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See Appendix EPAT1 – The Existential Patents
See Appendix EPAT2 – Existential Patents Quick Summary
See Appendix PUBS – Expansion of the Public Space Selected Summary
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“They will have time enough, in those endless aeons, to attempt all things, and to gather all knowledge ... no Gods imagined by our minds have ever possessed the powers they will command ... But for all that, they may envy us, basking in the bright afterglow of Creation; for we knew the Universe when it was young.” – Arthur C. Clarke, Profiles of the Future (1962)

Childhood’s End: Suppose I decide – somewhat arbitrarily – that the ‘First Era’¹ of human technology ended in or about 1850 – the word “technology” came into our language in 1859 (Merriam-Webster online dictionary), did I mention that before? – and thereafter began the ‘Second Era’ which we are in currently. Under that division of human history, what would be the defining technology or development that sets the Second Era apart from the First Era that gives Second Era technologies that almost intangible extra dimension that makes First Era technologies not only obsolete, but quaint and clunky in hindsight?

- ✓ One must be careful in retroactively applying modern concepts. For example, we refer to prehistoric technology of which prehistoric people clearly had no collective concept. To them, it was something else, magic perhaps, perhaps a reason to make up an origin myth or to be thankful for the puddle that fit them just perfectly. Commonly, we are rather careless in retroactive application, other examples discussed in GGDM include modern concepts of evil, romance, empiricism, smiles, and feudal.

The defining event of the Second Era would be the understanding of electricity, and the development of technologies to utilize, generate, and transmit electricity. Napoleon used telegrams on the eve of the change from the First Era to the Second Era. The most famous inventions of the late 19th Century were almost all based on the use of controlled electrical current – a technology based on ‘controlled lightening’ harnessed by human ingenuity, and by the 1950s the world moved from electrical engineering to electronics – the pioneers of the modern computer were electrical engineers pushing the edge of electric technology.

Now, were I to speculate on what development might be the defining element moving us into a ‘Third Era,’ I wouldn’t have much of a clue, but like so many before me, I would speculate that it would probably have to do with the invention of a new space propulsion system (and the principles that would be involved would revolutionize other technology areas) or intelligent machines. Others might speculate that it would be the development of a Unified Field Theory that revolutionizes the world’s technology, still others might look to the quantum (e.g., quantum computing, quantum communication) for the next era emergence.

- ✓ On the exponential progress of technology, perhaps an analogy: we can only see the shadow of a hypercube in three dimensions, a hypercube exists in a direction we cannot point to. It is thus that I know what the difference in Eras should look like, but can’t predict the new direction that technology has taken from the 1st Era to the 2nd.

Now, in the game, the invention of the Stardrive,² is the technology that (arbitrarily) defines cultures in the game as moving into the 1st Era of interstellar technology. Continuing on, I don’t know, and wouldn’t speculate, in game terms, what defining development would usher the interstellar civilizations into the 2nd Era, or what 2nd Era technology would look like, but based on the previous observations of recent Earth technology, I know what the effect/difference should look

like. That effect/difference, what I call here the Uber Alles, can be simulated abstractly – without needing to define the technological details.

- ✓ The Stargate SG-1 episode, “2010” shares some vague conceptual similarities to Arthur C. Clarke’s novel, Childhood’s End, except that the Aschen Confederation conquers by benevolently helping races to extinction with their advanced medicines while lulling them into complacency with peace and prosperity. The Aschen are like the bratty kid who helps grandmother down the steps with a kick from behind. Rumor is that there are a few of those in the Galactic Space. Don’t be grandma! See ‘total extinction’ in Countdown to Extinction, 1 Resolution, p. 1462, *infra*. The main characters mount an assault on the Aschen-controlled Gate to send a note back in time in hopes of avoiding the Aschen future. It’s a clever episode, but it probably didn’t work: Locking out the Aschen gate address in 2001 likely just created a branch non-Aschen timeline, while the Aschen timeline to human extinction continues.
- Scaling Eras: The 1st Era of Technology in GGDM necessarily corresponds to Type 1 Civilization on the Kardashev Scale (this was not intentional design).³ Whether the 2nd Era corresponds to Type 2 and the 3rd Era corresponds to Type 3 civilization depends on the imaginations of the participants and the type of game being played. But it is not likely.
 - ✓ On the John Barrow Microdimensional Mastery Scale, the 1st Era corresponds roughly to Type IV Minus technology, with the possibility that the 2nd and 3rd Eras might reach from Type V Minus to Type Omega Minus capabilities.
 - ✓ Finally, in the Robert Zubrin Scale of Civilizational Range, most positions begin at Type I and it is expected that for the time of the game, most will progress to and remain at Type II Civilizational Range.

The three scales are not necessarily incompatible or exclusive of one another in any way, and taken together represent a conceptual map for interstellar civilization.

