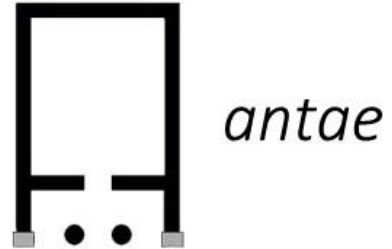


Elsewhere and Elsewhen: Parallel Universes and the Dangers of Interdimensional Travel in *Land of the Lost*

Kristine Larsen

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**Elsewhere and Elsewhen:
Parallel Universes and the Dangers of Interdimensional Travel in
*Land of the Lost***

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For a fleeting moment in May 2009, *Land of the Lost*, the 1974-76 American Saturday morning children's television series perhaps best known for its questionable special effects and stilted acting, was a trending topic on Twitter.¹ Thanks to a series marathon on the *SyFy Channel* (timed with the release of the Will Farrell movie loosely based on the series), a generation of science nerds briefly relived a forgotten guilty pleasure of its childhood. For the budding dinosaur aficionado, such as this author, watching *Land of the Lost* was a love-hate relationship, given the obvious scientific liberties taken with the Claymation stop-action dinosaurs (who were designated within the show by such undignified nicknames Grumpy, Dopey, Spike, and Alice). However, as the 2009 series marathon revealed, there is surprisingly good physics interwoven with the campiness for which the series is far better known. This suggests that the lack of attention paid to this series (the longest-running of the live-action Saturday morning series created by Sid and Marty Kroft) within popular culture circles has been ill-informed, as the series correctly and effectively tackles topics of time travel and parallel universes while entertaining its young audience.² Notably, well-known science fiction writers, including Larry Niven and Theodore Sturgeon, penned a number of hard science fiction episodes that explore the paradoxes and problems inherent in multidimensional travel. To the average ten-year-old of that time, the series was simply the adventures of Holly, Will, and father Rick Marshall (later replaced by Uncle Jack Marshall) searching for a way home from this primitive dinosaur-infested wildness. In reality, there was so much more to this Saturday morning ritual. This essay will investigate how a number of the series' episodes masterfully illustrate what the laws of physics predict for the possibility of travel between parallel universes and across timelines, all the while demonstrating both the potential for, and pitfalls associated with, journeying to what might be

¹ See Shannon Nutt, 'Land of the Lost—The Complete First Season', *DVD Talk*, 3 July 2004. <<http://www.dvdtalk.com/reviews/11394/land-of-the-lost-the-complete-first-season/>> [accessed 15 February 2016]; and Tony, 'Land of the Lost', *Tony's Fenokee Central*. <<http://www.angelfire.com/tv2/buford/lostland.htm>> [accessed 15 February 2016].

² For more information concerning the production of the series, see John Kenneth Muir, 'From the *Land of the Lost* (1974-1976) Blogging: Series Retrospective', *Reflections on Cult Movies and Classic TV*, 7 September 2014. <<http://reflectionsonfilmandtelevision.blogspot.com/2014/09/land-of-lost-1974-1976-blogging-series.html>> [accessed 15 February 2016].

termed *elsewheres* and *elsewhens*.³ It is important to note that this essay is not a thorough analysis of the series as such; rather, the central point is to lay out a case for why this series deserves thoughtful consideration by academics in the field of representations of science in popular culture.

The scientific basis for time travel is Albert Einstein's General Theory of Relativity, which explains gravity as the warping of space and time (collectively called four-dimensional space-time) by the presence of mass and energy. The myriad ways in which this malleable four-dimensional fabric can be deformed correspond to different distributions, and types, of matter and energy, which are represented as distinct mathematical solutions to the Einstein field equations. For example, it is theoretically possible to warp space-time in such a way as to permit a material object to travel backwards in time, and a number of mathematical solutions containing such time loops (more formally termed *closed timelike curves*) have been found, perhaps most famously as wormholes.⁴ Several such solutions had been discovered by the time of the airing of *Land of the Lost* (1974-76) and were discussed in both the scientific and popular science literature of the day. These include Kurt Gödel's 1949 model of a rotating universe,⁵ and Roy Kerr's 1963 solution for a rotating black hole.⁶ Therefore there was real science pertaining to the possibility of time travel that was well-known by the mid-1970s and thus available for science fiction writers to exploit. However, it was also widely known that with time travel comes complications and paradoxes, such as the infamous *Grandfather Paradox*. A time traveller could hypothetically travel back in time and kill her grandfather before her father was conceived, meaning that she would never have been born. But how, then, could she be there to prevent the conception in the first place? The *Back to the Future* franchise obliquely refers to this paradox in the first film, when Marty McFly finds himself fading out of existence as he unwittingly interferes with his parents' courtship. Another problem with time travel is the so-called *information* or *bootstrap paradox*, where an effect is its own cause, and knowledge (or a material object) appears from seemingly nowhere in a given universe. The paradox is named for the 1941 Robert Heinlein short story 'By His Bootstraps', in which Bob Wilson meets up with several future versions of himself. Bob transcribes a handwritten copy of a book received from a future

