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See Appendix EPAT1 – The Existential Patents
See Appendix EPAT2 – Existential Patents Quick Summary

[Looking out at a baked, waterless, irradiated Earth with strange pale daylight]

Clara: *When are we?*

The Doctor: *About six billion years ago. It's a Tuesday, I think.*

Clara: *...Have we just watched the entire life cycle of Earth, birth to death? And you're okay with that?*

The Doctor: *Yes.*

Clara: *How can you be?*

The Doctor: *The TARDIS. She's time. We ... wibbly Vortex. And so on.*

Clara: *That's not what I mean.*

The Doctor: *Okay. Some help. Context. Cheat sheet... something?*

Clara: *I mean one minute you're in 1974 looking for ghosts, but all you have to do is open your eyes and talk to whoever's standing there. To you I haven't been born yet. And to you I've been dead a hundred billion years. Is my body out there somewhere? In the ground?*

The Doctor: *Yes, I suppose it is.*

Clara: *But here we are talking. So I am a ghost. To you, I'm a ghost. We're all ghosts to you. We must be nothing.*

The Doctor: *No. No. You're not that.*

Clara: *Then what are we? What can we possibly be?*

The Doctor: *You are the only mystery worth solving.*

– Dr. Who, “Hide” (2013)

Talking to Ghosts: If you thought you were a time traveler, how would you ever know that you are not just sitting in a room talking to ghosts – imaginary or otherwise – and fully hallucinating the whole experience? H.G. Wells travelled far into the future of English humanity, and never left his seat (at least we think so); his journey was that of his character. What was the difference if it was real or not?

- ✓ What is the difference practically between Dr. Who and being a vampire? His ‘coffin’ is a blue box that flies around to different times (or maybe he is just somewhere dreaming), but everyone is a ghost, a memory. Could you see Peter Capaldi as a vampire? Someone can, because there is an animated video (in a foreign language) on YouTube called “Peter Capaldi Vampire” (I have no idea what it is about since it is language dependent). Or maybe there's another Peter Capaldi?

Temporal Ship: The following sections detailing the Temporal Ship (hereafter “T-Ship”) are an example of an extremely limited and detailed (if not particularly clever) temporal technology that *might* be acceptable in the game.¹ A sample Temporal Ship Patent is not provided.

Nothing comes from nothing. The origin of the Temporal Ship is simple: I started wondering one day what would be the equivalent of submarine warfare in space? The essence of submarine warfare is the ambush, how do you ambush in space? I am sure that Tom Clancy's books Red Storm Rising and Hunt for Red October were on my mind. I had probably also been reading “Before the Universe” (1940, and its sequels) by Frederik Pohl and Cyril Kornbluth, there seems to be a connection between the two in my recollection. And of course, I am familiar with WWII:

- ✓ “Postwar analyst agreed, however, that the submarine was the weapon that had done the most to conquer Japan. Americans had become so accustomed to a defensive attitude that they scarcely realized how daring and effective their own undersea raiders were. ‘Dud’ torpedoes had been a handicap during the early months of the war; but once the defects were remedied, the blows to Japanese transportation of raw materials reduced the island empire to sore straights by the early months of 1945.” – Lynn Montross, *War Through the Ages* (3rd Ed., 1960), p. 961.
- **A Moment of Caveat:** Although many of the following concepts and rules, specifically surreptitious entry and ambush combat, were developed specifically for Temporal Ships, those rules exist independently from Temporal Ships and would be applicable (more or less, with necessary modifications) to any similar situation, such as the development of cloaking and/or stealth technologies by positions during the game.
 - ✓ For example, the “stealth Viper,” the Blackbird that disabled the Resurrection Ship’s engines so that it could not escape, while the two Battlestars attacked and kept the Cylons distracted and destroyed the Resurrection Ship. Battlestar Galactica, “Resurrection Ship, Part 2” (2006).

Back in the real world, scientists have had some impressive successes with “metamaterials” made of nano-particles that can make curved surfaces appear flat to electromagnetic waves (which includes light so they look flat when you look at them from above with bare eyes). Many articles exist on the internet discussing cloaking with metamaterials, e.g., H.M. Doss, “Cloaking – Making Something Appear Invisible,” Physics Central or David Calpito, “Invisibility Cloaks Are Real, And The Military Is Interested,” Tech Times, September 22, 2015.

