The Science Fiction Handbook

M. Keith Booker
and
Anne-Marie Thomas

WILEY-BLACKWELL
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For our students
And for Amy, Adam, Skylor, and Benjamin Booker

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Part 1

Introduction

Science Fiction in Western Culture

Most readers of science fiction spend little time or energy worrying about a definition of the genre or attempting to determine whether any given text is science fiction or not. They tend to know what sorts of stories and books they regard as science fiction and have little trouble locating works in the category to read. Scholars and critics tend, however, to be more cautious (and finicky) about categorization, so that many studies of science fiction as a genre begin with lengthy meditations on the definition of science fiction, often in order to distinguish it from other forms of "speculative" fiction, such as fantasy and horror. Such efforts tend to reveal that science fiction might not be so simple to define as first meets the eye. For example, most of the essays in James Gunn's collection, *Speculations on Speculation*, attempt in one way or another to define the characteristics of the genre and to "address the difficulties in delimiting the field of science fiction," as Gunn puts it in his own introductory remarks (*Speculations*, 1). Indeed, the first essay in this collection is Gunn's own "Toward a Definition of Science Fiction," the very title of which suggests that even Gunn (who has spent decades as a science fiction scholar and novelist) is unable to complete the task of defining science fiction, or "sf" as we will frequently call it in this book.

Gunn begins his essay by avowedly declaring that "the most important, and most divisive, issue in science fiction is definition" (*Speculations*, 5). He then goes on, not really to define science fiction, but to characterize it. Primarily, for Gunn, science fiction is a literature set in worlds different from our own – and different in ways that invite the reader to interrogate these differences, to ask "hard questions" about them in terms of what they can tell us about our own world. Though Gunn oddly fails to mention Darko Suvin in this brief essay, his vision of science fiction is very much congruent with Suvin's now classic argument that science fiction is a literature of "cognitive estrangement," a literature that places readers in a world different from our own in ways that stimulate thought about the nature of those differences, causing us to view our own world from a fresh perspective. Suvin's discussion of cognitive estrangement (which has played a founding role in the history of serious academic criticism of science fiction) is included in his book *Metamorphoses of Science Fiction* (1979). It is also included as the third chapter in Gunn's collection, which includes a second essay by Suvin as well.

In this volume we will work primarily from Suvin's definition of science fiction as the literature of cognitive estrangement, while remaining aware that this definition is a bit incomplete. After all, cognitive estrangement is very similar to the phenomenon of defamiliarization that the Russian formalists saw as the central strategy of all literature. Indeed, it could be argued that all literature produces cognitive estrangement to some extent, an observation that leads Carl Freedman to declare that, in this sense, all fiction could be considered science fiction and that the latter may actually be a broader category than the former (*Critical*, 21). On the other hand, Freedman (citing Suvin) goes on to argue that the designation "science fiction" is best "reserved for those texts in which cognitive estrangement is not only present but dominant" (*Critical*, 22). In other words, while all fiction produces cognitive estrangement, it is only in science fiction that such estrangement is the principle goal and project of the text.

Still, even with this basic notion in place, Freedman spends an introductory chapter of over twenty pages attempting to define science fiction and distinguish it from other genres. Ultimately, he arrives at his final focus on cognitive estrangement via a dialectical negotiation between what he sees as the two basic tendencies in attempts to construct definitions of science fiction: the narrow tendency to view science fiction only as that fiction which derives directly out of the American pulp tradition that began with the founding of *Amazing Stories* by Hugo Gernsback in 1926, and the broad tendency to consider virtually all "arealistic" literature, from Lucian and other early satirists to Pynchon and other postmodernists, as science fiction (*Critical*, 14–15).

For our purposes, science fiction might be defined as fiction set in an imagined world that is different from our own in ways that are rationally explicable (often because of scientific advances) and that tend to produce cognitive estrangement in the reader. But, in employing this definition, we follow Freedman in attempting to negotiate between "narrow" and "broad" conceptions of science fiction as we discuss the genre in this book. It is, for example, important to note that sf has many important predecessors in the Western literary tradition. Thus, in his history of science fiction, Adam

Roberts locates the origins of sf in the ancient Greek novel, devoting separate chapters to "ancient" sf and to sf in the seventeenth, eighteenth, and nineteenth centuries, respectively.[1] The arealistic satire of Jonathan Swift's *Gulliver's Travels* (1726) is quite frequently discussed in relation to science fiction, and it is significant that Swift's book appeared as a sort of countercurrent in British literature just as Daniel Defoe and others were helping to launch the realist novel as a major literary force. The barbs of *Gulliver's Travels* are aimed at what Swift saw as the dehumanizing aspects of scientific modernity and thus in many ways run counter to the celebration of scientific and technological progress that informs so much science fiction, but Swift's satire (designed to reveal the follies of his contemporary society by displacing them onto unfamiliar turf) definitely relies on cognitive estrangement for its effects. In any case, critiques of the possible negative consequences of unrestrained scientific and technological advancement are an important strain within modern science fiction. Mary Shelley's *Frankenstein: Or, the Modern Prometheus* (1818), often identified as the first genuine work of science fiction and at the very least an important literary predecessor of science fiction in its modern form, is similarly concerned with science overstepping its bounds, even as it draws upon earlier models such as the various literary incarnations of the Faust story.