³ This paper is an expansion of a talk given at the Northeast Popular Culture Association Conference, held at Queensborough Community College, NY, on 24 October 2009.

⁴ For more information on the physics of time travel and the paradoxes associated with it, see Kristine Larsen, 'The Impossible Girl and the New World: Televisual Representations of the Scientific Possibilities and Paradoxes of Time Travel', in *Time-Travel Television: The Past from the Present, the Future from the Past*, ed. by Sherry Ginn and Gillian I. Leitch (Lanham, MD: Rowman and Littlefield, 2015), pp. 213-222.

⁵ Kurt Gödel, 'An Example of a New Type of Cosmological Solutions of Einstein's Field Equations of Gravitation', *Reviews of Modern Physics*, 21(3) (1949), 447-450.

⁶ The existence of closed timelike curves in the Kerr family of solutions was first noted by Brandon Carr, 'Global Structure of the Kerr Family of Gravitational Fields', *Physical Review*, 174(5) (1968), 1559-1571.

self, which then becomes the very book that his future self gives to his past self. So where did the original notebook come from?⁷

Assuming that a time machine will someday be successfully built, how can such paradoxes be avoided? Physicist Stephen Hawking has described two possible solutions. Perhaps the laws of physics are constrained such that these paradoxes simply cannot arise. For example, if you try to go into the past and kill your grandfather, the gun will jam, or you will slip and miss the shot. As Hawking succinctly puts it: ‘So much for free will’.⁸ You might intend to change the future, and believe that you actually have the free will to do so, but in the end you will always do exactly what you were destined to do in order to keep timeline consistent. An example can be seen in the TV series *Lost* (2004-2010). In the past of the mysterious island, Eloise Hawking kills her time-travelling grown son, Daniel Faraday, at the same time that she is pregnant with the foetus who will become Daniel. Once her son is born, she devotes her entire life to making sure he becomes a brilliant scientist who can discover a mechanism for time travel, despite the fact (or, rather because of the fact) that she knows he will have to die at her very hand.⁹

The potential to act with free will and change history through time travel is consistent with a different interpretation of the laws of physics, one in which there simultaneously exist parallel realities. In the so-called “Many Worlds Interpretation” of quantum mechanics (introduced in 1957), every time an experiment has two or more possible outcomes, the universe branches into parallel realities, one for each of the possible choices.¹⁰ In one universe, Jane ate an apple for breakfast today, while in another Jane had two fried eggs, and in a third Jane was late for work and decided to skip breakfast altogether. But which Jane is the *real* Jane? All Janes are equally real, each in her own particular universe. What’s more, in its original form, the Many Worlds Interpretation predicts that none of the Janes will ever be aware of any other version of herself.

David Deutsch has argued that it *is* theoretically possible for the various parallel universes to interact, and in fact it is the existence of this infinite multiplicity of potentially interacting parallel universes that allows for the possibility of time travel into the past.¹¹ A time traveller who succeeds in going back in time and killing her grandfather before her parent’s conception is doing so in a universe in which she will never be born. However, in the universe in which she

⁷ For more information on the bootstrap paradox see Kristine Larsen, “Who Wrote the Notebook?” Physics, Fiction, and the Bootstrap Paradox’, in *Critical Insights: Robert A Heinlein*, ed. by Rafeeq O. McGiveron (Ipswich, MA: Salem Press, 2015), pp. 153-166.