There are physical limitations to this technology – mainly that objects can be hidden only at certain wavelengths and not at all wavelengths – but there are also some intriguing possibilities. There are also severe size limits, see “Researchers determine fundamental limits of invisibility cloaks,” News Release, University of Texas at Austin, July 7, 2016. Objects have also been rendered ‘invisible’ using lenses only, such as the “perfect paraxial cloak” across a range of angles. See, “Cloaking Device Uses Ordinary Lenses to Hide Objects Across a Range of Angles,” News Release, University of Rochester, September 25, 2014 (the hole in the hand photo is a bit creepy).²

“Time keeps on slippin, slippin, into the future...”

– Steve Miller Band, “Fly Like an Eagle” (1976)

Ghost Probabilities: The Republic Ghost Ship slipped into the system quietly. Captain Miniwatt smiled in pride at his new command, the prototype warship of a whole new era. It was too easy, if the enemy used stationary detectors, the Ghost Ship simply blinked in and out of time erratically, making the Comarchy (aka “Archies”) operators think that something was wrong with their sensors. If the enemy used roving sensors, it simply disappeared into time and appeared five minutes into the future when the sensor sweep had passed.

The Archies had this coming for a long time, ever since the slaughter of the innocent populations on Anthony Three. Patch up the diplomatic front, put on a smile, and quietly research new warship technologies. Very quickly, the Ghost Ship saw a spherical Archie Colony Ship, probably

leaving to colonize Anthony Three. From the trajectory, the Ghost Ship calculated where it was five minutes earlier and slipped five minutes back into time, to get behind the local colony defenses, moving to intercept the point of departure from orbit.

Suddenly, the Ghost Ship appeared out of no-when over the colony world, at point blank range of the *just departing* colony ship, if the Ghost Ship had had windows, they could have admired the new paint job on the Archie Colony Ship. The Archie designer paint job was suddenly spoiled by a Ghost Ship that wasn't there five seconds ago, alarms went off all over, but were cut short as the Colony Ship came apart from rapid, close-range conventional weapons blasts.

Captain Miniwatt smiled in a way that no one at home would have appreciated, took his prescription psycho awake meds, as the ghost probabilities of the Colony Ship's trajectory came unraveled; it was there, but it was never there. The Ghost Ship slipped away into the future while colony defenders desperately searched for the attacker and sent out panicked communications.

- ✓ The interstellar belligerents in this story were drawn from an article titled, "Stellar Conquest for Two" in *The Dragon*, Issue 36 (April 1980) accompanying a boxed game release of *Stellar Conquest*. The article, written by Steve Jackson, who the editors incorrectly credited as the designer, describes a two-player variant called the Perseid War, between the Republic of Diphda and the Dubhe Comarchy ("Archies"). Perhaps the story in this section is a future version of a never-ending war between interstellar superpowers? Mr. Jackson worked at Metagaming with Howard Thompson, the founder of Metagaming and designer of *Stellar Conquest*, who was also the first editor of their in-house magazine, *The Space Gamer*.
- ✓ A creepy example of temporal being is the Drakh Emissary in *Babylon 5*, "Lines of Communication" (1997) who appeared displaced because it was constantly nano-shifting in time. Video is available on YouTube. Or maybe it's a quantum wave that does not collapse upon observation? A being that refuses to be an eigenstate. See 'quantum eraser' *ut infra*, top p. 822.
- Shadow Memory: The Ghost Ship created a small localized paradox: If the Ghost ship saw the colony ship, slipped back in time and destroyed the colony ship 5 minutes before first seen ... how could the Ghost ship have seen the colony ship in the first instance since it never arrived at that point? Only the crew onboard will remember having sighted the colony ship, as part of their own personal forward moving timelines, only their autobiographical memories hold the paradox together. Just like only you saw the ghost. Take your psycho meds.
 - ✓ [Interview with fictitious science-fiction writer Kevin Ulrich] "We experience time as we perceive it, and if it was being altered, would we perceive that? Would we? That's the big question. Would we even notice?" – *The History of Time Travel* (mockumentary, 2014).³
 - ✓ "My memory's cloudy. It's a cloud. Cause my memories aren't really memories. They're just one possible eventuality now. And they grow clearer, or cloudier, as they become more or less likely. But then they get to the present moment, and they're instantly clear again. I can remember what you do after you do it. It hurts ... *But this is a precise description of a fuzzy mechanism.* It's messy." – Joe talking to a younger version of himself over dinner, *Looper* (2012) (emphasis added).

