

# Book Review: The Generation Starship In Science Fiction A Critical History, 1934-2001

Simone Caroti

reviewed by John I Davies

Dr Simone Caroti has now delivered his presentation on *The Generation Starship In Science Fiction* to students taking the i4is-led interstellar elective at the International Space University in both 2020 and 2021. Here John Davies reviews his 2011 book based on his PhD work at Purdue University\*.

Within an overall chronological plan the major themes in Dr Caroti's book seem to me to be -

- The conflict between the two conceptions of a worldship. Is it a world which happens have an artificial "substrate" or is it a ship with a mission which happens to require a multi-generation crew.
- How can the vision of dreamers like Tsiolkovsky, J D Bernal and Robert Goddard be made to inspire the source civilisation, for whom this is a massive enterprise, the initial travellers, their intermediate descendants and those who must make a new world at journeys end?
- And, more practically, how can culture, science and technology be sufficiently preserved over many generations?

## Opening Chapters

The book sees the development of the worldship as a fictional theme in six overlapping eras - the first worldship ideas (not all as fiction), The Gernsback Era, 1926-1940 , The Campbell Era, 1937-1949, The Birth of the Space Age, 1946-1957, The New Wave and Beyond, 1957-1979 and The Information Age, 1980-2001.

Caroti read a lot of science fiction and speculative non-fiction before beginning his PhD at Purdue University. He mentions Vernor Vinge, Iain M Banks and Carl Sagan (and returns to them later). Another early mention is critic John Clute [1].

His Introduction gives some historical context to worldship ideas with the key scientific event of the discovery of the first ideas of the true scale of the universe and the unattainability of light speed in 1905 as the founding premise for the worldship concept. Tsiolkovsky, as (almost) always, sets the problem and suggests a solution in *The Future of Earth and Mankind* in 1928. In the following year J D Bernal in *The World, the Flesh & the Devil* [2] suggests a hollowed asteroid as a worldship.

In the chapter "Fathers" he again cites Tsiolkovsky and Bernal and adds Robert W Goddard, who wrote some notes, *The Last Migration*, and a précis *The Ultimate Migration*, in 1918 - a year before his seminal idea *A Method of Reaching Extreme Altitudes* [3] in 1919. Caroti sees Tsiolkovsky as having a "purer vision" than Goddard. But Goddard's envisaged *Last Migration* was not published in the USA until 1972 [4].

\* *The generation starship in science fiction, 1934-1977* [docs.lib.purdue.edu/dissertations/AAI3379320/](https://docs.lib.purdue.edu/dissertations/AAI3379320/)

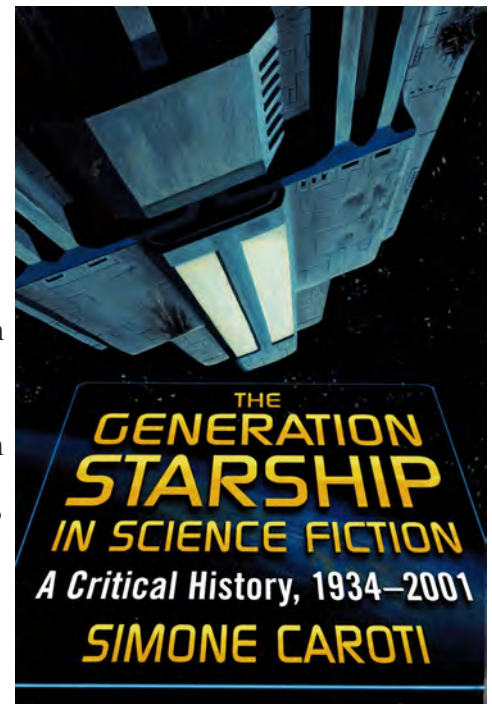
[1] *Encyclopaedia of Science Fiction*, edited by John Clute, David Langford, Peter Nicholls (emeritus) and Graham Sleight (managing). [www.sf-encyclopedia.com/entry/world\\_ships](http://www.sf-encyclopedia.com/entry/world_ships)

[2] J D Bernal, *The World, the Flesh & the Devil, An Enquiry into the Future of the Three Enemies of the Rational Soul*, Verso Books, [www.versobooks.com/](http://www.versobooks.com/) and [www.marxists.org/archive/bernal/works/1920s/soul/](http://www.marxists.org/archive/bernal/works/1920s/soul/)