Such predecessors clearly indicate that science fiction has strong historical connections within mainstream literary connections. Indeed, it has affinities with numerous established genres. Among other things, the emphasis in science fiction on change (and the often-noted ability of the genre itself to change dramatically over time in conjunction with technological and other changes in the world at large) would link science fiction to the genre of the novel in general. Mikhail Bakhtin has famously characterized the novel an ever-evolving genre that changes continually over time, largely because of its ability to maintain close contact with developments in the world outside the novel, leading to an intense contemporaneity that is also reflected in the novel's ability to maintain contact with "extraliterary genres, with the genres of everyday life and with ideological genres" (*Dialogic*, 33). Science fiction might, of course, be considered one of these "extraliterary" genres, but it is also the case that most of Bakhtin's descriptions of the novel as a complex, dialogic genre that absorbs the characteristics of all other genres with which it comes into contact also apply to science fiction.

Science fiction bears special similarities to certain specific novelistic subgenres. For example, the tendency of science fiction to be set in historical periods different from those in which it is written suggests parallels with the subgenre of the historical novel, identified by important critics such as Georg Lukács as perhaps the quintessential form of the realist novel.

In his highly influential *The Historical Novel* (first published in 1937, though not translated into English until 1962), Lukács argues that the great historical novels of the early nineteenth century are the quintessential literary expressions of the ideology of the European bourgeoisie in their period of ascent to power. In particular, Lukács argues that these novels uniquely captured the dynamic energies of this revolutionary historical change, though they declined in power as the bourgeoisie became conservative and decadent after establishing their dominance. This ability to reflect historical change is one that is often associated with science fiction. Indeed, the historical novel and science fiction as a whole have more in common than might first be obvious. As Edward James notes, "Of all the non-sf genres, only historical fiction presents readers, and authors, with problems that resemble those of sf" (*Science*, 112).

In the same vein, Freedman, building upon the work of the important Marxist critic and theorist Fredric Jameson, presents an extensive elaboration of the parallels between science fiction and the historical novel (*Critical*, 50–62). Jameson, in fact, has pointed out on several occasions a connection between science fiction and the historical novel, as when he describes science fiction as "a historically new and original form which offers analogies with the emergence of the historical novel in the early nineteenth century" (*Postmodernism*, 283). Jameson presses this point further in *Archaeologies of the Future*, where he argues that Lukács's historical model of the decline of the historical novel can be completed by extending it one step further, to include the emergence of science fiction, "which now registers some nascent sense of the future, and does so in the space on which a sense of the past had once been inscribed" (*Archaeologies*, 286). Science fiction, in short, inherits the mantle once worn by the historical novel as the utopian literary genre par excellence and as the genre most capable of capturing the energies of the historical process.

From this point of view, it may be significant that science fiction as we know it began to take form as a genre in the nineteenth century, just when, according to Lukács, the historical novel was in a state of decline. In any case, it was with the "scientific romances" of H. G. Wells at the end of the nineteenth century that modern science fiction began to emerge in an identifiable form – though we should also note that sf, as a publishing category, did not then exist and that Wells's romances were not, at the time, easily distinguishable from other contemporary forms (the utopian fictions of Edward Bellamy and William Morris, the imperial romances of H. Rider Haggard and Rudyard Kipling). Wells, who would go on to even greater success in the early years of the twentieth century as an author of realist satires such as *The History of Mr Polly* (1910), in many ways towered over the genre of science fiction for the next several decades, adding a modicum of literary respectability to a form that really became visible as a separate entity only with the success, beginning in the 1920s, of American pulp magazines devoted to science fiction.

Science fiction as a selfconscious publishing category is generally considered to have begun in 1926, when editor Hugo Gernsback published the first issue of *Amazing Stories*, the first magazine devoted exclusively to science fiction. *Amazing Stories* was marked by an extremely optimistic vision of a technology-driven future, foreshadowing such later visions as the future technological utopia of *Star Trek*. However, pulp science fiction quickly began to gain complexity and sophistication, especially with the work of John W. Campbell, who assumed the editorship of the pulp magazine *Astounding Stories* beginning in 1937. Campbell's quest for stories with greater complexity and literary merit led to the discovery of such writers as Isaac Asimov, Lester Del Rey, Robert Heinlein, Theodore Sturgeon, and A. E. Van Vogt. Retitled *Astounding Science-Fiction* in 1938, Campbell's magazine dominated the genre through the World War II years and beyond, helping to make the period from the end of the 1930s to the end of the 1950s what has come to be known as the Golden Age of Science Fiction.

