Food and Foodways in Science Fiction

Len Fisher and Anders Sandberg

Abstract: Science fiction writers are concerned with puzzles about the future. Here we examine some of the puzzles where food is a significant factor, and sometimes the major factor. Some are simply puzzles in their own right, from the frankly humorous to the seriously disturbing. Others highlight deep paradoxes and problems of human society and the human condition within a futuristic setting. We ask in both cases whether the solutions to these puzzles may have relevance for humanity's real-life present and potential future.

The imagination of science fiction writers has given us galactic travel and adventures, alien species and civilizations, unusual ethical dilemmas, and whole new worlds to explore. What might such creative minds have to offer when it comes to the subjects of food and drink?

The answer in the majority of cases is 'Not very much'. As with the characters in conventional fiction, those in science fiction seem seldom to eat and even more seldom to take an interest in their food. Even authors who have had a real-life involvement with food often seem to forget its existence when it comes to their novels. E.E. (Doc) Smith, the originator of the 'space opera' genre, was a food scientist who gave us bleached flour,[1] but food seldom appears in his space-devouring novels. Jason Sheehan, restaurant critic by day[2] and science fiction writer by night, produces novels of giant killer robots, radioactive mutants, mad scientists and rampant nanotechnology,[3] but still steers clear of what or how his characters eat.

Luckily for our present theme, some scifi authors have boldly faced the fact that their characters need to eat and drink. Here we explore where the authors' imaginations have led them, and ask whether their solutions may have relevance for our real-life present and future.

We divide our investigation into two parts:

- Types of food
- Food manners, etiquette and ethics

Types of Food

Normal Earth meals

We begin in 1865, when Jules Verne, considered by many to be the father of science fiction, wrote 'From the Earth to the Moon'.[4] His heroes, housed inside a giant cannon shell (complete

with sofas, windows and a kitchen!) have been shot out of an equally giant cannon towards the Moon. The journey will take them 97 hours and 20 minutes; plenty of time for breakfast.

'The breakfast began with three bowls of excellent soup, thanks to the liquefaction in hot water of those precious cakes of Liebig, prepared from the best parts of the ruminants of the Pampas. To the soup succeeded some beefsteaks, compressed by an hydraulic press, as tender and succulent as if brought straight from the kitchen of an English eating-house. Michel, who was imaginative, maintained that they were even 'red'. Preserved vegetables ('fresher than nature,' said the amiable Michel) succeeded the dish of meat; and was followed by some cups of tea with bread and butter, after the American fashion. The beverage was declared exquisite, and was due to the infusion of the choicest leaves, of which the emperor of Russia had given some chests for the benefit of the travelers. And lastly, to crown the repast, Ardan had brought out a fine bottle of Nuits, which was found 'by chance' in the provision-box'.

The 'precious cakes of Liebig' (an extract of meat) were a real thing. Liebig was a well-known chemist, responsible for the modern science of organic chemistry, and also for promoting the myth that searing the outside of meat 'seals in' the juices. His 'extract of meat' was 'a thick, dark syrupy beef extract paste,' sold in glass bottles, and later rebranded as OXO.

Question: Verne had his characters eating what was essentially a normal Earth meal. To what extent is this possible in the real environs of space? One answer lies in this menu from the 1965 Gemini 7 space mission:[6]