[3] NATURE 26 August 1920 [www.nature.com/articles/105809a0.pdf](http://www.nature.com/articles/105809a0.pdf)

[4] [www.centauri-dreams.org/2013/05/06/robert-goddards-interstellar-migration](http://www.centauri-dreams.org/2013/05/06/robert-goddards-interstellar-migration)

*The Ultimate Migration* <https://web.archive.org/web/20191102193806/https://www.bis-space.com/2012/03/23/4110/the-ultimate-migration>



Published: McFarland 2011 [mcfarlandbooks.com](http://mcfarlandbooks.com)

Image credit: Bill Knapp, *Arrival*  
[www.artprize.org/bill-knapp](http://www.artprize.org/bill-knapp)

Caroti sees parallels between an aristocracy of scientific knowledge in Bernal and Gene Rodenberry's vision of our interstellar future. "Strange bedfellows" indeed given that Bernal was a lifelong convinced communist [1]. Bernal was certainly very "modern" - conceiving of his habitats as having a "metabolic" existence with no clear organic/mechanical distinction. Caroti compares the visions of Tsiolkovsky, Goddard and Bernal and is optimistic about the influence of science on both capitalist and socialist[2] societies. Would he still be so optimistic now - ten years after publication?

### The Gernsback Era

The first of Caroti's overlapping eras is *The Gernsback Era, 1926-1940*. Gernsback recruited Verne and Wells into his category of "scientific-ition" using it to proselytise for science and engineering solutions to human problems and the advance of technical civilisation. But Caroti agrees with the later view of Brian Aldiss that Gernsback "ghetto-ised" science fiction (SF) while also arguing that he was unconsciously following the more articulate techno-optimism of Bernal, Tsiolkovsky and Goddard. Curiously he does not mention *Things to Come*, a 1936 film written by H G Wells, which pitched technological progress against the local demagogue, The Boss, and shot a nubile young couple to the Moon with the last words uttered by Raymond Massey in his full pomp "All the universe or nothing? Which shall it be?".

Gernsback published *The Living Galaxy*, Laurence Manning, in 1929 which Caroti cites as "the first fully fledged generation starship narrative". An 8 page story covering an 800 million year future history (which he later contrasts with the brief time



Cover of the first edition. Image credit: Frank R Paul



Opening pages of *The Voyage that lasted 600 years*, Don Wilcox. Credit: Amazing Stories, 1940. <https://classicsofsciencefiction.com> Images- Julian S Krupa

of pulp-era science fiction to pit an evil monster or robot against a white male hero and his defenceless female companion might be present here? Caroti suggests that Wilcox is simulating a perceived decline in contemporary American culture. Caroti devotes 25 pages to analysing this story, more that 10% of his main narrative.

[1] Bernal maintained his support for the Soviet model of communism until his death in 1971. He also stretched his intellectual embrace as far as the anti-Mendelian genetics of Lysenko. In political jargon he was a "tankie" - one of those who supported the suppression of the 1956 Hungarian uprising by Soviet tanks.

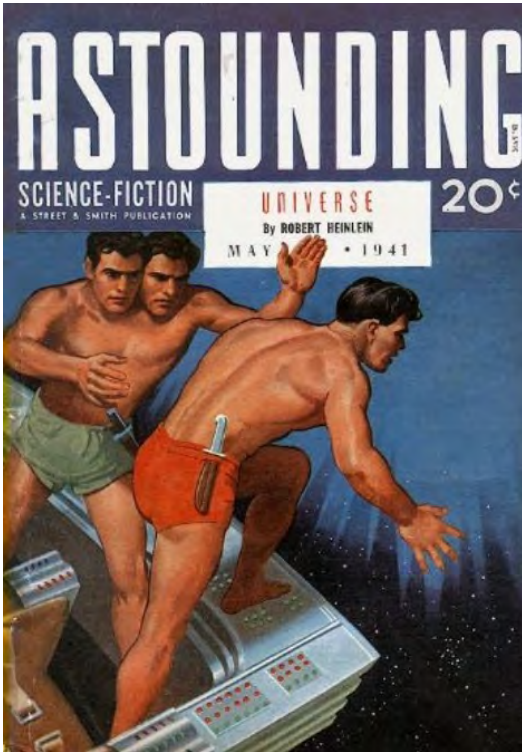
[2] By "socialist" I believe he means communist in the Soviet sense - thus leaving out both the post-communist oligarchies of Russia and China and the social democracy which has been either dominant or highly influential in western Europe.

