entropy increase. To make the reassembly of the vase event occur, energy must be added to the system, and this must come from another system in which entropy increases. It is thus clear that, if time travel to the future moves with the entropy slope, time travel to the past would require much energy to induce the current entropy of the machine and traveler to decline. Perhaps energy could be extracted from the increased entropy of the system moving into the future. Thus in the film *Back to the Future* (1985), the car with the dog Einstein travels one minute into the future and becomes very cold, presumably by “pulling energy” out of the car during its travel.

The psychological arrow is equally important in time travel stories. The physical flows of time (the thermodynamic and cosmological arrows of time) have their own movement, but our perception of these movements is not uniform. We inhabit only a small slice of time, called the “now,” before which is our past and memories, after which lies our future and its desires. There are a number of stories that exist on the