Gemini 7 Space Flight Menus

Menu I (*Calories:* 2,315)	*Menu II* (*Calories:* 2,304)	*Menu III* (*Calories:* 2,322)	*Menu IV* (*Calories:* 2,297)
Days 1, 5, 9, 13.*	Days 2, 6, 10, 14.	Days 3,‡ 7, 11.	Days 4, 8,§ 12.
Meal A:	Meal A:	Meal A:	Meal A:
Grapefruit drink.	Chicken and gravy.	Salmon salad.	Bacon squares.†
Sausage patties.	Beef sandwiches.†	Pea bar.	Ham and applesauce.
Banana pudding.	Applesauce.	Gingerbread.†	Chocolate pudding.
Fruit cocktail.	Peanut cubes.†	Cocoa.	Orange drink.
Meal B:	Meal B:	Meal B:	Meal B:
Beef and vegetables.	Orange-grapefruit drink.	Grapefruit drink.	Beef and gravy.
Potato salad.	Beef pot roast.	Bacon squares.†	Corn chowder.
Cheese sandwiches.†	Bacon and egg bites.†	Chicken and vegetables.	Brownies.†
Strawberry cubes.†	Chocolate pudding.	Apricot cubes.†	Peaches.
Orange drink.		Pineapple fruitcake.†	
Meal C:	Meal C:	Meal C:	Meal C:
Orange-grapefruit drink.	Potato soup.	Spaghetti and meat.	Coconut cubes.†
Tuna salad.	Shrimp cocktail.	Cheese sandwiches.†	Cinnamon toast.†
Apricot pudding.	Date fruitcake.†	Butterscotch pudding.	Chicken salad.
Date fruitcake.†	Orange drink.	Orange drink.	Applesauce.
			Grapefruit drink.

*Meal A also includes apricot cereal cubes, total Calories: 2,429.

†Nondehydrated, others are rehydratable.

‡Meal A also includes toasted bread cubes, total Calories: 2,429.

§Meal A also includes strawberry cereal cubes, total Calories: 2,411.

The menu offers familiar foods that one might equally find offered by a less-than-high-class restaurant back on Earth. The same stricture applies to the food on more recent missions.[7] It seems that, just like most science fiction authors, the planners of real space

missions (or perhaps the astronauts themselves) were simply not interested in applying their imaginations to the problem of food. More likely, perhaps, plain and familiar foods would have provided comfort in an environment that was otherwise startlingly unfamiliar.

The meal of beef with vegetables, pork and potatoes and bacon and apple sauce reputedly consumed by Neil Armstrong and Buzz Aldrin during the 1969 moon landings (https://www.thesun.co.uk/tech/9522962/astronaut-food-history-moon-landing/) fits into the same category. Admittedly, the components would have been reconstituted, and there was also the undoubtedly unfamiliar fact that they had spare meals stuck to the inside of their helmets in case of emergencies.

Familiar foods continue to be a theme in science fiction and in real life. In Smith's *Lensman* series, the hero Kimball Kinnison at one stage grills himself a thick, juicy steak while on his intergalactic travels.[8] Reality trumped fiction when, in 2001, the Pizza Hut chain delivered a pizza to the Russian cosmonaut Yuri Usachov on the International Space Station.[9] NASA is now working to grow fruit and vegetables in space.[10] So 'normal' Earth meals may also become normal in space – at least for vegetarians.

Food pills and blocks

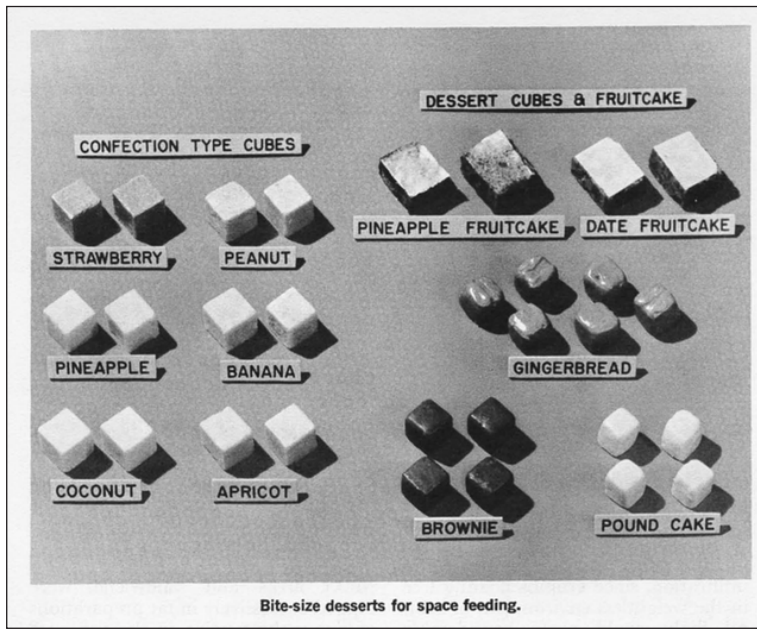
Isaac Asimov in *Prelude to Foundation* had 'flavor spheres,' which were raw dainties, flavoured for the outside market, but eaten unflavoured ('slightly sweet and ... a faintly bitter aftertaste' with a 'main sensation that eluded [description]') by the natives of the planet Mycogen.[11] Nat Schachner, in *Redmask of the Outlands*, produced a follow-up to these rather chunky objects, about the size of a table-tennis ball, with tiny rose-red cubical wine pellets, which brought 'a sparkle into the eyes with the coursing of concentrated stimulant through the veins'.[12]