[3] Plot spoiler - It may be worth noting the limits of this parallel. The Eloi are, it turns out, eaten by the Morlocks.



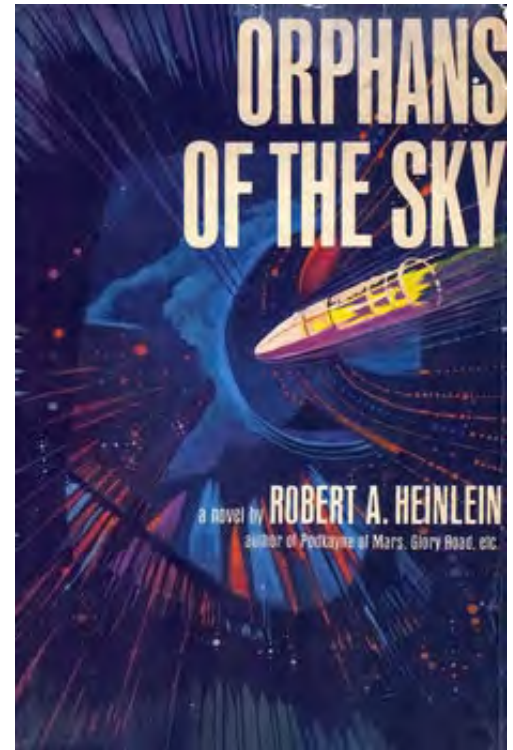
## The Campbell Era

Caroti tells us that John W Campbell's *Astounding* magazine attempted to make SF more about engineering than "bug-eyed monsters". The recovery from the '29 crash and the technological supercharger of the Second World War offered scope for more optimistic SF. He sees the technical race between Germany, Japan and the US as a main driver. Presumably the Soviets and the Brits were less influential? He also sees Robert Heinlein as Campbell's virtual alter-ego. Heinlein attempted a technology driven "history of the future" with his linked worldship stories "Universe" and "Common Sense" occupying the latter part of his timeline. In fact this pair of 1941 magazine stories became a novel, *Orphans of the Sky*, more than 20 years later (1963).



1941 to 1963. A contrast in covers between the same stories in *Astounding* magazine and the book 20 years later.

Credits: *Astounding* and Putnam (+ book cover artist Irv Docktor) respectively



Heinlein envisaged a cylindrical worldship - and again it had lost its way. Heinlein gives us the guided tour in typical explanatory style. A regressed culture within a very advanced technology with a ritualising scientific elite [1]. The degenerate "muties" Caroti sees as protestants in late medieval Europe with the prophetic character Hyland as Galileo leading them out of interstellar darkness to planetfall [2]. Again Caroti discusses a story at length, 25 pages.

The Heinlein timeline from *Revolt in 2100*. Credit: SFFWorld <https://www.sffworld.com/2019/02/revolt-in-2100-by-robert-a-heinlein/>