⁸ Stephen Hawking, ‘Space and Time Warps’, *Stephen Hawking: The Official Website* (1999).
<<http://www.hawking.org.uk/space-and-time-warps.html>> [accessed 15 February 2016]

⁹ For more information concerning depictions of time travel paradoxes in *Lost*, see Kristine Larsen, ‘The Art of World-making: *Lost* and Time Travel’, in *The Take2 Guide to Lost: The Ultimate Compendium*, ed. by James O’Ehley and Erin Willards (New York, NY: Take2 Publishing, 2015), pp. 203-217.

¹⁰ See Hugh Everett III, “Relative State” Formulation of Quantum Mechanics’, *Reviews of Modern Physics* 29(3) (1957), 454-462.

¹¹ See David Deutsch, ‘Quantum Mechanics Near Closed Timelike Lines’, *Physical Review D* 44(10) (1991), 3197-3217. A popular level treatment can be found in David Deutsch, *The Fabric of Reality* (New York: Penguin Press, 1997).

was born (the universe she had initially travelled from) her grandparents lived to successfully reproduce and therefore she was eventually born. Free will is conserved, but no paradox results. This interpretation of the physics of time travel is central to the television series *Sliders* (1995-2000). Here, genius physicist Quinn Mallory accidentally creates a machine that opens doorways between alternate realities. Mallory and his friends afterwards slide between these different realities, each in some way recognisably distinct from their home reality. In the short-lived series *Terra Nova* (2011), human refugees from the future of our universe establish a colony 85 million years in the past of a parallel universe (where, interestingly, there are dinosaurs similar to those of our world's past). Unfortunately for science fiction writers, work by Allen Everett has cast significant doubt on this mode of time travel. He suggests that although a microscopic object such as a subatomic particle could successfully navigate between two parallel histories using a wormhole (similar to the interstellar subway system of *Babylon 5*), a larger object (such as a person) would be rather gruesomely 'sliced into two, or more generally many, pieces in passing through the wormhole, with different pieces winding up in different worlds'.¹²

Having noted the dangers of time travel predicted by our current understanding of the laws of physics (and given examples of how these are reflected in various popular culture works), the reader is now invited to follow the Marshall family over the mist-enshrouded waterfall and into the Land of the Lost. Here various doorways between alternate spaces and times randomly appear and disappear, the result of curious pyramidal boxes dubbed *pylons*. In episode 1.8 'Skylons', Holly and Will first open a pylon and peer inside. 'Looks like it goes on forever in there', Holly observes.¹³ In episode 1.16 'Hurricane', Land of the Lost visitor and hypersonic glider pilot Beauregard Jackson enters the golden pylon with Rick Marshall and exclaims 'it's bigger on the inside than it is on the outside'.¹⁴ For science fiction enthusiasts, the parallel with *Doctor Who*'s TARDIS is clear. As in the case of the TARDIS (*Time and Relative Dimensions in Space*), the distortion of the normal conception of space within the pylon demonstrates the power of those who can warp space-time, and is reminiscent of Einstein's seminal lesson—that space and time *are* relative to the observer. The relativity of time is illustrated in episode 2.8 'The Pylon Express' (written by Theodore Sturgeon, screenwriter for the original *Star Trek* series episodes 'Shore Leave' and 'Amok Time') when Rick and Will travel through a pylon to several different parallel realities. Afterwards, Rick is amazed to learn that a day and a half have passed in the Land of the Lost, because to him it seemed that they had 'only been in there ten minutes'.¹⁵

According to the work of Einstein, there are several reasons why two observers will experience time differently. From the Special Theory of Relativity, if two observers are moving at some velocity relative to each other, time will flow differently for each. If each considers him or

¹² Allen Everett, 'Time Travel Paradoxes, Path Integrals, and the Many-Worlds Interpretation of Quantum Mechanics', *Physical Review D* 69 (2004), 124023-3.

¹³ 'Skylons', *Land of the Lost: Season 1* (Universal Studios, 2009) [DVD].

¹⁴ 'Hurricane', *Land of the Lost: Season 1* (Universal Studios, 2009) [DVD].