- ✓ “As an example, consider the human civilizations of Avatar and Ender’s Game. Both use relativistic craft and travel between fairly local systems. Though there are world-destroying weapons and much larger-scale space travel in Ender’s Game and its sequels, the phlebotinum involved is specifically said to use enormously less energy than normal physics would suggest for accomplishing those tasks. In Avatar, the necessity of brute-forcing relativistic travel speeds may put that civilization higher on the Kardashev scale, despite the largely inferior technology and scale of development. Keep this in mind when placing examples, and try to include some explanation. After all, a hallmark of improving technology is increased efficiency, which would actually lower a civilization’s Kardashev rating, all else equal.” – from TV Tropes.com, “Abusing the Kardashev Scale.”

Thus, greater power consumption does not correspond directly to greater technology; the breakthrough technology was transistors and then Very Large Scale Integration (VLSI, i.e. the computer chip) which use less energy.

An interesting concept and one I have not seen elsewhere in this form (and is probably more to the point), and so I guess I am proposing here, is that the true measure of a civilization’s ‘progress’ is its mastery of abiogenesis, psychogenesis, and noogenesis, and maybe cosmogenesis (see Order of Genesis discussion, 1 Order, p. 522, *supra*). Those four, which I will

call the Gee-scale (in the vein of the preceding scaled measures of civilizations) holistically represent a true measure of ‘levels’ of civilization and shelf levels of existence. Science-fiction literature, of course, is filled with examples of the ability to bring life to inanimate matter (abiogenesis) and self-conscious intelligence/sapience to entire races (‘uplift’) or to machines (AI), all of which are usually presented as the godlike achievements of ancient star-faring races or the accidental, tragic bumbblings of man. But it is usually expressed in other frameworks, and not as a ‘genesis’ scale.

“Second, I hope very strongly that one of the by-products of IGY may be this: that it drive the last nail in the coffin of the juvenile, and dangerous argument over the value of basic research. Scientific advances, whether national or international, can no longer be sustained on a crash basis or by gifted tinkerers. They depend almost exclusively upon the rewards of basic research. The mere symbols of basic research have become fantastically powerful in recent years.”

“The IGY has had a double impact upon society, first as a purely scientific enterprise, and this I have already briefly discussed. That IGY also has overriding significance as a purely human engagement, as an activity of man without specific reference to its subject matter. ...

First, it was not a government program, although governments at home and abroad supported it generously. Second, it was not a military program, although the military establishments of many governments, like our own, provided a variety of logistic support. Third, it was not an internationalized program, even though one of its greatest achievements was in the field of international cooperation. The very fact that it was none of these things accounts for a large measure of its success, scientific and international.

What it was and what it is, is this: a gathering together of private human beings, each of whom had a vital personal interest in a particular subject, each of whom felt that this subject needed, out of its own exigencies, a concerted attack, but one for which a simple, uncluttered mechanism would suffice.

Thus the IGY was at root an enterprise of private persons, an enterprise in the hands of doers, and the form and shape it took largely reflect this. This form and this shape reveal much about the character of the IGY and may well afford a pattern worth noting, worth using again in other areas.”

– “The Meaning of the International Geophysical Year,” Remarks by Dr. Hugh Odish, Executive Director, US National Committee for IGY, before the National Press Club, Dec. 4, 1958

The Matrix: The Era Matrix is a separate two-dimensional grid to which Research Groups are moved when they become Applications. It is not part of the Public Space, and is not affected by events in the Public Space. The Matrix contains only connectors and Applications, and each position has its own Era Matrix which (like the Public Space) is hidden from the view of others.

There is inherent in the Application the assumption that at the moment it is placed on the Era Matrix, the new technology represented by the Application is demonstratively superior to the currently existing technology of the same general type. This is an important concept for Patents and technological progress in GGDM.

- First Era Matrix: Matrix' represent objective physical laws. Each Era has a different Matrix, however, all positions have the same Matrix for each Era, such that, unlike Public Space, they are not unique to the position. The 1st Era Matrix is a *four by four square* where Applications are placed one each in the squares of the grid. Thus, the 1st Era Matrix has room for sixteen Applications and connections may be made vertically, horizontally, and diagonally.
- #IGY: One is added to each dimension of the Matrix for each Era following the first. That is, the 1st Era Matrix is 4x4 and has spaces for 16 Applications, the 2nd Era Matrix is 5x5 and the 3rd Era Matrix is 6x6 with space for 36 Applications.
- Current Era Matrix: Whenever the rules refer to the 'current Era Matrix' the term means whatever Matrix they are currently using. When a position passes to the next Era, the Matrix from the previous Era remains and is available, however, there is little reason for positions that have passed to the next Era to continue to use the previous Era Matrix to develop technologies; it is kept mostly for reference. Applications **are not** transferred to the next Era when a position advances, rather, in each Era, each position must start over again (*tabula rasa*) developing Applications and prosecuting Patents for that Era.
- Fourth Era and Beyond: The game design is premised on three technology Eras, however, it is possible, theoretically, for positions to move beyond the 3rd Era into the 4th Era (however, see Terminus, 1 Temporal Technology, p. 801, *infra*); it is possible for the game to have an infinite number of Eras, with each Matrix increasing in size. However, this game is premised on a balanced development of technology, culture, industry, military machines, and exploration and expansion, such that it is not anticipated that most positions will pass beyond the 3rd Era before the game ends. See It was the End of History, 1 Resolution, p. 1456, *infra*.