### THE HEINLEIN TIMELINE

Note: stories in brackets never written. See Postscript to *Revolt in 2100*

DATES	STORIES	CHARACTERS	TECHNICAL	DATA	SOCIOLOGY	REMARKS
A.D.						
	Life Line "Let There Be Light" (Word Edgewood) The Roads Must Roll Blowups Happen The Man Who Sold the Moon	John Lytle Zeb Jones Ford Magdalene MacIntosh Farr Parsons The "Doctor" Libby McCoy Shubs Doyle	Transatlantic Rocket flight Antipodes rocket service		THE "CRAZY YEARS" STRIKE OF '76 The "FALSE DAWN" First Rocket to the Moon	Considerable technical advance during this period, accompanied by a gradual deterioration of morals, orientation and social institutions, terminating in mass psychoses in the sixth decade, and the Interregnum.
	Delilah & the Space Rigger Space Jockey Requiem The Long Watch Gentlemen Be Seated The Black Pits of Luna— It's Great To Be Back "—We Also Walk Dogs" Searchlight	Wingath Rhysling Gaines Hanger Erickson King Lentz Harriman Machyo Dunnings Nehemiah Scudder Satchel Sam Jones Satchel	Static submodular engineering Mechanized roads Helicopter Interplanetary travel Mechanized rocket travel Development in psychomechanics and psychodynamics Artificial radioactives—uranium 235—Static submodular engineering		Luna City Founded Space recalcitrant Act Harriman's Lunar Corporations PERIOD OF IMPERIAL EXPLORATION Revolution in Little America Interplanetary exploration and exploitation American—Australasian anchluss	The interregnum was followed by a period of reconstruction in which the Voohts financial proposals gave a temporary economic stability and chance for reorientation. This was ended by the opening of new frontiers and a return to nineteenth century economy. Three revolutions ended the period of planetary imperialism: Antarctica, U.S., and Venus. Space travel ceased until 2172. Little research and only minor technical advances during this period. Extreme puritanism.
2000	Ordeal in Space The Green Mills of Earth (Fire Below) Logic of Empire (The Sound Of His Wings) (Eclipses) (The Stone Pillow) "If This Goes On—" Coventry	Magdalene MacIntosh Farr Parsons The "Doctor" Libby McCoy Shubs Doyle	Douglas-Martin sun-power screens Commercial rocket travel Helicopter Interplanetary travel Mechanized roads Development in psychomechanics and psychodynamics Artificial radioactives—uranium 235—Static submodular engineering		Rice of religious fanaticism The "New Crusade" Rebellion and independence of Venusian colonists Religious dictatorship in U.S. THE FIRST HUMAN CIVILIZATION	Certain Aspects of psychodynamics and psychometrics, mass psychology and social control developed by the priest class. Re-establishment of civil liberty. Renaissance of scientific research. Resumption of Space travel. Luna city refounded. Science of social relations, based on the negative statements of semantics. Rigor of epistemology. The Covenant.
2100	Mist Universe (prologue only) Methuselah's Children Commonsense (Ba Capo)	John Lytle Zeb Jones Ford Magdalene MacIntosh Farr Parsons The "Doctor" Libby McCoy Shubs Doyle	Atomic "talking" Elements 98—416 Parasitic engineering Rigor of collisids Symbolic research Longevity		Beginning of the coolidation of the Solar System First Attempt at interstellar exploitation Civil disorder, followed by the end of human adolescence, and the beginning of first mature culture.	

[1] The ritualisation of science seems to me to parallel the humorous parody of science as religion in Bester's *The Stars My Destination*. The "Scientific People" are effectively marooned on an asteroid worshipping "The Holy Darwin", anticipating "The arrival of the fittest" and approving good actions as "most scientific".

[2] The second story "Common Sense" evokes Thomas Paine and I suspect Heinlein used it consciously but Caroti does not mention the parallel between the title and another rationalist persecuted for challenging religious orthodoxy. See the *Book Review: Religions and Extraterrestrial Life* by David A Weintraub in *Principium* 29. May 2020.

## Birth of the Space Age

Dr Caroti characterises the period 1946-1957 as The Birth of the Space Age, He cites the influence of the members of the German Rocket Society, the VfR [1] notably Willy Ley, who fled the Nazi regime, and Werner Von Braun, who led the design of the V2 missile. A minor error here - Caroti refers to the V2 as "the first true ICBM". From the US point of view it was most fortunate that the A4, propaganda name V2, was not a "true ICBM". There was an intercontinental ballistic missile on the drawing board, the A9/A10 two stage vehicle, but the war ended before it could be built.

Arthur C Clarke appears in 1946 with his Astounding magazine story "Rescue Party", of a worldship fleet evacuating a dying Earth. Gernsback is still active, publishing the non-fiction "Interstellar Flight" by Les Shepherd of the British Interplanetary Society[2]. Caroti commends Shepherd (with Tsiolkovsky) for examining the worldship as a system, though neglecting the psychology of the travellers, and for addressing the question "Why go?". The systems approach is extended to hydroponics in Clifford Simak's "Spacebred Generations" in 1953.