¹⁵ 'The Pylon Express', *Land of the Lost: Season 2* (Universal Studios, 2009) [DVD].

herself to be ‘at rest’ (standing still), they will observe the other’s clock to be running slow.¹⁶ Time is also curved in various ways in the different solutions to the Einstein field equations of General Relativity. Einstein himself noted that in ‘every gravitational field, a clock will go more quickly or less quickly, according to the position in which the clock is situated’.¹⁷ Thirdly, if one is travelling through a wormhole, one is essentially taking a shortcut in space-time, and therefore one expects that one’s elapsed time will be shorter than if one took the long way around. For example, this is the scientific principle utilised in Carl Sagan’s 1985 science fiction novel *Contact* and its 1997 film treatment.¹⁸ This relative time card is often played in *Doctor Who*, when the Doctor returns to visit one of his earth-bound human companions after what he has experienced to be only a brief sojourn. In reality, in the timeline of the companion, he has been absent for an unexpectedly long period of time. Perhaps the most famous example in recent years is in the fifth series opener ‘The Eleventh Hour’, in which the Doctor lands in seven-year-old Amy Pond’s backyard and promises to return for her in a few minutes. He returns to find a fully-grown (and rather annoyed) woman, as *his* few minutes’ departure translates into an over decade-long wait in Earth time.

The pylons are eventually explained as a space-time travel system developed by the Altrusians, an ancient reptilian species whose so-called Lost City is the focal point of many adventures. In the present day of the main characters, the city is inhabited by the primitive and warlike Sleestak, who resemble the Altrusians in physical form but little else. In 1.6 ‘The Stranger’ (penned by *Star Trek* original series actor Walter Koenig), the Marshalls meet Enik, an Altrusian who has been stranded in the Land of the Lost. He explains that he is one of the future descendants of the Sleestak, perhaps 100,000 years in the future. Young Holly drives home this point to the young audience by incredulously blurting out ‘You mean you’re not alive yet?’¹⁹ Enik notes that he and the Marshall family have fallen through a dimensional doorway, although in his case the doorway resulted in time travel and apparently not multidimensional travel. Later in the episode Enik is horrified to discover that he has actually travelled into the future, and that the Sleestak are the de-evolved future of his species, ‘the barbaric descendants of a people who could no longer keep their anger in check, and eventually destroyed my past’.²⁰ There are clear parallels to the 1968 film *Planet of the Apes* (and the short-lived TV series of the same title that ran concurrently with the first season of *Land of the Lost*). Here, astronauts come to realise that they have journeyed into the future of their own planet, a future in which humans are now the more primitive species and apes have inherited the Earth. As a result of his enlightenment, Enik

¹⁶ An early review of this effect can be found in Gilbert N. Lewis and Richard C. Tolman, ‘The Principle of Relativity, and Non-Newtonian Mechanics’, *Proceedings of the American Academy of Arts and Sciences* 44(25) (1909), 711-724.

¹⁷ Albert Einstein, *Relativity: The Special and General Theory*, trans. by Robert W. Lawson (New York: Pearson Education, 2005), p. 103.

¹⁸ Physicist Kip S. Thorne explains his role in suggesting a wormhole to Carl Sagan in *Black Holes and Time Warps: Einstein’s Outrageous Legacy* (New York: W. W. Norton, 1994), pp. 483-490.

¹⁹ ‘The Stranger’, *Land of the Lost: Season 1* (Universal Studios, 2009) [DVD].

²⁰ *ibid.*

redoubles his efforts to return home, to his time, in order to warn his people and therefore prevent *this* future from occurring. However, according to the Many Worlds Interpretation, even if Enik had successfully returned to the past, he would only have been able to save the future of a parallel universe, not the reality he had, in fact, travelled back from.