Cubical pellets of various types and sizes are a mainstay of science fictional food. The first mention of such 'food tablets' was probably in an 1879 novel called *The Senator's Daughter*,[13] where just a small box full, scarcely larger than a watch, could sustain a person for more than twenty years (J.R.R. Tolkien in *The Lord of the Rings* would later ascribe similar properties to the fictional elvish *lembas*, or 'waybread').

Among the advantages of the tablets in *The Senator's Daughter* were 'an end to the evils of gluttony ... and ... the brutal murdering of fellow animals and brother vegetables'. Presumably also an end to the Oxford Symposium as we know it.

More recently, the wonderful *Bistro in Vitro* offers us something that is really in tune with the times: 'Celebrity Cubes', made from celebrities' stem cells.[14] Eat your favourite star. The fictional bistro offers them dipped in a whiskey glaze, and describes them as 'deliciously addictive'.

Question: Are there real-life equivalents of these space-saving space foods? Yes of course. Even on Earth we have Oxo cubes and the like, designed to pack in a space-filling way. And have a look at these space treats for the 1965 Gemini 7 space mission:



Bite-size desserts for space feeding.

One may, in fact, count in any dried food, since cubes or rectangular prisms (as in Kendall mint cake!) are the most efficient way to pack the material. The advantage that the fiction writer has is that water may be collected from any passing planet. In real life, it has to be carried along with the dried food.

Yeast, algae, bacteria, plankton etc

Here we come to a point where fiction and reality become difficult to distinguish. Yeast, algae, bacteria and plankton etc were being discussed as foods of the future by science fiction writers at around the same time as their use was being seriously considered by earth-bound food scientists. Arthur C. Clarke's *The Deep Range*,[15] for example, tells of a world where plankton is farmed for human food, although in his fictional scenario whales are herded and used as farmers.

Isaac Asimov, on the other hand, is one of a number of authors who favour yeast as a source, with yeast farmers being distinguishable by their distinctive aromas.[16] Algae, being considered for today's s space programme,[10] feature in James Blish's *Cities in Flight* [17] – the successor, perhaps, to today's seaweed-based gastronomic delicacies.

Unfortunately, the algae in one of Blish's tanks mutates when they pass too close to a source of radiation. 'There's been another mutation in the Chlorella tanks; must have started when we passed through that radiation field near Sigma Draconis. We're getting a yield of about twenty-two hundred kilograms per acre in terms of fats'.

'That's not bad'.

'Not bad, but it's dropping steadily, and the rate of decrease is accelerating. If it's not arrested, we won't have any algae crops at all in a year or so. And there's not enough crude-oil reserve to tide us over to the next star'.

The one fungal food to avoid is mushrooms. As Ray Bradbury points out,[18] aliens may disguise themselves as mushrooms. Eat one at your peril.

Question: Are algae, yeasts etc a viable source of food for intrepid space travelers?

The clear answer is 'yes,' and many experiments have already been carried out along these lines.[10] Some of the results have been serendipitous, including the discovery of previously unknown bacterial strains aboard the International Space Station.[19] The bacteria concerned were a strain of *Methylobacteria*, which can help to promote plant growth and to fight off infections in food plants growing under stressful conditions.