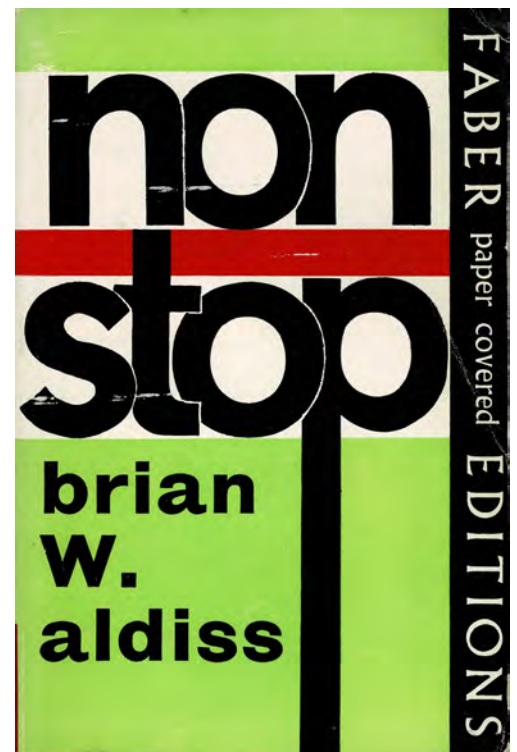
Caroti examines Frank M Robinson's "The Oceans are Wide" at some length. Themes include the 'loneliness of command' and the choice of destination - leadership rejecting a paradise planet and preferring a challenging environment despite having fled a conflict-ridden Earth.

Another minor error, Caroti briefly mentions James Blish's "Cities in Flight" series and mentions the cities operating "billions of years after our planet's demise". At the conclusion of *Earthman Come Home* they do just that but the Earth cops don't welcome them!

## The New Wave and Beyond

Caroti sets the beginning of the New Wave of SF in 1957 and sees it extending to 1979. 1957 seems to be chosen as the year of Sputnik 1 when Americans found a bleeping sphere orbiting over their heads every 90 minutes - and the advent of Mutually Assured Destruction (MAD)[3].

The most accepted beginning of the New Wave was in 1964, with Michael Moorcock's editorship of the magazine *New Worlds* and the stories of Harlan Ellison, J G Ballard and Brian Aldiss. But Caroti mentions an earlier story by John Brunner, "Lungfish", in 1957 with mutual alienation between the Earthborn and Tripborn generations. Population psychology dominates technology. Another example, "The Wind Blows Free" - also 1957, by Chad Oliver has a misfit "rebel without a cause" who tries to commit suicide by leaving the ship only to discover it has already arrived. A novel *NonStop*, Brian Aldiss 1958, describes a degenerated starship society of jungle tribes with limited access to more advanced weapons. The evolved social rituals and the partitioning of the ship into elements paralleling human psychology are clear examples of the intervention of what became characterised as "inner space". Caroti deals at some length with the shift between Heinlein and Aldiss. Though their careers overlapped their anticipation of worldship societies diverged enormously. J G Ballard ventured into the field with the story "Thirteen to Centaurus". Here the plot revelation is the ship never left Earth and is an experiment in social psychology, precursor to a real mission[4]. Here Ballard's "inner space" is both psychological and literal.



Nonstop 1965 Faber edition cover.

SF has started to get serious by 1965

[1] Verein für Raumschiffahrt, Society for Space Travel 1927-1934

[2] More about this by the encyclopaedic Paul Gilster in The Worldship of 1953 <https://www.centauri-dreams.org/2014/06/12/the-worldship-of-1953/>

[3] Caroti characterises MAD as a "zero sum game" preventing World War III. This is doubtful. In a zero sum game every point I win is a point you lose so the sum of wins, pluses, and losses, minuses, comes to zero. Any game where both sides benefit as in the avoidance of World War III cannot be zero sum. However the views of experts would be welcome.

[4] Is this a variant of the great moral question of the worldship - who can decide for succeeding generations?. But we are all, to a degree, limited by our social backgrounds. It is very hard to leave a closed religious community or to avoid a military mindset in a military family.



The concept of Spaceship Earth has a natural relation to worldship ideas and Caroti mentions the thinking of Adlai Stevenson, Barbara Ward and R Buckminster Fuller - and later biological metaphor of James Lovelock's Gaia hypothesis.

An example of another worldship issue arises in Samuel R Delaney's *The Ballad of Beta-2*. Caroti here illustrates the Wait calculation but does not take it as a major theme - perhaps because it has received limited attention in fiction. Will a slow ship be overtaken by faster technology, making the sacrifice of generations perhaps pointless?[1]

Though the new wave encompassed "inner space", feminist SF and later cyberpunk and steampunk, Caroti quotes examples of the old style such as Poul Anderson's *Tau Zero*, a voyage almost infinitely prolonged by the unstoppable acceleration of a Bussard ramjet, and Clarke's *Rendezvous with Rama*, the alien worldship with no apparent inhabitants. But Harlan Ellison's brave attempt to introduce a worldship to television SF, *The Starlost*, was cancelled after a single series.