The unintended consequences of actually changing the past are demonstrated in episode 3.10 'Time Stop' in which Enik and Uncle Jack Marshall (played by actor Ron Harper, one of the time-travelling astronauts in the aforementioned *Planet of the Apes* television series) fight over the key to the temporal regulator pylon.²¹ Cha-ka, one of the apelike Paku, is chased into a deadly geyser field by Torchy, a fire-breathing Dimetrodon (who subsequently sinks into the hot mud and dies). Jack promises to return the key to Enik after turning back time to save Cha-ka from the impending geyser eruption, with the less-than-profound observation: 'Wow—I'm gonna manipulate time!'²² After turning the knob the wrong way (and inadvertently spraying Cha-ka with steaming hot geyser water), Jack turns time backwards, and we see the events of the episode played out in reverse. Jack is then able to prevent Cha-ka from running into the geyser field, but the price to be paid is that Torchy does not die, and the dinosaur destroys the pylon with his fiery breath. After a short discussion of *déjà vu*, the Marshalls continue on their way, they and Enik being none-the-wiser about the disaster that has been averted (and the possible journeys home that have been lost due to the destruction of the temporal regulator pylon). No one in the Land of the Lost remembers the alternate timeline (which no longer exists). A different twist on the same idea can be found in 'The Day of the Doctor', the fiftieth anniversary episode of *Doctor Who*, in which three incarnations of the Time Lord team up to change their own past and save their home world of Gallifrey. The two past incarnations lose their memory of the changed events (the change having occurred in the future of their timestream) and they thus retain the psychological trauma and guilt that was central to their seasons of the series.²³ However, the laws of physics are not so easily thwarted; if the events described in 'Time Stop' were meant to happen in the same reality (the same world of the MWI), then Jack would not have been able to affect such a change. For example, how could Jack have used the pylon to save Cha-ku if the pylon had already been destroyed? As Paul J. Nahin explains to would-be writers of time travel popular culture, 'if your story has a single time track or line, the events around a closed loop in time must be consistent; e.g. you can't have a time traveller changing the past'.²⁴ This is therefore a case where frequent season 3 writer Joseph L. Scanlan deviates from the series' hard science fiction roots demonstrated in seasons 1 and 2.

²¹ Uncle Jack Marshall conveniently pops into the Land of the Lost in the season 3 opener 'After-Shock' after Rick Marshall falls through a time doorway during a strange earthquake.

²² 'Time Stop', *Land of the Lost: Season 3* (Universal Studios, 2009) [DVD].

²³ Martin Izsak, 'In-Depth Analysis Review: "The Day of the Doctor"', Lyratek (2013). <<http://www.lyratek.com/bg/dwida245.htm>> [accessed 15 February 2016].

²⁴ Paul J. Nahin, *Time Travel, a Writer's Guide to the Real Science of Time Travel* (Baltimore: The Johns Hopkins University Press, 2011), p. 4.

One of the most interesting episodes of *Land of the Lost* is 1.15 ‘Elsewhen’, penned by D.C. Fontana, a writer for both *Star Trek* and *Star Trek: The Animated Series*. A mysterious blonde who calls herself Ronnie appears out of a misty time doorway in Enik’s cave just as Holly is doubting her self-worth. Ronnie empathises with Holly’s lament that she is treated like a baby, noting that the Marshalls are ‘very much like my own family’.²⁵ Holly spies a peculiar scar on Ronnie’s arm, and is told that Ronnie received it long ago when she was helping her brother out of a difficult situation. Ronnie warns Holly to get back to her family and urges her to conquer her fear of heights, mysteriously urging her to always ‘look at the Earth’.²⁶ Holly returns to her family, who are trying to explore an enigmatic dark hole in a wall that seems to lead to a bottomless pit. Only Holly is small enough to squeeze through the hole, and is lowered down on a rope to explore the cavern until her family is captured by the Sleestak. Holly recalls Ronnie’s words and slowly climbs up the rope. Suddenly a bright light appears, and she realises that the world around her is, surprisingly, upside-down. Thanks to Ronnie’s admonition she is able to conquer her fear by looking up at the Earth above her head and climb out of the hole.