“Laws of thought, traditionally, the three fundamental laws of logic: (1) the law of contradiction, (2) the law of excluded middle (or third), and (3) the principle of identity. That is, (1) for all propositions p, it is impossible for both p and not p to be true ... (2) either p or ~p [not p] must be true, there being no third or middle true proposition between them ... ; and (3) if a propositional function F is true of an individual variable x, then F is indeed true of x.... Another formulation of the principle of identity asserts that a thing is identical with itself ... or simply that x is x. Aristotle cited the laws of contradiction and of excluded middle as examples of axioms. He partly exempted future contingents, or statements about unsure future events, from the law of excluded middle, holding that it is not (now) either true or false that there will be a naval battle tomorrow but that the complex proposition that either there will be a naval battle tomorrow or that there will not is (now) true...

That the laws of thought are a sufficient foundation for the whole of logic, or that all other principles of logic are mere elaborations of them, was a doctrine common among traditional logicians....

In 1920 Jan Lukasiewicz, a leading member of the Polish school of logic, formulated a propositional calculus that had a third truth-value, neither truth nor falsity, for Aristotle's future contingents, a calculus in which the laws of contradiction and of excluded middle both failed. Other systems have gone beyond three-valued to many-valued logics – e.g., certain probability logics having various degrees of truth-value between truth and falsity.”

– Encyclopedia Britannica article, “Laws of Thought,” retrieved April 20, 2018

The Laws of Human Thought: I played a game of Mahjongg this evening. The game lasted 4 minutes and 22 seconds, the game also lasted nearly an hour. Both statements are true and most would not have difficulty accepting them in the proper framework (i.e. I paused the game to go put dinner in the oven and ended up doing several other tasks before returning), but a really simple machine intelligence might not resolve the contradiction. The program, “60 Minutes” can be said (truthfully) to have run 2,325 hours (i.e. episodes) as of December 3, 2017, over 51 years. On American television, an NFL game lasts 60 minutes and also 3½ (or more) hours. The last 5 minutes game time of any broadcast sporting event lasts 30 to 45 minutes. Girlfriends get mad when you say there is only 5 minutes left in the game, I want to finish watching this – and it finally ends 45-minutes later. This is true of nearly every sporting event broadcast. The ability to understand these truths is the same as a double entendre:

- ✓ “I shot an elephant in my pajamas this morning. How he got in my pajamas, I don’t know!” – Groucho Marx.

According to the 2011 IBM TV commercial that aired this video sound byte, computers could not understand this double entendre. In 50 years, this will probably be a historical moment.

- ✓ **Guin:** I’ll see you in 500 years, Picard. **Picard:** And I’ll see you in a few minutes. – Star Trek: TNG, “Time’s Arrow, Part 2” (1992).

The ending of Carl Sagan’s Contact (1997) takes advantage of this; the sphere dropped through the spinning rings and into the safety net in seconds, but the internal time passed was 18 hours. Although the politicians covered themselves with a Congressional investigation into an apparent boondoggle (citing Occam’s Razor), both time measurements were objectively true. Non-scientific humanity simply didn’t have (or want to have) the proper framework.

- ✓ Within GGDM there warships and not warships (e.g. Colony Ships, Cargo Ships, Scouts, Log Ships), something is either a warship or not a warship and both cannot be true at the same time.
- ✓ A Log Ship is not a warship, but is allowed to move as a warship because it is necessary for the game (see Warships, 1 Combat, p. 941, *infra*).
- ✓ Within GGDM, there are starships and fighters, the line between the two is bright and clear at the start (but may become less so later in the game), one is a unit, and the other a unit enhancement, and as such, there is no middle or third option (see Fighters, 1 Carriers & Fighters, p. 1046, *infra*).
- ✓ But a system boat is not a starship, and not a fighter, but can frequently act as a ship but cannot move between stars on its own (see System Boats, 3 Construction, p. 677, *supra*), could carry fighters, but can never act as a fighter in any sense.
- ✓ Fighters, however, can never act as a ship except that they can initiate combat as if they were a warship if based on another unit, a colony for example.
- ✓ “It’s all terribly confusing.” – Ancient One, The BeastMaster TV series.

Now, I could have attributed the previous quote properly to “The Ancient One,” the character’s official name, but since there is only one Ancient One in the series (and presumably that world), an appearance of the character is either p or $\sim p$, and thus, if the Ancient One’s appearance is p , then we don’t need to include ‘the’ article to distinguish from others and it is usually ignored.