## The Information Age

Caroti's last chronological phase is the period 1980-2001, The Information Age. Here we digress to the "Terminator" films but quickly come to trends in SF identified by John Clute in his article in *The Cambridge Companion to SF*, 2006 -

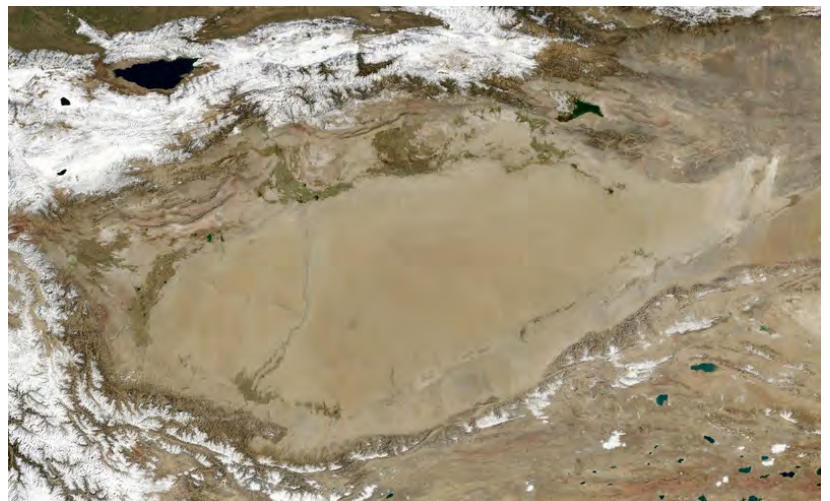
- relative decline in written SF versus films, TV and games
- the abandonment of the idea of the SF genre having a "life story", birth, maturity, etc
- the end of machine-oriented SF with the "end" of the space programme (written, of course, before the rise of private launchers, the development of "heavy" launchers outside NASA and lunar and Mars missions by India and China)
- new writers who are "citizens of the information revolution"

Caroti gives weight to the latter two but notes more Campbell-ian SF with Asimov and Clarke continuing to write stories in this style. I beg to differ in the case of Clarke who, perhaps influenced by his final home, Sri Lanka, embraced nature and even titled his space elevator story, a classic Campbell theme, *The Fountains of Paradise*.

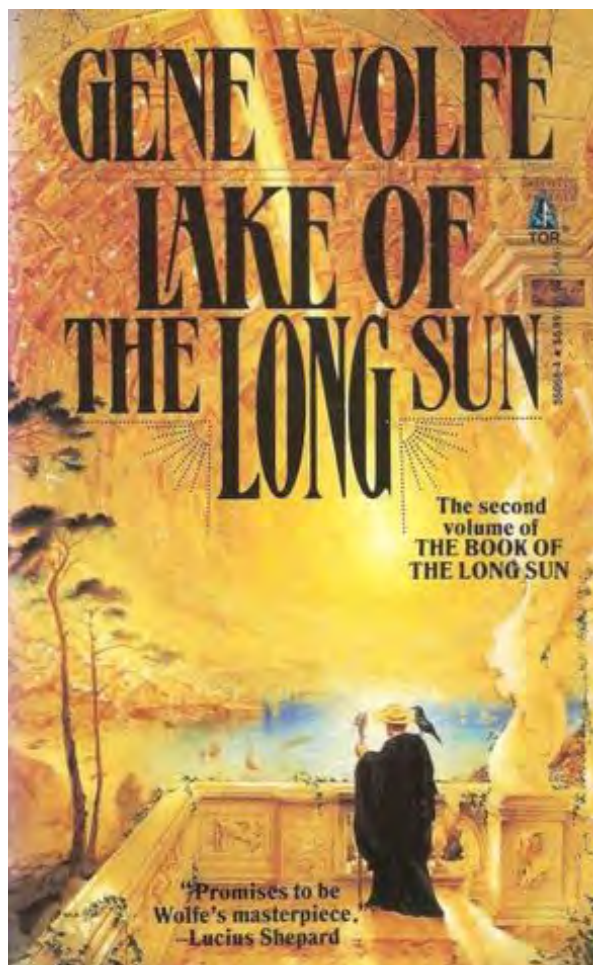
An exception, for Caroti, is Frank M Robinson with *The Dark Beyond the Stars*, in 1991. Here a worldship, 2,000 years into its voyage, has split into "go on" and "go back" factions with the "go on" faction all immortal. The viewpoint character discovers he is biologically immortal but is "mind wiped" every 20 years. When the ship does return to Earth it discovers an alien starship in orbit. Robinson wrote a 1954 story, "The Oceans are Wide" (briefly mentioned earlier in this review). The last survivors of Earth in a ship dominated by a visible "Director" and an unseen "Predictor". Caroti sees the decision, to settle a hostile world rather than a benign one to avoid decadence, as a contradiction. The voyagers are fleeing a nuclear holocaust arising from just the aggressive qualities sought in the destination planet - and thus a probable repeat of that history. In the later novel Robinson is saying "Earthman come home" 54 years after a story advocating the rebuilding of a "Heinlein tough" civilisation from nuclear ashes. He recommends reading the two stories in succession.