The 1950s saw the proliferation of other important magazines, including *The Magazine of Fantasy and Science Fiction* and *Galaxy Science Fiction*, as the short story continued to be a vital form for the exploration of new sf ideas. Meanwhile, the genre was changed forever with the rise, during that decade, of the science fiction novel as a specific publishing category, in the midst of an explosion in paperback publishing in general, especially in the US. However, the science fiction "novel" was initially dominated by the conversion of previously-published magazine fiction (such as Isaac Asimov's "Robot" and "Foundation" stories) into book form. The rise of the science fiction novel (with Wells still looming as an important precedent) provided room for Golden Age writers such as Heinlein and Asimov to exercise their imaginations in more expansive ways – and in ways that often differed dramatically from the innocent optimism of the Gernsback era. The opportunities offered by the expanding sf publishing industry of the 1950s also helped to launch the careers of younger writers with genuine literary talents, such as Alfred Bester and Philip K. Dick, who began to take science fiction in new and more literary directions.

One could argue, though, that it is a mistake to try to "justify" science fiction by pointing out what it has in common with the more mainstream tradition of Western canonical literature. Indeed, much of what makes science fiction important (and gives it a special ability to produce cognitive estrangement) is the way in which it departs from canonical literary traditions. For example, while the realist novel is a strongly individualist genre focusing on the attempts of strong individual protagonists to surmount personal difficulties, the science fiction novel often deals with the life-or-death fates of entire cultures or planets. As a result, science fiction tends to be weak on characterization in relation to the literary novel, but strong in its exploration of important social and political issues. In addition, pulp sf magazines have remained crucial to a fan culture that has helped sf readers to establish communities of a kind unknown among devotees of "high" literature, including an array of popular sf conventions in which fans can meet each other as well as well-known authors.

The existence of a vibrant fan culture helped to drive the rise of the science fiction film in the 1950s. American films fueled by Cold War anxieties – especially alien invasion films such as *The Day the Earth Stood Still* (1951) and *The Invasion of the Body Snatchers* (1956) – were particularly important here, though the horror movies of Hammer Films in England (as well as apocalyptic Japanese monster movies) were part of the same phenomenon. Such films demonstrated that even the "lowest" of cultural forms could respond to important social and political issues, and perhaps in ways that engaged with contemporary concerns far more directly than loftier cultural forms.

Among other things, the pulp aspects of science fiction at least potentially endow the genre with certain folk energies, while allowing the "lowly" genre to explore certain themes in ways that would never be possible in more "respectable" venues. Alan Wald, for example, has noted how left-leaning American writers during the repressive years of the McCarthyite 1950s often diverted their critique of American capitalism into popular genres such as science fiction in order to avoid censorship. Or, as sf master Frederik Pohl has put it, science fiction writers can "say things in hint and metaphor that the writer dares not say in the clear" (*Politics*, 10). As a result, Pohl notes, 1950s science fiction might well have been able to get away with political statements that other forms could not and may therefore have represented "the only truly free speech left in America" at the time (*Politics*, 12). The diversion of leftist energies into popular genres in the 1950s produced a few interesting works by genuinely leftist writers – such as Ben Barzman's *Twinkle, Twinkle Little Star* (1960) – and there are certainly a number of works of 1950s' sf – such as Pohl and C. M. Kormbluth's classic *The Space Merchants* (1952) – that include strong liberal (if not radical) political commentary.

This tradition of political commentary may explain why science fiction was able to respond to the changing political climate of the 1960s with a so-called New Wave (a term borrowed from the French *nouvelle vague* movement in film) that emphasized social and political relevance as well as greater literary complexity. Thus, if the Golden Age was dominated by “hard” science fiction (in which the emphasis is on particular technologies and on scientific accuracy), the New Wave signaled a turn toward “soft” science fiction, which is more character driven and more concerned with the social and political ramifications of technological developments than with the technologies themselves.

The New Wave was spearheaded by editors such as Britain’s Michael Moorcock (*New Worlds* magazine) and America’s Judith Merril (in the anthology *England Swings*). Such editors attempted to make sf more sophisticated in terms of literary style as well as content, responding especially to trends of the 1960s to include franker treatment of issues such as sexuality. In addition to Moorcock himself, leading New Wave writers include Brian Aldiss, J. G. Ballard, M. John Harrison, John Brunner, Samuel Delany, Thomas Disch, Harlan Ellison, Ursula K. Le Guin, Robert Silverberg, and Norman Spinrad. The New Wave was dominated to some extent by short stories, but New Wave writers also produced important novels, including Spinrad’s *Bug Jack Barron* (1969) and Delany’s *Triton* (1976). Television’s *Star Trek*, which enjoyed only moderate success in its original broadcast run (1966–1969), also echoed many of the concerns of the New Wave – and would go on to become arguably the most important single phenomenon in the history of science fiction, spurring a particularly enthusiastic fan culture and eventually triggering an extensive sequence of film adaptations and spin-off television series.