Food in television series

With television series such as *Red Dwarf* and *Star Trek*, we finally come to some truly imaginative ideas about food in science fiction.

Star Trek began conventionally enough with the routine concentrated food blocks, but the franchise progressively introduced so many unusual foods and food ideas[20] that there is now a whole cookbook devoted to them.[21] Perhaps the most unusual is the onomatopoeic Klingon delicacy *gagh* (live worms): 'the actual taste of gagh is revolting and it is eaten solely for the unique sensation of the gagh spasming in one's mouth and stomach in their death throes'.[22] Heston Blumenthal, beat that.

Star Trek also solves the food problem in a more general way with its iconic food replicator, which can synthesize from scratch any food that your heart desires (https://foodreplicator.tumblr.com/recipesbyseries), including stewed bok rat liver. Fred Pohl[23] takes us one step further with the Oort Cloud Processor, which processes icy pieces of space debris into food.

Red Dwarf features food extensively,[24] including a whole episode where food occupies centre stage.[25] The food situation is dire. 'We've no meat, no pulse and hardly any grain,' says the mechanoid Kryten 'and space weevils have eaten the last of the corn supply'. Kryten decides to grill the weevils ('at least they are corn fed'), which Lister devours avidly, taking them for crunchy king prawns. Shades of contemporary discussions on insect-based diets!

Enter the character Legion, appearing from a swirling mist. He offers them a 'traditional 24th century Mamosian banquet'. We are not told what the food consists of, but the tools to eat it are literally out of this world. Kryten, 'programmed to be proficient in all known off-world eating techniques, including Jovian Boogle Hoops, and the often-lethal Mercurian Boomerang Spoon,' is also versed in Legion's antimatter chopsticks. The design of the first two is left to our imagination, but the antimatter chopsticks are presented rather unimaginatively as whirling devices, rather like egg whisks with the ends cut off.

No matter. The point of the chopsticks is that they never touch the food, which rises by itself when the chopsticks are brought near. The Mamosian telekinetic wine that accompanies it is contained in glasses that are fixed to the table, so that there is no chance of knocking them over. One simply wills the liquid into the mouth, and then telepathically decides on its flavour. Robert Heinlen offers a similar idea when his characters land on a planet inhabited by friendly aliens who can read your mind and modify local fruits and vegetables to your taste.[26]

Question: Can we get close to any of these ideas in real life? Well, who knows? Taste sensations on the tongue have been stimulated electrically,[27] although stimulating the olfactory bulb may be a trickier proposition. It is interesting to note that there is now an implant that can read the brain waves of people and convert them into written words.[28] So maybe, just maybe, we could one day produce taste and flavour sensations by thought alone, or even have food levitated by thought.

Designer animals

Douglas Adams[29] offers us 'a large fat meaty quadruped of the bovine type with large watery eyes, small horns and what almost have been an ingratiating smile on its lips. 'Good evening,' [it says] 'I am the main Dish of the Day. May I interest you in parts of my body? ... Something off the shoulder perhaps? Braised in a white wine sauce?'

'Er, *your* shoulder?'

'But naturally my shoulder, sir,' mooed the animal contentedly, 'nobody else's is mine to offer'.'

Question: The ethics of designer animals

Adams is challenging us in a number of ways here, not least in the way that we often treat food animals in real life, and in the idea of 'designer animals' bred exclusively for food. In doing so, he elevates the role of science fiction which, like other forms of fiction, can be used to raise and investigate distinctly uncomfortable ideas.

Humans

Some of the most powerful ethical questions of all revolve around the question of cannibalism. To what extent is it permissible? Under what circumstances?

Soylent Green[30] is a well-known example. Less well-known, and more extreme, is the Larry Niven short story 'Bordered in Black'.[31] The title itself is a black joke, since death notices are frequently bordered in black. But the story is worse. Far worse. So bad, in fact, that we would recommend that people who might be emotionally affected should possibly skip to the next section.