Another parable is Bruce Sterling's *Taklamkan*, a real desert providing the background of a story about the discovery of a monster cavern containing three fake starships populated by "undesirables".

NASA image of the Takla Makan Desert (setting of Sterling's *Taklamkan*) in north west China. 920 km by 420 km, mostly shifting sand.  
[www.britannica.com/place/Takla-Makan-Desert](http://www.britannica.com/place/Takla-Makan-Desert)



[1] For a fairly recent examination of this see - *Interstellar Travel: The Wait Calculation and the Incentive Trap Of Progress*, Andrew Kennedy, JBIS, Vol. 59, 2006, open publication available via Google Scholar.



Caroti sees this as a relatively benign environment compared with our own outcast areas such as Gaza, Darfur and Afghanistan[1]. If we are to have what Caroti calls "generational entrapment" as in these unfortunate places then perhaps a worldship, even a simulated one, is preferable[2]?

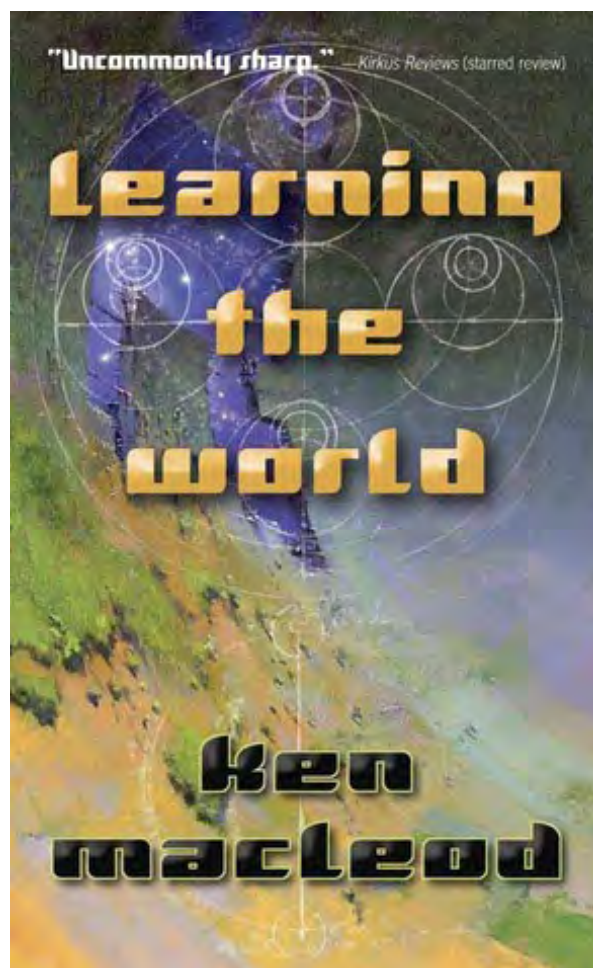
Simone Caroti is clearly a Gene Wolfe fan. He looks at the worldship which forms part of his New Sun/Long Sun sequence of novels. From this long lived ship, the Whorl, he suggests Wolfe has a "painterly" approach, using SF tropes to examine concepts like Plato's cave[3]. The Long Sun is the extended illuminator of another cylindrical worldship with the population degenerating to worshipping the controlling artificial intelligences.