[Interview with fictitious science-fiction writer Kevin Ulrich]

“With the time machine, the Soviets could have gone back in time and prevented America from ever existing. But they were smarter than that. They realized the danger that if they altered the past prior to Edward Page inventing the time machine, that he might never invent it at all. Recent history, however, would be up for grabs.”

– The History of Time Travel (mockumentary, 2014)

Tea Time: Unlike the regular Era Warships, the Temporal Ship (hereinafter, ‘T-Ship’) Warship System requires two special technologies. The first technology is the Temporal Sensor which allows the T-Ship to realtime scan a short distance into the future and past, and enables the T-Ship’s tactics but at the same time, allows opponents to defend against the T-Ship if they have Temporal Sensors. The Temporal Sensor is a prerequisite technology to the T-Ship technology, which allows short movements of the T-Ship into the immediate past or present, and spatial movement to points within the range of the Temporal Sensor, while protecting the time sense of the crew onboard. It is all very strange. Don’t close your eyes now.

- **Temporal Sensors:** Like sonar and radar, and any other detection technology, it is capable of being used on the offense and the defense. If a Temporal Ship can use the Temporal Sensor to see a short distance into the future and the past, then the Temporal Ship’s opponents can also use it to defend in the same way. It is suggested then, that Temporal Sensors would become a key component of fleet and colony defense, perhaps in the form of a special Temporal Sensor ship, or as expensive permanent enhancements to warships, or in colony defense, as a Technological Device protecting the system. You only need one at a location.

“In critical moments, men sometimes see exactly what they wish to see.”

– Acting Captain Spock, ST:OS “The Tholian Web” (1968)

How to Make Friends Over Tea: Temporal Ships are warships that have the limited ability to move about in local time, short distances into the future and the past. This gives them a huge tactical advantage over other ships that cannot move about in time and opens whole new areas of combat possibilities. However, T-Ships are very expensive compared to their normal counterparts, and the ability to move about in time takes quite a bit away from their firepower. T-Ships may not be constructed until the Temporal Ship Patent has been successfully completed.

The limitation of localized tactical movement in time is a key component to being an acceptable temporal technology in GGDM; the T-Ship’s time shifting ability is not enough to disrupt the Regular Turn sequence, it cannot undo turns or Power Activations or News Events, it cannot go back to the beginning of the universe. Nor can it erase anything more than five minutes in the past. The entire displacement of the T-ship exists within a single Combat Round.

- **T-Eras:** Theoretically, temporal technology sufficient to make a T-Ship could be available in any Era (after a successful Stardrive Patent), so T-Ships could appear in the 1st, 2nd or 3rd Eras. It must also be assumed that Stardrive does not interfere with Temporal Technology.

- ✓ As noted in Assumptions of Light, 1 Stardrive, p. 781, *supra*, FTL Stardrive (or anything around even half-light speed), implies necessarily some kind of temporal abrogation. The Concierge may also consider 1st Era Warship Existential Patent a predecessor requirement for T-Ship.
- ✓ As discussed in Terminus, 1 Temporal Technology, p. 801, *supra*, the 4th Era does not automatically equate to Temporal Technology, and thus, Temporal Technology is not specifically limited to the 4th Era.

Like Era Warships, Carriers, and Fighters, T-Ships do not receive the benefit of any automatic Era progression, and a new Patent must be designed for each Era of T-Ship. Temporal Ships should be very expensive to construct and strain the limits of most positions.

- T-Bones: T-Ships generally may receive the benefit of all defensive technologies available to their owner, unless they are deemed incompatible with the T-ship technology, for example a cloaking device may require too much power or may interfere with the temporal fields.

Offensively, they receive the benefit of all offensive and weaponry technologies, except that T-Ships may reasonably be prohibited from carrying or using the more potent weapons due to energy or because the weapons malfunction or become unstable in the temporal field; mainly, Temporal Ships will need to use energy conservative and less exotic or field disruptive weapons available in their time.

It's really a question of cost and effectiveness, and how much the T-ship will derail the game. Imagine a T-Ship Death Star? The Death Star is the biggest, baddest, most potent military unit in the Star Wars universe, why would it need to be a T-ship since nothing can stop it from going wherever it wants? But of course, a small T-ship could appear and go right down the uncovered vent with no possible pursuit!