The quest for social and political relevance that fueled the New Wave also helped to drive related phenomena, such as an important resurgence in utopian fiction (especially that by women writers such as Le Guin and Joanna Russ) in the 1970s, though Brunner’s dystopian fictions of the late 1960s and early 1970s provided an important counter-trend. By the early 1980s, however, the science fiction novel seemed to have reached a certain stagnation, partly because the New Wave had narrowed the gap between science fiction and mainstream fiction, depriving sf of some of what made it special and important in the first place. It was also the case that phenomena such as the end of the space race and increasing concerns about technology-induced environmental decay (the near-disaster at the Three Mile Island nuclear plant in 1979 can be taken as a key marker) had, by the 1980s, seriously muted public excitement about the potential of technology to change the world in positive ways.

On the other hand, written science fiction also suffered in the late 1970s and early 1980s because science fiction film, from the release of *Star Wars* in 1977 to the release of *The Terminator* in 1984, was experiencing an unprecedented period of critical and commercial success, even if the films of the period often showed more nostalgia than optimism, more anxiety over the threat of technology than excitement over its possibilities. This brief period saw the release of such important films as *Close Encounters of the Third Kind* (1977), *Star Trek: The Motion Picture* (1979), *Alien* (1979), *E.T. the Extraterrestrial* (1982), and *Blade Runner* (1982), as well as the first two *Star Wars* sequels: *The Empire Strikes Back* (1980) and *The Return of the Jedi* (1983). In subsequent years, advances in the technology of computer-generated imagery would continue to make science fiction film a hugely popular phenomenon, though the increasing emphasis on displays of dazzling special effects sometimes made sf film more spectacular at the expense of being less thoughtful.

The success of the *Star Wars*, *Star Trek*, *Alien*, and *Terminator* sequences of films brought sf to wider audiences than ever before and helped to fuel a Golden Age in sf television in the 1990s.[2] Meanwhile, written science fiction proved more resilient than it might have first appeared as the skepticism of the early 1980s helped to fuel the rise of "cyberpunk" science fiction, a movement that revitalized science fiction and drove it in important new (postmodern) directions. With writers such as William Gibson and Bruce Sterling leading the way, the cyberpunks combined an individualist punk sensibility with a keen awareness of the implications of the emergent computer technologies of the era. They also employed an array of styles derived from other genres (hardboiled detective fiction provided a particularly important stylistic model), indicating a tendency toward postmodern pastiche that allowed the cyberpunks to produce something genuinely inventive by reassembling bits and pieces of the works of the past, drawing upon important sf predecessors such as Bester and Dick, in addition to more mainstream authors such as Thomas Pynchon. The result was a hipper and edgier form of science fiction that was well in tune with the popular imagination of the cynical 1980s.

This cynicism is often reflected in cyberpunk fiction itself, which tends to be set in near future worlds in which technology (especially computer-based virtual reality technology) has advanced significantly, but in which these advances have done little to solve the sorts of social, political, and economic problems that were already prevalent in the 1980s. Partly because of this inability (or unwillingness) to imagine a better future, the original wave of cyberpunk science fiction was relatively short-lived, and some observers have seen Neal Stephenson's *Snow Crash* (1992), with its lighter satirical tone, as announcing the end of the original movement and the beginnings of what would come to be called "postcyberpunk."

In the years since the publication of *Snow Crash*, postcyberpunk fiction has continued to evolve, often blending with a new tendency toward "posthuman" science fiction, which imagines a future in which technological changes have brought about dramatic physical and intellectual changes in the human species itself – or even rendered that species irrelevant through the rise of superior artificial intelligence (AI) technologies. Meanwhile, the release of *The Matrix* in 1999 signaled the first truly successful cyberpunk film, while cyberpunk has exercised a major influence in the realm of comic books and graphic novels; Japanese comics (*manga*) and animated films (*animé*) have show a strong cyberpunk influence as well. Other trends in science fiction have also remained vital and Kim Stanley Robinson's "Mars" trilogy (1993–1996), which has little in common with cyberpunk, may be the most significant work of both hard and soft science fiction to have been produced in the 1990s, thus illustrating that the "hard" and "soft" designations are not mutually exclusive.

In the realm of posthuman science fiction, the work of the Australian writer Greg Egan is worthy of special mention, though developments in postcyberpunk and posthumanist science fiction have been largely dominated by a group of writers who have collectively constituted a "Boom" in British sf from the mid-1990s to the present. British Boom science fiction is often highly literary and fiercely political; it might be noted that Roger Luckhurst interestingly echoes Wald on the American 1950s when he suggests that the Boom has been made possible partly because the low value accorded science fiction, fantasy, and the Gothic has allowed these genres to "flourish largely below the radar" of the British cultural establishment ("Cultural," 423). Luckhurst further notes that this situation in contemporary British science fiction has parallels with that of American science fiction in the repressive days of the 1950s. He suggests, however, that the situation in Britain is much less repressive than that which prevailed in the United States in the McCarthy era, providing an atmosphere conducive to a genuine Boom in political science fiction, as opposed to the scattered works of politically-engaged sf in the US in the 1950s.