- ✓ In the real world, I read an article, I think it was in 2019, ridiculing Ohio State University for engaging trademark lawyers to register “The Ohio State University”; viewers of NFL football have seen alumni players introducing it in that way on national television, with an emphasis on the “THE.” It also appears that way on the university website. Pundits ridiculed the egotistical waste of money as no one would confuse Ohio State University in Columbus, Ohio, with the much smaller Ohio University in Athens, Ohio. Nor is there another state university in Ohio or anything close.
- Progress: The word ‘progress’ is fraught with controversy, as indicated perhaps by the fact that there are political parties and movements in most nations who call themselves ‘progressives’ and are opposed by those who don’t call themselves ‘anti-progressives,’ but prefer the warm fuzzy term ‘conservative’ (or ‘ultra-nationalist’ nowadays, wherever progressive thought is associated with urban globalism and multi-culturalism) instead. Progress in this sense was previously discussed in *The Bargain*, 5 Culture, p. 426, *supra*. And as discussed in *Patently Off-Limits*, 3 Patents, pp. 750-752, *supra*, there are philosophical and scientific issues where ‘progress’ is linked to teleological thinking. But when I say that I am progressing down the page, no controversy exists as to what is meant and whether this is good or not.
 - ✓ After all that said, ‘progress’ of Eras is intended here in the simplest sense, as defined by Merriam-Webster online dictionary at *progress* (n): **3**: gradual betterment; especially: the progressive development of humankind, and *progress* (v): **2**: to develop to a higher, better, or more advanced stage.

“You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.”

– Buckminster Fuller

The Blurry Lines of Progress: There is no bright line or singular event that defines 1850 as the year that humans on Earth passed from one technological era to another, nothing special at all about 1850. Lines and retroactive terms are things imposed in historical hindsight (e.g., terms such as ‘feudal’ or ‘the Middle Ages’), whereas, the actual course of progress is like a drunken person staggering forward in a blur.⁴

- ✓ “Historians cheat.” – Dr. Paul T. Mason, Jr., Duquesne University, Dept. of History.
- The Progress of Eras: An Era is complete when:
 - 1) All Applications spaces on the Era Matrix are filled, and
 - 2) All Applications are connected to at least one adjacent Application.

When this occurs, the position automatically progresses to the next Era (however, see next section regarding the 1st Era) and the next Era Matrix becomes available, a new Current Era.

Conceptually, the completion and connection of all of the Applications in the Era, collectively advances technology by an order of magnitude; the advancement of technology or technological progress is not accomplished usually by a single incredible invention, but rather by the accumulation of small inventions and application to engineering problems. For example, compare the cell phone to the rotary phone to the telegram.

- ✓ Remember that Development of the final Application of an Era is automatically successful. See Short One Wingnut, 2 Technology, p. 708, *supra*. Connectors however, are not automatic, they are part of the Patent process (see Patent Prosecution, 3 Patents, p. 747, *supra*).
- Event Horizon: There are two additional requirements that must be met to exit the 1st Era:
 - ✓ First, in order to progress to the 2nd Era, the position must have obtained a Stardrive Patent. This is not negotiable, a 2nd Era position cannot exist without Stardrive.
 - ✓ Second, before exiting the 1st Era, a position must have obtained or successfully prosecuted *all* of the Existential Patents (if possible, see below).

The Generic Stardrive Existential Patent *satisfies both requirements*, as it is also an Existential Patent. The 1st Era may be quite long for some positions, most positions will spend the majority of the 1st Era developing technological basis for interstellar culture: The Stardrive and the Existential Patents, with one or two new unique technologies. Further:

- ✓ A 1st Era position may only prosecute Existential Patents until it has successfully prosecuted (and/or ‘bought’ during the setup) 11 Existential Patents, excluding GSD.
- ✓ See further, And One Moving Violation, 1 Stardrive, p. 789, *infra*.

There are a mind-boggling number of possible combinations to fill the 1st Era Matrix; it is probably possible to do so without completing all of the 1st Era Existential Patents. When this happens, automatic progression should be delayed two (rounded up) Regular Turns for each un-obtained Existential Patent, thus providing an incentive to keep the 1st Era tidy.

- All Things Are in Motion: Upon advancing to the next Era, a roll is made for each Patent completed in the Era to see if a new Monad is added to the position’s Public Space. There is a 10% chance x the level of the new Era for each Patent to result in an added Monad, e.g., there are 17 Existential Patents in the 1st Era, each of which has a 20% chance to add a Monad to the position’s Public Space (average result would be 3-4 added Monads). The new Monads are randomly inserted into the Public Space. As described in Over the Edge, 1 The Sidereal Stage, p. 108 and Edge of Reality, 4 Writs, p. 452, *supra*, inserting Monads in the Public Space can push existing pieces out of adjacency and just generally mess things up.
 - ✓ “But today we find modern science almost repeating Heraclitus’ dictum when it says: ‘*All things are in motion.*’ Like all dicta which briefly resume wide truths, this dictum of modern science requires expanding and explaining if it is not to be misinterpreted. By the words, ‘All things are in motion’ we are to understand that, step by step, science has found it possible to describe our experience of perceptual changes by types of relative motion: This motion being that of the ideal points, the ideal rigid bodies, or the ideal strainable media which stand for us as the signs or symbols of the real world of sense-impressions. We interpret, describe, and resume the sequences of this real world of sense-impressions by discussing the relative positions, velocities, accelerations, rotations, spins and strains of an ideal geometrical world which stands for us as a conceptual representation of the perceptual world. In our Chapter V. we saw that space and time did not themselves correspond to actual perceptions, but were *modes* under which we perceived, and by which we discriminated, groups of sense-impressions” – Karl Pearson, The Grammar of Science (1892), p. 239 (found on Google Books, also on archive.org)(emphasis in original).