- Dark Tea: Because of the peculiarities of the operation of a T-Ship, T-Ships have one more turn of Operational Flight Limitations (OFL) and Operational Supply Limitations (OSL) than normal ships (see 3 Movement, pp. 855-856, *infra*). However, in order to be resupplied, they must give up their temporal abilities for the Regular Turn or Combat Round of resupply, and become just regular warships, and are thus vulnerable to normal attacks. Unlike normal ships, T-Ships do not automatically reset their Operational Flight and Supply Limitations when they arrive at a supporting colony, thus T-Ships are not automatically revealed.
- T-tection: The presence of T-Ships in a system is never revealed to other positions until they either initiate or join a combat, they are revealed by a Temporal Sensor Array, or if they fail their Surreptitious Entry of the system or took a resupply when others are present.
 - ✓ Most baseball fans wouldn't think about what happens if a player is on base when it is their turn to bat – because it can't happen unless you have less than four kids on each team in backyard baseball. Our backyard games featured lots of 'ghost runners' and were mostly a pitching and hitting exercise with two or three kids on each side and not much room to actually hit the ball. So, I am theoretically standing on second base (in my ghostly image) and at the same time, standing in the batter's box swinging at pitches I can't possibly hit, being thrown from about 30 ft. away. Or maybe it was actually my ghost in the batter's box? Which explains a lot. Someone was supposed to be keeping track of it all, but no one ever really knew the score. There was always a lot of arguing.⁴

*“One particularity of quantum physics, however, is that this smearing, clouding, and rippling doesn’t merely happen over space, but time as well. This can be seen demonstrated in the famous ‘quantum eraser’ experiments, which indicate that quantum particles act as if they go out of their way to avoid paradoxes, in ways which would require they ‘knew’ what happened in the past. There have been countless attempts to explain the strange consistency of quantum phenomenon in these strange examples, but basically, it is as if quantum particles ‘know’ what we are going to do beforehand, and take this into account to make sure they don’t do something which would violate the often already paradoxical seeming, yet nevertheless consistent, laws of quantum mechanics. **In many senses, the paradoxes only arise if we view the quantum world with our everyday, more linearly temporal lenses, similar to the way in which Looper appears inconsistent from a more traditionally linear temporal point of view.**”*

– Christopher Vitale, “Collapsing the Fuzzy Wave: Rian Johnson’s ‘Looper’ (2012), Quantum Logics, and the Structures of Time Travel Films,” networkologies (blog), written in 2012, updated and reposted, October 31, 2014 (emphasis added)

What to do with Paradoxes: Indeed! A ship was destroyed at 11:00 a.m. because it was sighted by a T-Ship at 11:05 a.m. Every time a T-Ship attacks (or even acts) it creates a paradox, even if the target is not destroyed. The sorts of paradoxes created by T-Ships exist in two parts, the T-Ship crew who remembers things that never happened, and the location where the attack occurred. Any time the Concierge detects that a paradox has occurred, it should at least be recorded, in pairs, the location and the actor. If the T-Ship survives the action, it will invariably move away, both spatially and temporally from the site of the act, and eventually leave the system probably. The two points, however, should probably be considered to remain connected.

- ✓ Merriam-Webster online dictionary at *paradox*: **2:a** a statement that is seemingly contradictory or opposed to common sense and yet is perhaps true.

The preceding discussion is one that is seemingly contradictory or opposed to common sense, yet is perhaps true. A temporal paradox is created by causality running against the direction of time. For example, if an enemy ship were spotted at 11:00 a.m. and destroyed at 11:05 a.m., that would be just normal intercept and destroy combat. It is the unidirectional experience of time that creates the paradox; consider then the situation with the Chinese general at the end of the movie *Arrival* (2016)? A pre-cognitive or post-cognitive psychic is a walking temporal paradox.

T-ships are capable of creating paradoxes (and general cosmic havoc) without attacking other ships or anything else. The list of situations is probably endless, but an example might be if the T-Ship were sent to surreptitiously extract an agent from an alien planet. The T-ship spots the agent’s fleeing ship because it is being pursued by enemy patrol ships. The T-Ship slips back in time, and intercepts the agent’s ship before it is spotted by enemy patrol ships, rescues the agent and slips away. Have a nice paradox day.

- ✓ The card game *Chrononauts* features an “Uber-Paradox” in which, if WWII occurs as a result of the Cuban Missile Crisis, all of the subsequent history is wiped out. What makes it a paradox is that all of the player’s agents were born in the subsequent history and thus could not exist, but do. All of the player’s agents, except one, that is: One of the player agents is an intelligent time-travelling cockroach from the future, whose species survived and were raised to intelligence by the nuclear war, so its objective is precisely to cause WWII and erase the other timeline. GGDM is not, of

course, designed for that sort of play, whereas, Chrononauts is... it's like trying to turn a straight head screw with a hex wrench. When I was young, I used to hear frequently that only cockroaches would survive WWII because they are radiation resistant, how many kids know that now?