Two space explorers have discovered a planet that has been terraformed, but then apparently abandoned. There are lakes on the planet, full of algae. It appears that the planet was developed as a food source.

But there is a wavy black line around each lake. Close approach reveals that it consists of people, struggling to reach the algae. It seems that they are the descendants of farmers left on the planet to harvest the algae before it was abandoned. But recognition strikes. It wasn't the algae that was the food source; it was the *people*, kept as food animals and fed on the algae.

Sometimes a writer's imagination can take him or her a bit too far!

Food manners, etiquette and ethics

Ethical conundrums

Many of the ethical conundrums explored by science fiction writers are exaggerated versions of real-life situations.[32] N.K. Jemisin's *Broken Earth* trilogy, for example,[33] deals with food rationing in a world that is facing disaster. A community's careful calculations of food rationing are thrown out when a woman gets accidentally pregnant. The solution is grim; it is determined that the woman will get no extra food to support her yet-unborn child until someone else in the community dies.

Another extreme example is Ray Bradbury's *Here There Be Tygers*.[34] Human space explorers discover a planet where anything may be had merely by imagining it. Water becomes wine for the asking. Fish swim unwittingly into hot springs, cooking themselves for your dinner.

The conundrum comes with the over-exploitation of such an apparently infinite resource. In Bradbury's story, the discoverers can't leave well enough alone. They begin drilling into the ground, only to discover too late that they are injuring what turns out to be a sentient planet. Lakes turn into tar pits, dinosaurs and mammoths appear, and the explorers leave hastily. Their report back on Earth says that the planet is hostile and of no benefit to humans.

Climate change is a frequent subject, even before the issue became such a serious one in real life. Paolo Bacigalupi's *The Windup Girl*, for example,[35] features large food corporations battling over gene banks in a world devastated by climate change.

Capitalist society also takes a battering. The American cartoonist Al Capp is seldom considered as a science fiction writer, but he certainly belongs in the genre with his invention of the shmoo in 1948 as a character (well, OK, species) in his cartoon strip Li'l Abner, set in the fictional deep South community of Dogpatch.[36]

Shmoos (forerunners of Douglas Adams' bovine animal in *The Restaurant at the End of the Universe*), are shaped like soft bowling pins, reproduce rapidly, are delicious to eat, and are eager to be eaten. They also lay eggs, their eyes make perfect suspender buttons, and their whiskers can be used as toothpicks.

But their free availability threatens to undermine capitalist society ('Wif these around, nobody won't nevah havta work no more'.). Captains of industry become alarmed, and

organize to exterminate the shmoos. Dogpatch's extortionate grocer Soft-Hearted Jones is ecstatic: 'Now them mizzuble starvin' rats has t'come crawlin t'me fo' the necessities o' life. They complained 'bout mah prices befo'! Wait'll they see th' new ones!!'

Finally, we must mention George R.R. Martin's *Tuf Voyaging*, set on the planet S'uthlam, which is suffering from food scarcity due to overpopulation.[37] The brilliant solution turns out to be a form of manna that inhibits the libido. Shades of the urban myth that bromide was added to the tea of British soldiers in the First World War for a similar purpose.

Question: With such powerful allegories, why hasn't science fiction had a similar impact to some traditional fiction on community responses to ethical questions? Well, occasionally it has. Mary Shelley's *Frankenstein*, for example, still speaks to questions of science, ethics and society.[38] It is difficult, though, to think of other specific examples. Perhaps science fiction is seen (incorrectly) by most people as a genre devoted to ideas, but seldom to people.

Manners and Etiquette

Food manners and etiquette feature in a number of science fiction novels. In Asimov's *Caves of Steel*,[16] yeast-based meals are served in communal kitchens. Good manners in this crowded imaginary world prescribe that one should not look at one's fellow diners while eating. The fact that two fellow diners keep glancing at our hero gives them away as baddies.