Cover 1995 Tor Books edition of Lake of the Long Sun, Gene Wolfe.  
Illustrating the linear illuminator in Wolfe's cylindrical worldship

### Conclusion. Trip's End

In the final part of the main thread of his book, Dr Caroti takes us beyond the final date in his title. His book was published in 2011 and he reports that a dozen worldship stories were published after 2001. He particularly commends Ken McLeod's *Learning the World*. The ship visits systems, planting settlements carrying Founders, Crew and Colonisers. The story is of First Contact, with a batlike species at about early 20th century stage of technology. A paradoxical situation arises with formerly peaceful travellers descending to civil war while the benign message they carry promotes peace amongst the "bat people". "A fight in front of the children" as one of the travellers puts it!

Ken McLeod's *Learning the World*.  
US edition cover, Tor Science Fiction 2006



[1] a humorous treatment of this from Douglas Adams is the "B Ark", a real worldship populated by telephone sanitisers, hairdressers, personnel officers and management consultants in *The Restaurant at the End of the Universe* and the earlier radio and TV series.

[2] Reminiscent of President Donald Trump wanting to stop people coming to the US from "shithole countries" - as he told CNN in 2018 ([edition.cnn.com/2018/01/11/politics/immigrants-shithole-countries-trump/index.html](https://edition.cnn.com/2018/01/11/politics/immigrants-shithole-countries-trump/index.html)).

[3] Plato's cave - see Stanford Encyclopaedia of Philosophy, entry 13. Sun, Line and Cave of Plato's Middle Period Metaphysics and Epistemology <https://plato.stanford.edu/entries/plato-metaphysics/#13>



## Conclusions

This is a massive piece of work, in terms of scope and thinking, fitted into a relatively modest 240 pages of main text. I suspect I have done it less than justice.

There is a substantial *Appendix. The Generation Starship: A Chronological Bibliography*, a general bibliography, chapter notes and a good index - though with a few flaws.

There are some inconsistencies between main text, the two bibliographies and the index. An example - Fritz Leiber's *Ship of Shadows* appears in the Chronological Bibliography with a detailed citation but not in the general Bibliography, the Index, or (as far as I can tell) the main text.

I have a few reservations -

- Inevitably such a short book, 240 pages of main text, on such a massive subject needs to concentrate to some extent and Caroti concentrates on the literary, political and social aspects of the subject with little on the science and engineering, either implied or explained, in the works described.
- The question of technological, scientific and cultural development on board, possibly informed and influenced by communication with Earth despite the delay, does not seem to be much treated either in worldships as described in the stories or analysed by Dr Caroti. But maybe I'm asking for more than the book sets out to achieve.
- The balance between the chronological periods suggests concentration on the first half of the century -
  - The Gernsback Era, 1926-1940 and The Campbell Era, 1937-1949 average 3 pages per year.
  - The Birth of the Space Age, 1946-1957, The New Wave and Beyond, 1957-1979 and The Information Age, 1980-2001 average 2 pages per year.
- The most significant omission, in this reviewer's personal opinion, is the very brief mention of James Blish and his "Cities in Flight" series, notably *Earthman Come Home*, which imagines Manhattan as a worldship crewed by long-lived, but not immortal, 1950s-culture Americans, taking advanced technology around the galaxy with the slogan "Mow your Lawn, Lady?" emblazoned across City Hall. This looks like a prime target for the sort of cultural analysis that Caroti applies to what are, in my opinion, much lesser works. Blish has explicitly referenced Spengler's *Decline of the West* [1] as a primary inspiration for this series.

However I recommend Simone Caroti's book as the best coverage of the subject I have yet encountered and I believe it would merit an update and republication to a wider audience. In any case I will be reading it again.



Still from a video, *Cities In Flight*, by Charlie McCulloch ([www.charliemcculloch.com/](http://www.charliemcculloch.com/)) UX Design Lead at Recast, Edinburgh, inspired by the James Blish stories

[1] *Der Untergang des Abendlandes*, Oswald Spengler, 1922-23. Spengler's ideas of the finite lifetime of civilisations were a clear theme in the *Cities in Flight* series [www.britannica.com/biography/James-Blish](http://www.britannica.com/biography/James-Blish). Blish even applied it to cosmology by implying a cyclical universe.