Ronnie subsequently reappears and informs Holly that only she can save her family, as Ronnie cannot intervene. Holly uses the rope to save her father and brother from the Sleestak God’s sacrifice pit, but in the process her arm is badly scratched. Holly confronts Ronnie and calls the stranger out as her future self. Ronnie affirms that she returned through the time doorway to aid her younger self, revealing the entire episode as an example of the Bootstrap paradox. Holly joyfully exclaims that this means that her family will someday return home, but Ronnie correctly asserts that it merely means that they have the potential to go home. After all, Ronnie and Holly are possibly from different parallel (but closely aligned) timelines. In the Many Worlds Interpretation, the Bootstrap paradox is resolved because an event that occurs in the future of world A (the scar) can be sent into the past of world B and even though it appears that the future has caused the event in world B (the scratching), it is not the future of *that* world, hence no paradox exists. But even if the two Hollys are the same person (from the same universe), the storyline is consistent (as is Heinlein’s) within the universe of this particular time loop. As philosopher Nicholas Smith explains, a bootstrapped time loop, such as that traversed by Holly/Ronnie, is consistent according to the laws of physics: ‘it is only *because* you *will* make the trip—for whatever reason (forced or voluntary)—that your older self is there telling you about it in the first place’.²⁷ Compare this to the causal loop found in the third season of *Babylon 5*. Here former *Babylon 5* commander Jeffrey Sinclair, who is thought by the Minbari to be the reincarnation of their legendary leader Valen, travels back in time and *becomes* the Minbari

²⁵‘Elsewhen,’ *Land of the Lost: Season 1* (Universal Studios, 2009) [DVD].

²⁶ *ibid.*

²⁷ Nicholas J.J. Smith, ‘Bananas Enough for Time Travel?’, *British Journal for the Philosophy of Science* 48 (1997), 363-389 (p. 386).

leader, thus explaining why the Minbari of the future sense that Sinclair is the same soul as the Valen of the past.²⁸

The existence of parallel realities and timelines is central to the plot of the season 1 finale, 'Circle', cleverly written so as to have provided a satisfactory end to the series in the event that it had not been renewed for a second season. It was penned by *Ringworld* author Larry Niven and David Gerrold, who wrote the novel *The Man Who Folded Himself*, in which a man encounters multiple copies of himself in parallel universes. Enik is once again foiled in his attempts to travel back to his own time, by an apparent paradox that he describes as a reversal of the pseudoscientific sounding 'law of conservation of temporal momentum'.²⁹ The source of the paradox is a parallel version of the Marshalls whose image continually replays in, and locks up, Enik's time doorway. This version (here termed the Beta Marshalls for the sake of discussion) appears to die as they fall over the waterfall and crash onto the rocks below. As there is no otherworldly mist in this image, there is no time doorway for them to cross through. Much of the episode is devoted to the family's angst over the realisation that they should have been killed on the waterfall, and it is only thanks to the miraculous appearance of the time doorway that they find themselves alive. Rick Marshall suggests that they could throw a rope through the doorway, tether it to one of the rocks near the top of the falls, and pass through into what they falsely presume to be *their* Earth. Enik points out that since the scene cuts and repeats, their rope would also be cut. Interestingly, this is quite similar to Everett's warning for travellers who pass from one parallel reality into another via a wormhole (a hypothesis published three decades after the airing of this episode), as previously noted. Enik reluctantly gives Rick the knowledge to bring the Beta Marshalls into the Land of the Lost, thus saving their lives, but in order for the temporal momentum to be restored, objects of the same mass and number must leave, namely the original family, here termed the Alpha Marshalls. The episode ends with the Alpha Marshalls passing through the doorway into some version of Earth, and the Beta Marshalls awakening in the swamp to the growl of Grumpy the Tyrannosaurus Rex (as seen in the opening credits of each episode). Enik and the Marshalls have, in a sense, pushed the holy reset button for the series, and the Beta Marshalls find themselves in the same position as the original family, making camp in a now-empty cave (an inconsistency that is never explained).

The dangers of teleportation between universes (including the possibility of finding oneself chopped into pieces) are graphically depicted in episode 2.12 'Split Personality', written by Dick Morgan (a writer on the old radio series *Space Patrol*). Here the Marshalls awaken to a violent earthquake and a ghostly apparition of Holly. The youngest Marshall notes that the spectre 'looked like a person who was pushed through an egg slicer', an accurate, if not especially graphic, description of Everett's unsuccessful dimension-traveller.³⁰ We learn that the spectre is an alternate-world Holly, who begs the Marshalls to help *her* reality's versions of Rick and Will.

²⁸ In particular, see the episodes 'War Without End, Parts 1 & 2'.

²⁹ 'Circle', *Land of the Lost: Season 1* (Universal Studios, 2009) [DVD].