The British Boom writers represent a sort of culmination of the history of science fiction to this point. Their work is marked by high literary merit, yet often draws in important ways on pulp traditions. The British Boom writers also draw on virtually every previous science fiction subgenre, in addition to related genres such as fantasy and horror, particularly re-energizing such genres as the space opera and cyberpunk, previously thought to have seen their best days. The genre-bending fiction of China Miéville, combining a basic fantasy matrix with images from horror and the cognitive power of science fiction, may be the single most important example of British Boom sf. Meanwhile, writers such as Ken MacLeod, Charles Stross, Iain M. Banks, Justina Robson, and Richard K, Morgan have helped to reinvigorate both the space opera and cyberpunk, partly through multigeneric combinations of the two in single works.

The quality and quantity of the work produced by the British Boom writers – along with the rise of Australian writers such as Egan and the continued productivity of American sf writers such as Robinson – suggests that science fiction as a whole is currently in a particularly rich period that shows no sign of ending soon. The complex, multi-generic nature of British Boom fiction also helps to call attention to the variety of subgenres that has informed the historical development of science fiction. As a result, we attempt no comprehensive overall history of science fiction in this volume.[3] Instead, we present, via the individual chapters in Part 2 of this book, overviews of the development of a number of important subgenres, always taking account that there is considerable crossover among subgenres and that an individual work might participate in several subgenres at once. These overviews also include extensive lists of recommended reading within these subgenres, as well as lists of related works of science fiction film.

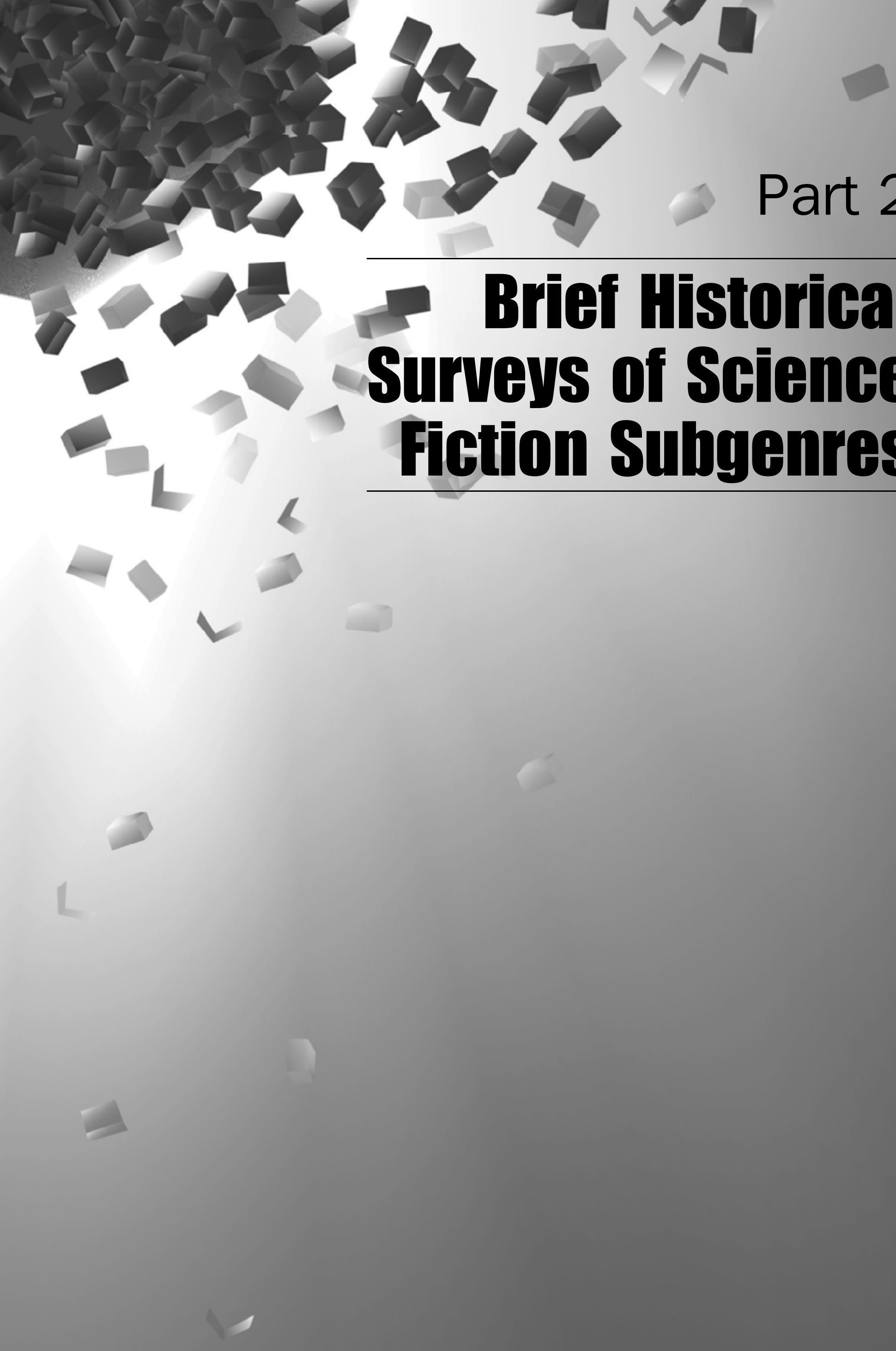
Part 3 of this volume includes brief biographies of a number of important science fiction writers, adding a further historical dimension by tracing the careers of these individual writers. Part 4 includes extensive critical analyses of some of the most important works of science fiction, chosen both for their merit and for their ability collectively to represent as many different science fictional phenomena as possible. Part 5 then closes the volume with a brief, selected glossary of terms relevant to the study of science fiction.