“Part 1: Beyond the Zero’ contains 21 episodes. The name ‘Beyond the Zero’ refers to lack of total extinction of a conditioned stimulus. The events of this part occur primarily during the Christmas Advent season of 1944 from December 18–26. The epigraph is a quotation from a pamphlet written by the rocket scientist Wernher von Braun and first published in 1962: ‘Nature does not know extinction; all it knows is transformation. Everything science has taught me, and continues to teach me, strengthens my belief in the continuity of our spiritual existence after death.’ The epigraph reflects themes of anticipated redemption and blurring of the sacred and secular, both of which pervade Part 1.”

– from Wikipedia article, “Gravity’s Rainbow” (“a 1973 novel by American writer Thomas Pynchon”), captured September 5, 2019 ⁵

Beyond the Zero: Nothing could be more telling on so many levels than the defeat of the Mahdist at the Battle of Omdurman in 1898 and the Battle of Umm Diwaykarat in 1899. Those who were paying attention might have been the prophets of World War I combat: Industrialized technological warfare had finally overwhelmed religious fanaticism (promise of afterlife reward), tribal savagery and human wave attacks that had characterized human warfare for more than ten millennia. Methodical technological tactics overtook fearsomeness and impact of numbers.

The jihadist state, as a political, religious and economic power model failed miserably in less than a generation; while England, led by Prime Minister Gladstone (whose opposition to the Opium Wars as an MP fueled his political rise; his sister suffered heroin addiction), began to have doubts and back away from imperialist colonial adventure and European colonialism subsequently crumbled in the next three generations. The results of Omdurman and Umm Diwaykarat perhaps foreshadowed a similar, broader process of the 20th Century – that had begun two centuries before – where technology and industrialization completely overwhelmed and changed the institutions of the Western world and more slowly, the institutions of humanity globally.⁶

“Luckily for quantum physicists, you don’t always need to explain a phenomenon in order to use it. Ancient humans didn’t know about friction before inventing the wheel; doctors in medieval China didn’t know about antibodies when they began inoculating people against smallpox 600 years ago. Not knowing what’s behind quantum entanglement didn’t stop Jian-Wei Pan, a physicist at the University of Science and Technology of China in Shanghai, from rocketing it into space.”

– Sarah Kaplan, “Quantum entanglement, science’s spookiest phenomena, achieved in space,” The Washington Post, June 15, 2017

Advanced Technology: There is no difference in the Research process in any Era, as Research occurs in the Public Space. Research and Research Groups are the same throughout the game, for everyone in all Eras.

- ✓ “Any sufficiently advanced technology is indistinguishable from a completely *ad-hoc* plot device” – David Langford, “A Gadget Too Far,” (New Worlds 2, 1992, anthology) as a corollary to Arthur C. Clarke’s Third Law.

- Advanced Development: Positions may attempt to Develop Applications on the next Era before completing the current Era. Positions *may not* attempt to develop Applications two or more Eras ahead of their current Era Matrix. The next Era Matrix becomes available for Patents as soon as a position successfully Develops the first Application in that Era.

If a position intends to attempt to Develop an Application in the next Era, that must be indicated in the Actions sent to the Concierge, otherwise, it will be assumed that the Application is being Developed in the current Era Matrix. The cost of Developing an Application in the next Era is tripled and the base chance of Development of the Application is reduced by the percentage (fractions are truncated) of uncompleted Applications in the current Era.

- ✓ For example, the normal base chance of Developing a Research Group into an Application is 50% (see Short One Wingnut, 2 Technology, p. 708, *supra*). When attempting Advanced Development into the next Era, the base chance is 50% minus the percentage of uncompleted Applications in the current Era. Thus, if attempting Advanced Development into the 2nd Era, the position would need to have completed more than 8 of the 16 Applications on the 1st Era Matrix and would pay triple RPs.

Additionally, for the first Application Developed in the next Era, there would be a negative adjustment (see Short One Wingnut, 2 Technology, p. 708, *supra*) for the first Application in a new Era. Thus, practically, a position may not attempt to Develop Applications in the next Era before most of the current Era Matrix has been filled.

- ✓ Continuing the previous example, there is a 10% penalty to the normal chance of Development for the first Application in a new Era (see Short One Wingnut, 2 Technology, p. 708, *supra*). Thus, a 1st Era position would need to Develop 10 Applications on the 1st Era Matrix before attempting Advanced Development of the first Application on the 2nd Era Matrix (50% base chance minus 10% for first Application minus 37% uncompleted Applications on the 1st Era Matrix = 3% chance of Advance Development of the first Application on the 2nd Era Matrix). Once the first Application in a new Era is successful, future Applications can take advantage of adjacency bonuses.

Conversely, if a position has filled the current Era and is merely waiting (and a bit unlucky) for the last connections to be made between Applications to trigger the automatic progression, then there is minimum adverse effect on Development in the next Era, except the cost.