- Cosmic Conundrum No. i: The Concierge should note all paradoxes, but what happens or doesn't happen as a result is entirely within the purview of the Concierge. We are after all in the outermost limits of science-fiction territory, bordering on the lands of horror, irony, manic, hysterical and mystical. Perhaps there might be an effect on the crew who remembers things that never happened (are they nuts)? Or perhaps it just doesn't bother sapient that much? Most likely, machine intelligences would not handle paradoxes well.
 - ✓ This is the explanation given in the sequel 2010: The Year We Make Contact (in which Kubrick had no interest), for HAL 9000's behavior in 2001: A Space Odyssey – that HAL 9000, who is incapable of error, was ordered to lie – to provide incorrect information – to the crew of the Discovery One about their mission to Jupiter. This causes HAL 9000 to begin making errors and act irrationally; the AI computer has a paranoid mental breakdown.

Perhaps the location of the attack becomes some kind of rift or anomaly in space, does it move and grow, or can it be marked and avoided? If it is a marked place to be avoided, some nutjob will try to go there (like kids who sneak into a haunted house⁵), perhaps looking to change their own past, speak to the dead, or pry a mystical secret from the universe. Does the paradox or multiple paradoxes eventually effect the planet or starsystem? Maybe a temporal paradox is like a rock sticking out of the water interrupting the flow of time on the surface of the hypersphere?

- ✓ “Time travel is damage, it's like a tear in the fabric of reality. That is the scar tissue of my journey through the universe. My path through time and space. From Gallifrey to Trenzalore.” – Dr. Who, “The Name of the Doctor” (2013)⁶

Ha! You thought I was going to tell you what to do about temporal paradoxes in GGDM!⁷

- ✓ Two examples of non-temporal paradoxes are the famous Zeno's Paradox and the Dishonest Person Paradox. The latter shows that when a dishonest person is honest, he does not become an honest person, whereas an honest person who sometimes is dishonest, is labeled as dishonest.
- Cold Case: We all look back on our lives, remembering things that happened a generation ago, or when we were children, or, for some, remembering acts of two generations ago. The television series Cold Case (2003-2010) played to this, Cold Case was about regrets. Obviously in looking back on events, we have a much different view of the events now than we did 10, 20, or more years ago; we see the situation or acts more clearly now. Ours is, according to some interpretations of physics, simply one of many possible time lines, each branching off from each decision (e.g., Many Worlds Theory). Some acts we are proud of, some we regret very much as the years wear on (regardless of our reasons at the time), and some that were good turn to bad, and some that were bad now seem harmless.

Imagine for a moment that the loop could be closed just a bit, that for a moment in the past, we have then the understanding of our acts or situation as in the present, a moment of clarity.

- ✓ “Telling Cid to run into the cane field, Sara stands between Old Joe and her son. Realizing that Sara’s death will turn Cid into the Rainmaker, Young Joe commits suicide, erasing Old Joe’s existence, saving Sara and preventing Cid from becoming the Rainmaker.” – from Wikipedia article, “Looper (film),” captured October 27, 2019.

Of course, if that changes the act in the past, then it changes the future, and that would be a paradox (unless it was all predestined, which is suggested by the heptapod writing in *Arrival* (2016)). But it would also be a step toward perfection in each iteration of the past-future closure. Dr. Who keeps this process compartmentalized by keeping the personal timelines of each successive Doctor separate and suppressing memories of previous Doctors, but that’s kind of a cop out. Perhaps the closure I describe here is the human version of the heptapod continuum-language in *Arrival* (2016)? The trick with *Arrival* is that the viewer thinks they are viewing the movie in normal forward time – that Dr. Banks’ daughter had died before the movie.