The etiquette of tea-drinking features strongly in Ann Leckie's debut novel *Ancillary Justice*.[39] Whole planets are devoted to its production. In a complex plot, the way in which tea is prepared and presented can serve to distinguish regional and cultural differences, and the supposed superiority of one group over another. The most prestigious teas are also used as gifts to someone from whom one might need a large favour. Tea drinking habits are used as clues by our heroine Breq as she seeks revenge against those who destroyed her starship by treachery.

The high point of food etiquette in science fiction, however, is surely Scott Meyer's *Master of Formalities*,[40] where good manners and the etiquette of dining play a central role in the plot, especially when the food *Skolash* comes in. A favourite on the hero Hennik's home world, it is presented as a dish that he has requested from his captors, whose society is governed by good manners – including preparing any dish that the captive has asked for.

But *Skolash* is some dish. Its literal translation is 'surprise,' and among those who are surprised are the chef, the sous-chef, and so on down the line, none of whom are allowed to know what the dish consists of. Nor are the guests at the banquet where it is to be served. The lowest kitchen employee is landed with the job of cooking a shapeless mass supported on a grav-platter (whatever that is). The food turns out to be a rotting carcass, cooked in a hermetically sealed chamber by setting fire to its own gases. The first slice is presented to Hennik as the honoured guest.

'I'm not hungry,' he says.

Humour

Which brings us to the subject food and humour in science fiction. Frequent examples may be found in the *Red Dwarf* series, but the prize must surely go to H.G. Wells in 'The Truth About Pyecraft,'[41] published in .[1903]

Pyecraft is a hugely fat London clubman who wants to lose weight. The narrator is a fellow clubman, in possession of his Hindu great-grandmother's recipe book that contains, among other things, a recipe for losing weight. But, like many of his great-grandmother's recipes, it is fraught with danger. Among the ingredients are rattlesnake venom, an addled egg, and a pariah dog.

Should our narrator pass the recipe on for Pyecraft to try? Eventually he does, with appropriate warnings, but both he and Pyecraft have overlooked an important aspect of the wording. The recipe is for loss of weight, not mass. Pyecraft remains the same size, but weighs nothing, and becomes like a floating balloon.

The situation is resolved by lead underwear, and Pyecraft begs the narrator to keep his secret. But the pressure, with Pyecraft's constant imploring glances as he eats yet another buttered bun, becomes too much, and the narrator reveals all.

Conclusion

Science fiction writers have come up with a few truly novel ideas with regard to food and foodways, but in the main their writing has aimed to highlight deep paradoxes and problems of human society and the human condition within a futuristic setting. Unfortunately, these lessons are seldom picked up or even noticed by the vast majority who do not count science fiction as serious 'literature'.

But there is room for more, not necessarily so serious. No author to our knowledge has yet combined food questions with Einstein's relativity of simultaneity. If I am toasting somebody who is approaching close to the speed of light, how do we time the raising of the glasses? If a dinner party is held in a gravitational well so that some participants have gravitational time dilation, how do we determine whom to wait for when starting to eat? If seniority matters, what about time dilated seniors? These and other questions remain to be answered.

Notes

1. Encyclopedia of Science Fiction http://www.sf-encyclopedia.com/entry/smith_e_
2. Jason Sheehan (2010) *Cooking Dirty* (New York: Farrar, Straus & Giroux)
3. Jason Sheehan (2013) *Tales From the Radiation Age* (London: 47North)
4. Jules Verne (1867) From the Earth to the Moon (London: Various)
5. https://www.cooksinfo.com/liebigs-extract-of-meat
6. M.V. Klicka & M.C. Smith (1982) Food for U.S. Manned Space Flight. *Technical Report NATICK/TR-82/-19* shttps://apps.dtic.mil/sti/pdfs/ADA118316pdf.