- ✓ Advanced Development should not be confused with or considered as advancing to the next Era, which cannot occur until the current Era Matrix is completed and all requirements are met.
 - ✓ Advanced Development may be an option if a Research Group has failed Development in all remaining Applications in the current Era and is foreclosed from the current Era. See The Kitty Incident, 2 Technology, p. 708, *supra*.
- Folding Space: It is possible for a position to attempt to avoid the specific requirements for automatic progression from the 1st Era to the 2nd Era using the Advanced Development and Advanced Patents rules presented below (i.e. never completing the last Application on the 1st Era Matrix). Doing so makes a hard and expensive hill to climb and may ultimately retard technological progress later in the game. Additionally, the Concierge may rule (but is not required to) that a position may not automatically progress to the 3rd Era when eligible, until

the 1st Era is completed (i.e. the last Application on the 1st Era Matrix is completed after the position has nearly filled the 2nd Era Matrix with Advanced Developments).

- ✓ The Advanced Development and Advance Patent rules simulate the blurry part of the line of technological gain, they create a situation that snubs both the Law of Contradiction and the Law of Excluded Third (*ut supra*).
- Advanced Patents: Positions may attempt to prosecute **non-Stardrive** Patents in the next Era as soon as the position has enough Applications in the next Era to try a Patent (i.e., a minimum of two Applications). Because Patents operate on the connection of all Applications listed on the Patent, a Patent *may not contain Applications from different Eras*; that is, all Applications used in a Patent must be found on the same Era Matrix. It is possible, if difficult, to create COT and ET Patents in the next Era based on a PIT Patent in the current Era.

The cost of prosecuting a Patent in the next Era will be 5+1-10 RPs per attempt (based on a die roll on a ten sided die) and the base chance (50%) of connecting any two Applications is reduced by 10 minus the number of successful Patents in the *current* Era x 5%. Thus, if a position has 5 successful Patents (of any type) in the current Era, the chance of making connections for Advanced Patents is 25%, whereas if the position had 10 successful Patents in the *current* Era, there would be no adjustment to the base chance of making connections.

- ✓ Stardrive Patents are a separate, special type of Patent and are not available as Advanced Patents. See And One Moving Violation, 1 Stardrive, p. 789, *infra*.
- ✓ The RP cost of prosecuting a Patent (above) *only applies to* Advanced Patent attempts. There is no RP cost for normal Patent prosecution attempts in the current Era. See Physical Item Technologies, 2 Patents, p. 739, and Back to the Drawing Board, 3 Patents, p. 748, *supra*.
- ✓ While the number of successful Patents is being used as a criteria for Advanced Patents, there is no rule specifying any number of Patents required to advance to the next Era, except that a position must successfully prosecute one Stardrive Patent and all Existential Patents to advance to the 2nd Era Matrix, *ut supra*.
- Future Shock: The Concierge may impose additional, temporary costs and restrictions and other difficulties or instabilities on advanced Patents that will be lifted once the position properly progresses to the next Era. The Concierge may also make case-specific rulings on any other sort of cross-Era situations, such as applying 2nd Enhancement Technology Patents to 1st Era ships.
 - ✓ A classic example is insufficient energy to power an advanced weapon on an inferior ship, for example, the advanced Excalibur Class destroyer in Babylon 5 whose main weapon, when fired, left the ship immobile and vulnerable for a minute (except life support and communications) while the power recharged the systems. The limitation manufactured drama for the program.

The Concierge will take into account in all cases, the level of industrialization of the position, the technology base of the position, the percentage of completion of the current Era Matrix, and social factors and institutions.

- ✓ Advanced Development or Patent Prosecution **does not entitle** the position to any abilities granted by the Uber Alles for the next Era, see 2 Eras, p. 767, *infra*, or any other advantages of the next Era (e.g., see Player Piano, 2 Eras, p. 770, *infra*).

“In an essay for the journal American Anthropologist, Brown University linguistics professor Philip Lieberman described as ‘absurd’ the mixture of different levels of advancement among different tribes living in close proximity. Lieberman pointed out that it ‘would be most unlikely 80,000 years ago’ for humans to still be exhibiting ape-like characteristics, at the same time noting that the Ivaka tribe was depicted as having ‘a village culture that would have been likely 10,000 years ago.’”

– from Wikipedia article, “The Quest for Fire (film),” captured June 10, 2019 (citing to Lieberman, Philip (December 1982). “Film Reviews: Quest for Fire.” American Anthropologist. 84 (4): 991–992)

Bruit Suit: There is an interesting distinction: While Prof. Lieberman’s point is probably true – and I say this with reservations because of the historical difference between the Europeans and the rest of the world in the 15th Century and Jared Diamond’s arguments – of cultures co-existing on the same planetary surfaces, it has not been true in science fiction (and *probably* will not be true in reality *if* we ever discover other intelligent technological civilizations) due to both the unbelievably vast interstellar distances, separate development of sapience and cultures on many planets, and because science fiction is generally based on Western history, particularly the period of European hegemony. Thus, ‘bruit,’ (pronounced ‘brute’ not ‘bru-it’) in all of its meanings, is a rather fitting (archaic) term for GGDM play:

- ✓ “Back in the days of Middle English, the Anglo-French noun bruit, meaning ‘clamor’ or ‘noise,’ rattled into English. Soon English speakers were also using it to mean ‘report’ or ‘rumor’ (it applied especially to favorable reports). We also began using ‘bruit’ as a verb the way we used (and still occasionally do use) the verb ‘noise,’ with the meaning ‘to spread by rumor or report’ (as in ‘the scandal was quickly noised about’). The English noun ‘bruit’ is now considered archaic, but the verb lives on.” – from Merriam-Webster online dictionary at *bruit*.