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- ✓ “I read in an interview or article, I believe it was Rian Johnson discussing his film *Looper*, that time travel is messy and that no matter how hard you try there are going to be plot holes, loose threads or paradoxes. Time travel by its very nature is not logical, it’s impossible to make something illogical into something logical. So the idea with a time travel story is to make it seem like its logical, at least for the duration of the film’s running time. If I’ve done my job well you will suspend disbelief and just accept the story.” – Rickey Kennedy interview, Dylan Levy, “AFF Interview: Writer/Director Ricky Kennedy, *The History of Time Travel*,” October 20, 2014.
- Wir müssen wissen – wir werden wissen: My thinking about how to define emergences has lead me to the same idea as paradoxes; that they are emergences only when viewed through our limited linear temporal lens (that is, ‘barrier’). It is also the same problem as quantum physics, it is one of framework. If this makes sense, then emergences share some of the same traits as paradoxes. To some people, that makes the problem automatically unsolvable (*Ignoramus et ignorabimus* – Emil du Bois-Reymond) but I think it is worth at least a book length dissertation (that no one will read). What if emergences are the results of paradoxes that we cannot yet comprehend or see? How else would a paradox resolve? Thus, the succession of fracturing of the universe described previously (see *Order of Genesis*, 1 Order, p. 522, *supra*; *Fourth Frame*, 1 Entropy, p. 226, *supra*) is likely ‘baryon-like’ groups of paradoxes, though I am not sure which came first, did the paradoxes cause the fracture (as suggested in *Big Bang Theory*, 1 The Big Bang, p. 2, *supra*) or vice-versa? Perhaps it was a feedback loop?
 - ✓ The 44-minute sci-fi short film, “Destroyer of Worlds” by Samuel Dawes (The CGBrothers, June 30, 2019) presents a very interesting vision of a paradox: The dictatorial time-travelling regime of the future encountered a ‘barrier’ that was ‘rapidly approaching’ from the future, which they could not leap past. They kidnapped the man who invented the equation leading to time travel (and his son as a hostage) to solve the barrier problem. What they did not realize was that the ‘barrier’ was the paradox of their own existence: due to an event in the past which they inadvertently created, their future timeline would terminate at the barrier when it reaches their current time. The barrier idea is nicely intuitive to those of us who experience time in a linear way. I highly recommend the video.⁸

- ✓ I have tended to favor ideas which are illustrative and intuitively grasped, for example, Mr. Case's four orders of natural phenomenon, or the paradox as a time barrier, *ut supra*. In physics, this would be evidence of an ignorant mind, of my childish intelligence, as physics discarded the necessity of intuitive-illustratability at the Bad Nauheim Debate in 1920; illustratability was a barrier (of our limited physical existence) which physics had to leap beyond to become modern physics.⁹ Modern physics is a skyscraper built of mathematical concepts and the debate on that issue is closed in physics, except for science educators (e.g., Kate Becker) who are trying to find a way to explain it to the public and science-fiction authors who are trying to tell a story.

“Maybe you just clean carpets. If you do, you're lucky. You're gonna live a long, happy life. But if you other guys are out there, if you're picking this up, forget about the Army of the Twelve Monkeys. They didn't do it. It was a mistake. Someone else did it. The Army of the Twelve Monkeys is just a bunch of dumb kids playin' revolutionaries. Listen. I've done my job. I did what you wanted. Good luck. I'm not coming back.”

– Cole (Bruce Willis), *Army of the Twelve Monkeys* (1995)

The Cole Loop: Cole knows they are not going to “live a long happy life”; the pandemic is starting. The Cole loop is a classic, the protagonist Cole, as a little boy going through airport security with his parents, saw his future-self killed in the airport terminal. Therefore, he became a fixed point, of sorts, he could not die of the global pandemic that killed his parents and 95% of humanity in a year or two – because he had to survive to be sent back in time and killed in the airport as an adult. But at the same time, he apparently didn't know or remember seeing himself killed, or what happened at the airport, otherwise, his adult self might not have gone to the airport that day.

- ✓ The Army of the Twelve Monkeys didn't do it, but they inadvertently provided the opportunity, they were the agents of chaos, the historical accident that tilted the system.

“If you object to the notion of 14th-century villagers finding a way to travel forward in time 600 years...well, in the present day, we haven't invented time machines either.”

– Gavin Edwards commenting about *Navigator: A Medieval Odyssey* (1988), “Future Tense: The 20 Best Time-Travel Movies,” *Rolling Stone*, May 20, 2014

Endnotes.

¹ Commentary: I believe that I must have designed the Temporal Ship technology sometime in the summer of 2001, as I cannot find any reference to it in the old game files before that time (my current game design files in MS Word only go back to early 1999). I started designing this game in early December 1992 using a program called 1st Word on an Atari 1040ST machine that I had bought in the summer of 1989. I also spent thousands of hours playing Time Bandit on my Atari using keyboard arrows and the space bar as controllers. I had to convert the burgeoning game files to ASCII format and save them to disc in October of 1997 when I moved and left my old computer behind. From the fall of 1997 to approximately June 1999, I designed this game on a Brother notebook, and in June 1999 converted the files again to ASCII format to bring them over to my new generic no-name Windows 95 PC (from a

mail order company in Texas) where they were converted to MS Word documents. The Word documents have progressed continuously through MS Word/Office versions to the current time thanks to backward compatibility.