Notes

1 Adam Roberts, *The History of Science Fiction*, 2005.

2 See the discussion of this phenomenon in Booker, *Science Fiction Television*, 111–47.

3 Such attempts do, however, abound. Roberts's volume is particularly far-ranging in its historical coverage, while James's *Science Fiction in the 20th Century* (1994) is particularly good on science fiction from Wells forward. Luckhurst's *Science Fiction* (2005) is also especially good for its emphasis on the evolution of science fiction within larger cultural contexts. For an overview of the history of sf film, especially in the US, see Booker, *Alternate Americas*, (1–25).



Part 2

Brief Historical Surveys of Science Fiction Subgenres

The Time-Travel Narrative

Time travel is an extremely rich science fiction motif offering numerous possibilities, not only for inventive plotting, but also for speculation on the fundamental nature of time – and of reality itself. In addition, the cognitive dissonance that occurs via a sudden movement from one time period to another potentially makes the time-travel narrative a paradigmatic science fictional form. The time-travel motif also presents extensive opportunities for humor and satire, giving the genre a particularly wide range. Indeed, the flexibility of the time-travel story has made it a favorite science fiction subgenre on television and in film, as well as in the novel and short story.

Narratives involving travel through time represent one of the oldest subgenres in all of science fiction. Even a story as old as Washington Irving's "Rip Van Winkle" (1819) involves time travel of a sort, in that the protagonist sleeps for twenty years, awaking to a much-changed world and experiencing a shock of cognitive estrangement of the kind that is often central to the time-travel narrative. This motif was later extended in Edward Bellamy's utopian classic *Looking Backward* (1888), whose protagonist goes into a hypnotic trance in 1887 and awakes to a utopian world in the year 2000. H. G. Wells's *When the Sleeper Wakes* (1899) similarly features a protagonist who goes into a long sleep and awakes in a very different (this time dystopian) future. More literal time-travel narratives appeared as early as early as 1881 in Edward Page Mitchell's short story "The Clock that Went Backward." Wells explored the motif in his 1888 story "The Chronic Argonauts," and Mark Twain produced a novel-length time-travel tale in 1889 with the publication of *A Connecticut Yankee in King Arthur's Court*. However, the true founding text of the genre is probably Wells's classic novel *The Time Machine* (1895), the first genuinely science fictional exploration of time travel in book-length form, though this pre-Einstein narrative did not actually explore the physics of time travel. *The Time Machine* has exercised an extensive influence on the time-travel genre, including the production of George Pal's 1960 film adaptation of the novel, one of the classic science fiction films of its era. Perhaps the most notable example of a novel influenced directly by *The Time Machine* is Stephen Baxter's *The Time Ships* (1995), a sequel to Wells's novel that captures the style of the original while expanding Wells's brief narrative into a much more detailed exploration that takes the Time Traveler through a virtual compendium of science fiction motifs.

Einstein's meditations on time provided a scientific basis for future time-travel narratives. Nevertheless, it has remained common for time-travel narratives simply to posit the possibility of time travel without exploring the actual mechanics of the process. Typical here is Peter Delacorte's charming *Time on My Hands* (1997) – in which a time traveler from 1994 travels back to the 1930s to try to change history so that Ronald Reagan can never become president. In this novel, the traveler uses a found time machine from the future; he himself doesn't understand the technology, so he doesn't have to explain it to us, either. In Terry Pratchett's *Night Watch* (2002), part of his massive "Discworld" series, time travel occurs literally by magic. And in one popular motif, the "time slip," a character is simply transported from one time period to another, though neither the character nor the reader has any idea how this movement occurred – as when Billy Pilgrim, the protagonist of Kurt Vonnegut's *Slaughterhouse Five* (1969) famously becomes "unstuck in time," perhaps owing to the intervention of aliens from the planet Tralfamadore. The time slip often appears in fantasy narratives, though texts with a more science fictional feel can employ the motif as well. A classic case is Octavia Butler's *Kindred* (1979), in which a modern black woman repeatedly finds herself transported back into the antebellum South, enabling a complex meditation on racism and slavery. In other cases, a kind of time travel is merely a side effect of other technologies, as in Joe Haldeman's *The Forever War* (1974), in which the time dilation effect associated with space travel at near light speeds introduces an important element of temporal displacement.