Within the Galactic Space co-exist (peacefully or not) races with different levels of technology, suspiciously watching each other or casting loving gazes, spreading or collecting rumors, and making a lot of noise in the vacuum of space.

“One of the biggest roles of science fiction is to prepare people to accept the future without pain and to encourage a flexibility of mind. Politicians should read science fiction, not westerns and detective stories. Two-thirds of 2001 is realistic – hardware and technology – to establish background for the metaphysical, philosophical, and religious meanings later.” – Arthur C. Clark ⁷

Kindergarten Experience: I once saw a news program about a business that offered a ‘kindergarten experience’ to groups of adults who paid to be – literally – treated like kindergarteners for a day. How can anyone conduct or attend such a farce with a straight face – I can only picture Allison Pill from Snowpiercer (2014) – without a noxious feeling inside?

Many people are nostalgic for their childhood, wishing they were children again to escape responsibility, pressures, and meaninglessness of adulthood. To be a child is to be powerless, completely dependent on adults, lacking in judgment, knowledge, understanding, gullible, vulnerable; “hell is for children!” as Pat Benatar sang (and screamed) in 1980.⁸ Who wants that

again? But as the West discovered in the early 20th Century, adulthood is the illusion that you are not powerless, dependent, or lacking in judgment, knowledge or understanding, thus we have constructed expensive social safety nets.

- ✓ This is also the problem with so-called ‘girlfriend experience’ services (which is just a repackaging of professional mistress and other similar services) – how can one engage in an intimate relationship they know is paid (contrast this with say, visiting a psychiatrist)? The feeling of illegal drugs is not real either, but the physical addiction is too powerful for users to disengage. The problem of human looking is that we cannot un-look. And this was the psychologically devastating ending of Robert Sheckley’s 1957 short story, “Pilgrimage to Earth” – in his naivety and need, the off-worlder was willing to think real the romantic love from a perfect girl who was programmed to please him (programmable girl is a concept reused in Dollhouse series).
- ✓ I worked with a young lady several years ago and would from time to time in walking through the office, overhear her talking to her boyfriend on the phone. The way she spoke to him like a juvenile, maybe being too cutesy or manipulative, almost made me ill and I had a sense that relationship would be over as soon as he finished remodeling her kitchen. I wasn’t wrong, it didn’t take long.

“Mighty and Everlasting Bomb, who came down among us to make Heaven under Earth, lighten our darkness. O instrument of God, grant us thy peace.”

“Glory be to the Bomb, and to the Holy Fallout. As it was in the beginning, is now, and ever shall be. World without end. Amen.”

“May the Blessings of the Bomb Almighty, and the Fellowship of the Holy Fallout, descend upon us all. This day and forever more.”

– Leader Mendez, *Beneath the Planet of the Apes* (1970) ⁹

Endnotes.

¹ Commentary: It is an East Asian tradition to define their history in periods or eras, or by the names of rulers, we do something similar, e.g., “Nixon era” or “Vietnam era.” That is not the basis of or inspiration for the eras scheme for GGDM technology progression. Instead, “Eras” were a reimagining of the ‘levels’ of the technology tables in the Stellar Conquest board game, a nominally non-teleological scheme to solve the technology tables problem.

² Commentary: What is most interesting about the reimagined Battlestar Galactica series is that the only technology that they have that we don’t have is their FTL drive. The Cylons have the same technology and have additionally evolved a biological-machine technology. Other than the FTL – and the fact that the Galactica can take nuclear missile hits and survive, the modern viewer easily recognizes everything else in the show; humans, technology and culture, except that they are polytheistic. The technologies we recognize, like their life support systems and space structures, are perhaps just a lot better than what we have, but not so much so as to impress the average viewer (who is unfamiliar with engineering details) as being ‘way beyond’ where we are now. It was a very viewer-friendly show in that way, while the story line is a bit less so for being big, dark and extremely complex, like the universe.

³ Citation: See <https://www.youtube.com/watch?v=mr7FXvTSYpA> for an explanation of the Kardashev Scale.

⁴ Citation: “I find it somewhat perplexing that so few people seem to realize how big of a problem it is that progress in the foundations of physics has stalled. Part of the problem I think is that physicist themselves have been talking so much rubbish that people have come to believe that foundational work is just philosophical speculation and has lost any relevance for technological progress. Indeed, I am afraid that most of my colleagues now believe that themselves. It’s wrong, needless to say; a better understanding of the theories we use to make all these fancy devices, will certainly lead to practical application. Maybe not in five years, or ten years, but more in 100 years or 500 years.