² Citation: <http://www.rochester.edu/newscenter/watch-rochester-cloak-uses-ordinary-lenses-to-hide-objects-across-continuous-range-of-angles-70592/>.

³ Commentary & Citation: The History of Time Travel (2014, written and directed by Ricky Kennedy) which I found on Amazon Prime by accident is a movie that should have won major awards (it won a few film festival awards), but barely even registers in Google searches, which translates approximately to it was barely noticed (since Google is always geared to what is popular). It received only a 6.7 on IMDB, much less than many other louder dumber big budget movies. It is almost conspiratorial the silence surrounding this faux documentary or mockumentary... As you can guess, I highly recommend seeking out this intelligently-made film and watching it when you are alone and can pay close attention!

- ✓ I added the director's name above because that slightly improves the Google search results. I found a few minor reviews (i.e. no major film critics) and the following interview from the Austin Film Festival 2014: <https://austinfilmfestival.com/news/2014/10/20/aff-interview-writerdirector-ricky-kennedy-the-history-of-time-travel/>. Otherwise, there is no discernable internet discussion (some reviews, no forum discussions) of this clever movie gem five years later, even from the time when it was first released.

⁴ Commentary: The one time I actually was standing on the cardboard piece that was second base, I took a baseball in the eye. The batter got mad at the pitcher and threw the ball as hard as he could back at the pitcher, who ducked out of the way. The batter and pitcher were brothers, and second base, where I stood not paying attention, wasn't far behind where the pitcher stood.

⁵ Commentary: I enjoyed Stephen King's Rose Red miniseries (2002). Also, there is a scene in one of Stephen King's Dark Tower books where Roland, Eddy and company sneak into a haunted house; the haunted house tries to eat them. Yeah. Because, you know, it's a Stephen King book. 😊

⁶ Commentary: More than most Dr. Who episodes – in which the TARDIS is just a transport box to a past or future on Earth, a place or time related to Earth, the present Earth, or to some distant planet at an unknown time – the two-part story told in “The Silence in the Library” and “Forest of the Dead” (2008) is a true time-travel story. Dr. Who meets his future wife, Riversong, daughter of future companions he has not yet met, on the day she ‘dies’ in the library. She knows him, he doesn't know her, having never met her in his personal timeline, and she has his sonic screwdriver from the future, which he does not understand. In the end, to save her essence into the datacore, he must figure out why his future-self gave his future-wife his sonic screwdriver – he never gives anyone his sonic screwdriver (there is probably a ribald joke in there...) – he has to solve a problem that he doesn't even know about yet, but that his future-self solved in hindsight with all the time in the universe to think it.

- ✓ “Everybody knows that everybody dies. But not every day. Not today. ... Some days are special. Some days are so, so blessed. Some days, nobody dies at all. Now and then, every once in a very long while, every day in a million days, when the wind stands fair, and the Doctor comes to call. Everybody lives.” – Riversong end narration, Dr. Who, “Forest of the Dead” (2008).
- ✓ “Everybody Lives” is a reference to the end of the Dr. Who episode, “The Doctor Dances” (2005). It also relates later to Riversong's lecture of Dr. Who at the end of “A Good Man Goes to War” (2011) showing the increasingly hostile arc of the main character from 2005 to 2011. The “Pandorica Opens” (2010) was an earlier warning in the character arc.

⁷ Commentary & Citation: In the B-grade movie The Time Travelers (1964), four people from 1964 are placed via time portal (probably the inspiration for Star Trek's “City on the Edge of Forever” (1967)) 107 years in the future, in the year 2071 where mutants roam a dying planet following catastrophic global thermonuclear war. Notably the time travel did not involve any spatial movement; they landed on the same spot on Earth in the future (ignoring the obvious problem with orbital mechanics). They discover an underground civilization of technologically-advanced normal humans, and about halfway through the movie (which is *twice* as long as it needed to be), it is finally resolved to construct a time portal back to their time and warn the world so that this doesn't happen.