³⁰ 'Split Personality', *Land of the Lost: Season 2* (Universal Studios, 2009) [DVD].

Through a telepathic connection with her spectre-self, Holly learns that in the other universe her mother is very much alive, and that the alternate family is also trying to get home from the Land of the Lost. Holly directs her family to a cave leading inside a cliff side, and in an apparent attempt to appease censors, she remains outside and does not witness the horrific scene within. Here Rick and Will find alternate versions of themselves (here dubbed the Gamma Marshalls) partially embedded in the rock face, and the sound of a car horn coming from the other side of the cliff (which is apparently connected to some version of Earth, and where alternate Holly is, likewise, partially stuck between realities). Again, while this episode obviously predates Everett's 2004 technical paper warning of similar circumstances for hypothetical travel between parallel universes using the Many Worlds Interpretation, it is nonetheless a fairly accurate illustration of his main points. For example, Everett predicts that an observer in a particular MWI reality will 'only see one of these pieces' of the unsuccessful wormhole traveller.³¹ Similar depictions in science fiction media are found in the 2008 direct-to-DVD film *100 Million B.C.* where a Tyrannosaurus Rex is transported back to its own time (after wreaking havoc in a modern city) only to become embedded in a mountain, and Michael Crichton's 1999 novel *Timeline*, in which there are 'transcription errors'—tiny but cumulative misalignments in all parts of the human body, including nerves and blood vessels – that limit the number of times that a person can travel through a wormhole to the past of parallel universes.³²

Upon assessing the situation in the cave, Rick theorises that somehow various dimensions are 'interlocked and grinding against each other' and observes that there are three green crystals missing from a crystal matrix on the cliff wall, perhaps due to the Gammas attempting to use the matrix to travel home.³³ There are two clear visual signs noted by Rick Marshall that these versions of themselves originate from an alternate universe/timeline: firstly, they are wearing clothes that the Alpha Marshalls lost when they fell over the waterfall and landed in the Land of the Lost, and secondly, they appear to be the Alphas' mirror-images, right down to an exchange of right-handedness for left-handedness. Rick warns his son not to touch the doppelgangers, in case they are made of antimatter. This reference appears to be a nod to the famous 1956 poem 'The Perils of Modern Living' by Harold P. Furth, in which famed nuclear scientist Edward Teller shakes hands with an antimatter version of himself, only to be annihilated in a shower of gamma rays (as particle-antiparticle pairs will do through the laws of physics).³⁴ The catastrophic power potentially released from a matter-antimatter annihilation is also central to the plotline of Dan Brown's 2000 novel *Angels & Demons* and the 2009 film treatment.³⁵ All is eventually set right in the Land of the Lost, and the Gammas presumably return to their version of home. The viewer, therefore, encounters at least three different versions of the Marshalls during the course

³¹ Allen Everett, 'Time Travel Paradoxes', p. 124023-13.

³² Michael Crichton, *Timeline* (New York: Ballantine Books, 2003), p. 26.

³³ 'Split Personality', *Land of the Lost: Season 2*.

³⁴ Harold P. Furth, 'The Perils of Modern Living', *The New Yorker*, 10 November 1956, p. 52.

³⁵ For more information on antimatter and the science of the film version of *Angels and Demons*, see the excellent popular-level scientific website developed for the film by the scientists at CERN: <http://angelsanddemons.web.cern.ch/> [accessed 15 March 2016].

of the series: the Alphas, who fall through the time doorway at the beginning of season 1, and presumably return to some version of present Earth at the end of that season; the Betas, who fall into the Land of the Lost in 'Circle' when the Alpha Marshalls leave; and the Gammas seen in 'Split Personality'. Ronnie's timeline is uncertain, but the fact that she warns Holly to cherish her brother and father because 'they won't always be there' suggests she might be one of the Betas, because Beta Rick Marshall is lost when he falls through the time doorway at the beginning of Season 3's 'After-Shock'. By itself, this complex web of multiple realities certainly raises the series above the level of mere children's entertainment.