Science fiction narratives play with aberrations in the flow of time in other ways as well, as in Robert Wilson's Hugo Award-winning *Spin* (2005), where mysterious aliens seal the Earth inside a barrier that causes time on Earth to pass much more slowly than time in the universe at large, so that billions of years pass in the cosmos during the lives of individual humans on Earth. Meanwhile, Philip K. Dick's decidedly strange *Counter-Clock World* (1967) imagines a late-twentieth-century Earth on which time has begun to move backward, owing to a cosmic phenomenon of unknown origin or cause. While life in many ways proceeds as it always had, anyone who has died before this phenomenon began comes back to life as time retreats to the moment of his or her death. Those who are alive, age backward, becoming younger and younger until they eventually re-enter a womb, then undergo a reverse pregnancy until they finally cease to exist in an act of sexual intercourse that must occur as time reaches their moment of conception.

Brian Aldiss's *Cryptozoic!* (1967) also posits the flow of time in reverse as its central motif, its late twenty-first-century characters eventually discovering that when they "mind travel" by means of a psychoactive drug to what they believe is the distant past, they are in fact witnessing the future. It is only human perception that time moves forward, an illusion that provides protection against the knowledge of humanity's ultimate dissolution. In this scenario, life begins at death, whereas the womb is considered the "grave" of the human race. Similarly, the narrator of Martin Amis's *Time's Arrow* (1991) begins his story from death, but unlike Aldiss's characters, he literally experiences life backwards in time. His mind inhabits the body of a Nazi surgeon, observing the events of the doctor's life, but in reverse chronological order. Thus, the narrator witnesses the events of the Holocaust, but experiences them not as the extermination of the Jews, but as a miraculous act of healing, in which the dead are resuscitated and sent back to their homes.

One of the earliest detailed science fictional explorations of time travel in the more literal sense is Isaac Asimov's *The End of Eternity* (1955), which follows *The Time Machine* in using the time-travel conceit to explore the future course of human evolution – though in this case the evolution turns out to be more social and intellectual than biological. This book also introduces the notion of the "time cop," an operative who is officially assigned to manipulate history via time travel. While we still get very few details about the time travel technology involved (other than the indication that it uses some sort of "temporal field"), Asimov's novel does present us with the most elaborate exploration of the possibilities of time travel that had been produced up to the time of its publication. In particular, it envisions an organization called Eternity, whose agents live outside of time, traveling freely both "downwhen" and "upwhen," both observing the course of history and instituting carefully calculated "reality changes" that modify the course of history to prevent various undesirable developments. *The End of Eternity* addresses a number of aspects of time travel, including time-travel paradoxes. Indeed, we learn that the Eternity organization was enabled by the work of an Eternity agent who traveled back in time to develop the temporal-field technology that made Eternity possible in the first place. It turns out, however, that the attempts of Eternity to prevent catastrophe have moved the course of human history into a comfortable mediocrity, removing the kinds of challenges and crises that drive the most daring technological advances. Ultimately, though, humans from the far future engineer a plot (with the mostly unwitting help of protagonist Andrew Harlan, an agent of Eternity) to prevent the establishment of Eternity in the first place, leading to technological advances that allow the establishment of a galactic empire that could be read as the one described in Asimov's "Foundation" trilogy.

Asimov's novel is the prototype of a large number of time-travel tales that feature powerful, often bureaucratic organizations that attempt to manage the potentially disastrous consequences of time travel. Typical of such organizations is the Time Patrol of Poul Anderson's interlinked short-story collection *The Guardians of Time* (1960), whose task it is to ensure that time travelers do not alter the "true" past. Bureaucrats of a ravaged future attempt to use time travel to correct the events that led to their current dire state in Terry Gilliam's excellent time-travel film *Twelve Monkeys* (1995), while in John Varley's *Millennium* (1983, adapted to film in 1989) a far-future bureaucracy oversees attempts to extract resources (mostly healthy human bodies) from the past in an effort to save a sickly humanity from extinction owing to disastrous environmental devastation.

Millennium is an excellent time-travel novel that contains a number of classic meditations on the nature of time and implications of time travel. It is in many ways reminiscent of the work of science fiction master Robert A. Heinlein, an extremely important figure in the development of the time-travel narrative. Heinlein's early short story "By His Bootstraps" (1941), for example, brought the time-travel narrative into science fiction's Golden Age. This story involves an early example of the time-travel "loop," in which travelers in time find that the principal events of history remain unchanged no matter what interventions are attempted. This story is a forerunner of numerous time-loop narratives, including those in which the passage of time is caught in a recursive loop, so that a given period of time is repeated over and over. This particular motif has been used in numerous television programs, though the best known example is probably the film *Groundhog Day* (1993). Ken Grimwood's novel *Replay* (1987), in which the central character repeatedly relives the period between 1963 and 1988, is a particularly interesting example of the time loop motif. This motif also underlies Heinlein's brief "All You Zombies" (1959). One of the classic works of time-travel fiction, this story involves a temporal manipulation agent whose time travels allow him to become his own father – and mother! At the same time, however, his activities do not change the course of his personal history but simply enable the history to be what it has been all along.