Finally, one of the smarter scientists mentions the obvious paradox. However, such a paradox depends on whether they are successful in preventing the events that caused the bad future. Perhaps they can go back but will be ignored, ridiculed, shunned and the war happens anyway? Maybe the universe changed and they cannot replicate the results of their initial experiment or explain why it worked? The paradox depends on perfect communication and

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absolute effectiveness (e.g., as in horse betting results, like in the 2014 movie *Time Lapse*, but this is not quite the same type situation), both of which are non-existent in this universe. Or perhaps they inadvertently cause the war through their radical ineffectiveness at trying to prevent it? Perhaps they are the founders of the group of “far thinking scientists” mentioned in the dialogue (a common idea of the time, e.g., *Ark II* (1976), *Logan’s Run* (1976), *The Morrow Project RPG* (1980), *Jeremiah* (2002)) who established the Colony which will launch the starship in 2071?

- ✓ The movie, the usual preachy mid-60s sci-fi movie (it was either that or creature features), tries too hard to portray the future humans as normal, industrious and likeable (and tries ineptly to inject humor and romance) while ignoring the obvious: Why don’t they use androids to build androids instead of humans doing the job – the movie shows the androids constructing the time portal components later and packing supplies to go on the ship. And how are they going to fit everyone into that small ship – meaning that the majority of the population, the workers building the androids by hand, will be left behind to die or be slaughtered by the mutants and apparently they accept that? The film is ambiguous on that point, understandably. The movie throughout screams of stark Aristotelian class division (see *Echoes of Aristotle*, 2 Colleges, p. 474, *supra*): The cloister of brilliant, educated scientists upon whose future humanity depends naturally rule over everyone else (i.e. the non-scientists workers) who are vaguely bestial, happy-go-lucky, and mindlessly compliant. And they are going to brute force launch a starship from the surface of the Earth to Alpha Centauri? Yay!
- ✓ Of course, the movie never gets to that point – you saw it coming, the mutants break in just as the ship is ready to launch and the portal ready to operate. The android defenders are incredibly impotent and the scientists are inept and uncreative in defending. The special effects of the ship failing to launch and falling over (with people onboard) are underwhelming, either because lack of knowledge (e.g., the Nedelin catastrophe in 1960 and this movie was made before the Soviet N-1 Rocket fell back to the pad on July 4, 1969) or just because they didn’t have the money and technology. The defenders are left with just the time portal to escape the attacking mutant invaders (a slaughter that bears similarity to the later *Beneath the Planet of the Apes* (1970)) – and this is where the movie takes an interesting, unexpected turn!

⁸ Commentary: Most of the intelligent, well-thought-out science-fiction literature comes from outside of Hollywood and is made on relatively low budgets. I especially prefer to watch indie and foreign-made time-travel stories. The economics of Hollywood is the barrier which it has not been able to penetrate – Mad Max director George Miller pointed this out in his 1985 interview with Anne Billson, and 35 years later they still have the same problem, but now, YouTube has given young writers not-of-Hollywood a place to play with ideas on low budgets, in addition to the already growing indie film production companies and the growth of other non-theatre or television video streaming services (e.g., Amazon Prime, HBO, Netflix, Hulu, etc.). This barrier may eventually and currently is, extinguishing Hollywood ‘as we know it’ forcing the market to adapt.

- ✓ I had an executive friend long ago who had an advanced degree in economics; he was also an aspiring board game designer who kept track of the number of hours he spent on his game design projects. One day during a car ride, around perhaps 1993 or early 1994, he asked me how many hours I had spent on my ‘game design’ (which at that point was an ‘advanced Stellar Conquest’ rules set) and I had no idea. And that was over 25 years ago. I always felt the limit with his approach to game design was that he cared about how many hours he worked on it, his problem was overthinking the economics. Had GGDM been made with the same approach (or with the approach of in-house game company ‘works made for hire’ by salaried employees), it would not have ever been finished, there would have been deadlines, time tracking.

⁹ Citation: “I would like to say, that what humans consider as illustrative or not, has changed. The view about illustrativeness is so to speak a function of time. I’m of the opinion, that physics is conceptual, not illustrative. As an example for the changing view about illustrativeness, I remind you of the view on illustrativeness of Galilean mechanics in different periods.” – Albert Einstein at the Bad Nauheim Debate in 1920 (https://en.wikipedia.org/wiki/Translation:The_Bad_Nauheim_Debate).

- ✓ “Thus one cannot use such a changing concept for or against the theory. ... To let decide the ‘common sense’ in this question, is no less problematic as it was before in respect to illustrativeness.” – summary by K. Körner. *Id.*