A final nod to the work of Albert Einstein is demonstrated in a recurring theme in season 1, the description of the Land of the Lost as a *closed universe*. A closed universe is one of the three general geometries of an expanding universe as postulated in General Relativity. In an open universe, light rays that start out parallel diverge, travelling along an ever-expanding curved space-time often depicted as similar to the seat of a saddle. In a flat or Euclidean universe, the classic laws of Euclidean geometry hold, even at the largest cosmological distances, and parallel lines remain so forever as the universe expands. However, in a closed universe, the expansion of the universe will eventually grind to a halt, and afterwards reverse, leading to a cataclysmic event termed a *big crunch* (the antithesis of a universe-creating big bang). In such a universe, space-time is finite, and a light ray (or any moving object) will ultimately travel in a circle, returning to its starting point like a boomerang, given sufficient time.³⁶ The viewer's first hint that the Land of the Lost is, in essence, a rather small closed universe, appears in episode 1.2 'The Sleestak God' when Will and Holly walk around in circles following a set of Paku tracks. In 1.4 'Downstream' (written by Larry Niven), the Marshalls build a raft in the hopes of following the river home. When the Marshalls escape a Sleestak attack by swimming down the river, they find themselves right back in Grumpy's swamp. Rick deduces that '[t]his is a closed universe. Like a locked room in space'.³⁷

The theme is further expanded in 1.16 'Hurricane' (penned by David Gerrold and Larry Niven), in which the children's careless handling of a hilltop pylon results in the entrance into their world of a space glider pilot from some twenty years into their future, Beauregard Jackson. Will notes that the time doorway (seen flying across the sky) is like the river in that it travels all the way around their visible world. In an attempt to return Jackson to his own reality, the Marshalls visit the hilltop and through Jackson's binoculars see the backs of their own heads, demonstrating that light rays as well as material objects move in a complete circle in the Land of the Lost. Another conveniently small closed universe, in which the curious effects of such a curved space-time could actually be witnessed, was famously depicted in one of the classic Mr. Tompkins stories written between 1938 and 1944 by physicist George Gamow (republished in a single volume in 1965). In these creative science-based tales, bank clerk C.G.H. Tompkins (named for three of the

³⁶ For further explanation on the three classic geometries of the universe, see George Gamow, *Mr. Tompkins in Paperback* (Cambridge: Cambridge University Press, 1965) pp. 31-43.

³⁷ 'Downstream', *Land of the Lost: Season 1* (Universal Studios, 2009) [DVD].

fundamental constants of nature) experiences strange dreams and visions motivated by a series of physics lectures (during most of which he falls asleep). In one story, ‘The Pulsating Universe’, Mr. Tompkins finds himself floating on an asteroid in a small (five mile wide) closed universe, and discovers that a book that is accidentally ejected off the asteroid will return to its starting point in only thirty minutes after traversing the entire universe.³⁸ Given the popularity of Gamow’s charming tales, it is highly likely that the adventures of Mr. Tompkins served as a source of inspiration for these episodes.³⁹

Like Mr. Tompkins’ wayward book, or the Marshalls themselves, this essay now finds itself returning to its starting point after traversing the self-contained universe of *Land of the Lost*. While the series has been derided as nothing more than a classic example of the cheesy children’s entertainment of its era, a close examination of the scientific content of the series has demonstrated that it is certainly deserving of a second look by popular culture scholars as well as curious adult viewers. In addition, given the series’ prescient depiction of issues with time travel that were predicted since the original airing of the series, it offers scientifically accurate illustrations for courses in the physics of science fiction media. *Land of the Lost* has surprisingly much that is intellectually well-founded, and therefore it might not be unreasonable to discuss this series in the same breath as other more recent (and more highly regarded) television series that likewise focused on space-time travel between multiple realities, such as *Doctor Who*, *Babylon 5*, *Sliders*, and *Lost*.⁴⁰

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³⁸ Gamow, pp. 44-54.

³⁹ Art Hobson, ‘Book Review: George Gamow and Russell Stannard, *The New World of Mr Tompkins*’, *Physics in Perspective*, 4(4) (2002), 494-495.

⁴⁰ A summary of some of the other similarities between *Lost* and *Land of the Lost* have been noted by Vozzek69, ‘*Land of the Lost*’, *Dark UFO Blog* (5 June 2009). <<http://darkufo.blogspot.com/2009/06/land-of-lost-by-vozzek69.html>> [accessed 15 February 2016].

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