But eventually, it will.” – Sabine Hossenfelder, “Physics is still in crisis,” Sabine Hossenfelder YouTube Channel, June 5, 2020.

⁵ Citation: The von Braun quote referred to is from an article “Why I Believe in Immortality,” which, according to NASA’s bibliography page, was published in two books in 1962 and 1968. Full text of the article is apparently unavailable on the internet, there are different clippings on various pages some of which contain the quote, others not, and the quote appears frequently on quotes sites. On the bibliography compiled by NASA, von Braun had published an article titled “Immortality” in two magazines in early 1960.

✓ <https://www.nasa.gov/centers/marshall/history/vonbraun/bibliography.html>.

⁶ Commentary: In the modern time, some (omit derogatory name-calling) people post videos on YouTube that are taken from movies like Khartoum (1966), Outpost Morocco (1949), or Four Feathers or a hundred other 20th century desert dramas, with smug, self-righteous, suggestive captions such as, “this is how they used to deal with Muslims.” Technology and industry have not solved the problem of those kind of (omit derogatory...) uh, people.

⁷ Commentary & Citation: Compare the similarities of this statement by Arthur C. Clark to the feature quote by Alvin Toffler, top of the 7 Beginnings, p. 68, *supra*.

⁸ Commentary & Citation: Pat Benatar’s album Live from Earth was one of the first records I owned, I probably bought it just after it was released in late 1983 (and I still have it, though I don’t have a record player now). If you don’t remember her screaming Hell is for Children, it is probably because the radio-play version was tamer. I grew so used to hearing the Live from Earth tracks that later when I heard radio-play versions of her songs, they sounded slow and tame, they didn’t sound right. I later saw her in concert at the Pittsburgh Regatta around 2000 – though she complained that she was tired of singing some of her songs (I think it was right before “Hit Me With Your Best Shot”) – her and her husband were fabulous, especially when they pretended to have a marital argument on stage, he ran off the back of the stage and hid out in the crowd, while she pretended to look for him from the stage and he played from the crowd. Thank the inventor of cordless amps!

⁹ Commentary: “In one of the countless billions of galaxies in the universe, lies a medium-sized star, and one of its satellites, a green and insignificant planet, is now dead.” – ending narration to Beneath the Planet of the Apes (1970). When I was a young teen, an afternoon movie program called Dialing for Dollars, came on Channel 16 (Scranton, PA) at 4 p.m. to 6 p.m., Monday through Friday, followed by local and network news. Dialing for Dollars featured theme weeks where they showed for example, Clint Eastwood Westerns week, Time Tunnel week, Buck Rogers week, or John Wayne week, five thematically ‘related’ movies. Early Sci-Fi Channel had something similar, I remember in the early 90s a ‘time travel week’ where I discovered the excellent indie movie Navigator: A Medieval Odyssey (1989) – the other four movies that week were forgettable – one I think featured some ‘time quakes.’ Dialing for Dollars had a Planet of the Apes week when I was in about 9th Grade and, of course, I watched them all. It would have been a Tuesday, after school, when I watched Beneath the Planet of the Apes (what homework?). I remember my reaction was OMG, as I realized what kind of insanity was being served. The mutants and their bomb worship, and the ending, stuck with me for 35 years.

✓ “And what is even more extraordinary is that Beneath, as a result of its shortcomings, is one of the weirdest and most insane sci-fi films of its era. It’s strongly anti-war, even including a scene referencing the Vietnam protests of the time in which young pacifist chimps holding signs are physically moved aside by soldiers. Its surreal imagery – an illusion of a giant statue of the apes’ Lawgiver raining blood on a forest of crucified apes, the incredible church service in which dozens of deformed mutants sing a hymn to an atomic bomb – matches the first in terms of sheer originality, and that ending is among the bleakest the genre has ever offered. ... Two things the Apes movies rarely ran short of were strange concepts and bizarre imagery, and Beneath – while far from the best film in the series – may top them all in both departments.” – Don Kaye, “How Beneath the Planet of the Apes Nearly Buried The Franchise,” Den of Geek, May 25, 2018.

✓ “When Beneath the Planet of the Apes adheres closely to this theme of dueling cultures and clashing religious viewpoints, it proves rather impressive, in my opinion. And the mutant civilization, down to the presentation of the ruined city and the ghoulish make-up, is every bit as impressive as the special effects work done on the original Planet of the Apes. The moment here in which the mutants reveal their ‘innermost’ selves to their God, the bomb, is more than bracing. It’s ghoulish. The unmasking of the mutants may not equal the psychic jolt of the Statue of Liberty revelation in Planet of the Apes, but it certainly rivets the attention, and visually brings forth the horrific toll of nuclear war upon both the human flesh and the human visage. It also assures that this sequel contributes some real visual ‘punch’ to the franchise.” – John Kenneth Muir, “Cult Movie Review: Beneath the Planet of the Apes (1970),” July 27, 2011.