A similar vision of time travel informs Heinlein's novel *The Door into Summer* (1957). Actually, this story involves two kinds of time travel.

Protagonist Daniel Boone Davis is an engineer and entrepreneur who goes into suspended animation in the year 1970 after being cheated out of the ownership of his own robotic inventions by his erstwhile fiancée and his unscrupulous business partner. When he awakes in the year 2000, he has become a time traveler somewhat in the mode of Rip Van Winkle. However, he also learns that the technology for literal time travel has by this time been developed (though it is still in the experimental stage). He then cleverly uses this technology to travel back to 1970 to turn the tables on his would-be nemeses, then returns to a happy life in 2000. Importantly, though, this 2000 is very much the same one he found on his initial awakening, once again suggesting that history is immutable.

David Gerrold's *The Man Who Folded Himself* (1973) takes its cue from "All You Zombies" in presenting a time traveler whose movements in time (via a "timebelt" whose origin and workings are never explained) enable him to become both his own mother and his own father. Here, however, this situation is enabled by a vision of time travel as movement among different parallel universes. Each trip taken by the traveler results in a slight change in history, creating a new timeline in which the traveler has a slightly (or in some cases greatly) changed identity – while the original timeline continues unabated in parallel. Ultimately, a male and female version of the traveler meet and produce a son – who grows into the version of the protagonist we had met in the beginning of the novel.

Jack Womack's *Terraplane* (1988), an early entry in a series of novels in which the author explores a future world increasingly dominated by the sinister Dryco Corporation, is also centrally concerned with time travel and parallel universes. Here, however, there are only two parallel worlds, which are virtually identical but which have recently taken different historical paths (possibly owing to the effects of nuclear explosions), including the fact that the second world now runs several decades in time behind "our" (i.e., Dryco's) world. A machine developed by a Russian scientist (and eventually conscripted by Dryco) allows travel between the worlds, and is used, in *Terraplane*, by the scientist in an attempt to retrieve Joseph Stalin from the parallel world so that he can try to set things right in the chaotic postcommunist Russia of our world. Meanwhile, in *Elvissey* (1993), Dryco operatives travel to the "slow" universe to retrieve a young Elvis Presley whom they hope to use to combat an Elvis cult whose power is beginning to rival their own in the "fast" universe.

In Jack Finney's *Time and Again* (1970), a scientist, Dr. Danziger, develops an unlikely method of time travel that essentially involves transporting travelers to earlier eras simply by placing them in the mindset of that era. However this book is uninterested in presenting a believable method of time travel. Instead, it focuses on a detailed description of 1882 Manhattan, to which protagonist Simon Morley travels. Morley encounters considerable difficulties in this past world, but ultimately concludes that the world of 1882 is more civilized and humane than the world of 1970 – especially after the government-sponsored project for which he is working shows signs of military-inspired interest in manipulating the past for their own ends. He thus decides to stay permanently in 1882. In a classic time-travel plot twist, he also manages to prevent Danziger's parents from meeting in that year, thus averting the eventual birth of the scientist and the founding of the time-travel project that sent Morley to 1882 in the first place.

Gregory Benford's *Timescape* (1980) represents one of the few attempts to present a detailed and believable scientific basis for time travel, while at the same time making an important contribution to environmentalist science fiction. In particular, the book presents a detailed depiction of both the personal and the professional lives of two groups of scientists who are involved in the development of a viable time-travel device. Having discovered a way to use tachyons (subatomic particles that are found to travel backward in time) to send coded messages into the past, Cambridge scientists in 1998 work to send warnings to a second group of scientists back in 1962 in an attempt to prevent ecological disasters that have ravaged the world's oceans in the intervening time and that threaten to wreak havoc on Earth's environment in the world of 1998. Among other things, *Timescape* presents an argument for the value of basic scientific research, which here helps to solve a problem crucial to the future of humanity, even though none of the research involved has any direct connection to the problem involved.

In *Doomsday Book* (1992), Connie Willis places the mechanism for time travel in the hands of twenty-first-century Oxford historians, who use the internet as a research tool, in this case to study the Middle Ages. In Willis's universe, time travel itself appears to have little value outside of academia since it cannot be readily exploited for economic gain, as it is in Michael Crichton's *Timeline* (1999), a novel that converts a number of the plot elements of *Doomsday Book* into Crichton's patented action-thriller format. Willis herself extends the ideas of *Doomsday Book* in *To Say Nothing of the Dog* (1997), describing the temporal continuum as a chaotic system in which tiny perturbations can cause major far-reaching effects. This system, however, also has the ability to correct potentially damaging incongruities introduced by time travelers; it protects itself from continuum paradoxes using "slippage," a shift in time that prevents actions that could alter history. Similar to Willis's story "Fire Watch," in which historians witness the efforts to save St. Paul's Cathedral during the Blitz, *To Say*