7. Smithsonian National Air and Space Museum *Food in Space* https://airandspace.si.edu/exhibitions/apollo-to-the-moon/online/astronaut-life/food-in-space.cfm
8. E.E. Smith (1953) *Second Stage Lensman* (New York: Fantasy Press)
9. Sarah Ramsey (2020) Pizza Hut Once Delivered Space Pizza to the ISS https://www.wideopeneats.com/space-pizza/
10. NASA (2021) Growing Plants in Space https://www.nasa.gov/content/growing-plants-in-space
11. Isaac Asimov (1988) *Prelude to Foundation* (New York: Doubleday)
12. Nat Schachner (1934) *Redmask of the Outlands* (New York: Astounding Science Fiction Magazine)
13. Edward Page Mitchell (1879) *The Senator's Daughter*. New York Sun, July 27
14. https://bistro-invitro.com/en/dishes/celebrity-cubes/
15. Arthur C. Clarke (1957) *The Deep Range* (London: Frederick Muller)
16. Isaac Asimov (1953) *The Caves of Steel* (New York: Galaxy Magazine)
17. James Blish (1957) *Cities in Flight* (Avon Press)
18. Ray Bradbury (1962) *Boys! Raise Giant Mushrooms in Your Cellar* in 'The Stories of Ray Bradbury (London: Knopf, 1980)
19. https://edition.cnn.com/2021/03/16/world/international-space-station-microbes-scn-trnd/index.html?utm_source=Nature+Briefing&utm_campaign=02e41775a1-briefing-dy-20210318&utm_medium=email&utm_term=0_c9dfd39373-02e41775a1-43732721
20. Adam Kuban (2009) https://www.seriouseats.com/2009/05/a-primer-to-star-trek-food-and-drink.html
21. Ethan Phillips & William J. Birnes (1999) *Star Trek Cookbook* (New York: Prentice Hall & IBD)
22. https://wiki.fed-space.com/index.php?title=Gagh
23. Fred Pohl (1980) *Beyond the Blue Event Horizon* (New York: Ballantine Books)
24. http://tviv.org/Red_Dwarf/Food
25. http://www.cervenytrpaslik.cz/scenare/EN-32-6_Legion.htm
26. Robert Heinlen (1941) *Methuselah's Children* (New York: Astounding Science Fiction Magazine)
27. R.A. Nimesha Ranasinghe (2012) Digitally Stimulating the Sensation of Taste Through Electrical and Thermal Stimulation. Ph.D. thesis, University of Singapore. https://core.ac.uk/download/pdf/48659289.pdf
28. Anon (2021) A New Brain Implant Translates Thoughts of Writing into Text. *Wired* https://www.wired.com/story/new-brain-implant-translates-thoughts-of-writing-into-text/
29. Douglas Adams (1980) *The Restaurant at the End of the Universe* (London: Pan Books)
30. Richard Fleischer (director) (1973) *Soylent Green* movie
31. Larry Niven (1973) *Bordered in Black* in *Inconstant Moon* (collection) (London: Sphere Books)
32. Ross Pavlac (2020) Some Thoughts on Ethics and Science Fiction https://www.spectacle.org/396/scifi/pavlac.html
33. N.K. Jemisin (2015) *The Fifth Season* (London: Orbit Books)
34. Ray Bradbury (1951) *Here There Be Tygers* in 'New Tales of Space and Time' (ed R.J. Healy)
35. Paolo Bacigalupi (2009) *The Windup Girl* (New York: Nightshade Books)
36. https://en.wikipedia.org/wiki/Shmoo
37. George R.R. Martin (1986) *Tuf Voyaging* (Wake Forest, N. Carolina: Baen Books) (https://en.wikipedia.org/wiki/Tuf_Voyaging
38. Paul K. Guinnessy (2018) The lessons of *Frankenstein*. *Physics Today* https://physicstoday.scitation.org/do/10.1063/PT..6.³20180302a/full/
39. Ann Leckie (2013) *Ancillary Justice* (London: Orbit Books)
40. Scott Meyer (2015) *Master of Formalities* (Seattle: 47North)
41. H.G. Wells (1903) The Truth About Pyecraft (London: Strand Magazine)