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See Appendix EPAT1 – The Existential Patents
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“It began to take so long to calculate the census that many observers envisioned a day when one census would come due before the last one was completed.... The solution to this problem was to use some kind of mechanization. The first attempt came in the census of 1870 when machines invented by Col. Charles W. Seaton, chief clerk of the census, were used. The machines were sorely needed because there were 40 million Americans to be counted.”

– Joel Shurkin, Engines of the Mind (1984)

The Great Abacus in the Sky: Like the Resource Point (RP) the exact measurement of the population factor is not specific in the number of entities or population density it represents. One suggestion in Traveller RPG for translating population factors to hard numbers for human populations was that the population factors would represent the number of zeros after the one, in human populations. So, five population factors would be 100,000 people. This works for *human* populations perhaps, but how many ants could live in the same space taken by 100,000 people?

- ✓ For example, MSN reported in the last week of December 2017 that vandals had knocked over several large hives on a bee farm in Iowa, killing half a million bees from cold exposure and destroying the business.
- ✓ In another case, a man disturbed an estimated 800,000 bees living in a crawlspace attic of a house. Most unfortunate it was for him...

And there is no indication that there are, in fact, *any human populations* in this game, and with so many variables, who knows what exactly a population factor represents or why it is important? The GGDM game definition is that one population factor is a ‘unit’ capable of producing .2 RP when the Taxation Power is activated and .2 new population factors of the same Native Population Type on an Optimal Planet when the Census Power is activated.

- ✓ However, as humans are not very good at being anything but being human – and certainly are not very good at being godlike – undoubtedly the unspoken assumption in GGDM will be that the populations of the game will be human or humanoid aliens, as in most science-fiction television series (with the possible exception of the Truly Alien Primal State). Only big budget movies have dared in recent years to create truly alien – usually hostile to humanity – beings.¹
- **Living Spaces:** One universal rule that applies to all living creatures, no matter how their population factors are composed: They have to live somewhere. At all times during the game, population factors must be either on a colony (or Homeworld) or on a Colony Ship. Population factors are recorded with the colony or ship information.

“When the cosmos shoots pool, it plays for keeps. It sank a six mile wide rock in our pocket of the solar system 66 million years ago. The smack of the asteroid against Earth released energy on the order of billions of atomic bombs. Dinosaurs were the cataclysm’s most famous victims, joined by sea creatures, plants and microorganisms. All told, Earth’s biodiversity shrank by 75 percent in what is known as the ... KPg extinction. A large asteroid strike happens only once every 100 million years. And a controversial new report suggests the KPg impact was an exceptionally unlikely shot.

In a paper published ... in the journal Scientific Reports, a pair of researchers calculated the asteroid had little more than a 1 in 10 chance of triggering a mass extinction when it smacked into Earth. (We mammals should be glad it beat the odds: After the dinosaurs' swift exit, nocturnal furballs – our ancestors – scampered into the daylight and conquered the planet. And one branch of dinosaurs survived and persists as today's birds.)"

– Ben Guarino, “Dinosaurs would have survived if asteroid hit Earth elsewhere, scientists claim,” Washington Post, November 9, 2017

Habitability: It is difficult to repudiate the events of history that put you here. Without the asteroid, perhaps you might have been an English-speaking dinosaur, as in the silly TV mini-series, *Dinotopia* (2002). Nocturnal furballs rule the world! And eat the food I put out for the cats.

All planets are classified, for colonization purposes, based on two criteria: Habitability Class and Maximum Habitability. The information on each planet's Habitability Class and Maximum Habitability (and other information) is subjective and is displayed on the position's information.

- **Cloud Shrouded Surfaces:** The Habitability Class and Maximum Habitability of each planet is determined when the starsystem is first explored. There is a relationship between Stellar Class (i.e. 'star color' in GGDM) and Habitability Class that is explained in detail in *Looking Through, 2 Expansion*, p. 900, *infra*. The game does not need or include any details of the appearance of a planet, or the planet's surface, land masses, weather, atmosphere, or a hundred-thousand other eco-geological details. The only relevant factors are Maximum Habitability and Habitability Class, and that is all the game looks to discover for each planet.
- **The Air That I Breathe:** Habitability Class refers to the *relative* natural environment of the Planet and are divided into six self-explanatory Habitability Classes: Optimal, Hospitable, Habitable, Unpleasant, Hostile, and Uninhabitable (think Venus, or Earth in 200 years). Populations can be landed on any Optimal, Hospitable, or Habitable planet without any additional technology, however, Controlled Environment Technology (CET) is needed to colonize Unpleasant and Hostile Planets. It is also possible, through great effort, to slowly improve the Habitability Class of a planet, while, conversely, pollution and other entropy events will slowly decrease the Habitability Class of planets.
 - ✓ It is striking the similarity between the reasons offered by Ted Kaczynski (aka the Unibomber) for his move to a primitive wilderness existence in Montana in 1971 and his later terrorist attacks, and the lyrics of John Denver's late 1972 hit song, “Rocky Mountain High.” It is probable that Kaczynski was aware of the song later and may have retroactively constructed his 1971 thinking along that line. But it is just as likely that the two, *to very different ends*, come from and express a common mystic anarcho-primitivism root. This is supported by the fact that the locals told the New York Times that shaggy, primitive, reclusive Kaczynski wasn't considered unusual or considered peculiarly strange in the area that attracted many of those types (see, John Kifner, “ON THE SUSPECT'S TRAIL: LIFE IN MONTANA; Gardening, Bicycling And Reading Exotically,” New York Times Archive, April 5, 1996, available free).
- **Dayworld:** Maximum Habitability is the maximum number of population factors that can be on the planet surface. No population can be added to or grown on the *surface* of a planet that is at Maximum Habitability. Orbital Cities (via the Orbital City Existential Patent), costing

20 RPs each, will extend the colony beyond the surface Maximum Habitability of a planet by 15 population factors each by placing populations in orbit (see *Orbital Platforms*, 2 Construction, pp. 666-667, *infra*, for more on *Orbital Cities*, moons, and *Orbital Platforms*) up to half of the planet's *original* Maximum Habitability (all of this can be improved by later Patents).

- ✓ Imagine a massive crowded colony on a habitable world, or imagine Earth with a population of 50 billion humans. Imagine that cities extend for miles underground, extracting heat energy from the magma layers. Imagine a combined orbital and lunar colony population in excess of 100 billion?
- ✓ Imagine that there are people who are born, live and die in underground cities, never seeing the stars, never seeing the surface, which is either becoming uninhabitable, or is reserved for spaceports, the imperial palace, government buildings and defense complexes, and the wealthy who can afford expensive surface estates.²
 - A city that covers an entire planet is called an ecumenopolis, a term coined in 1967. A city that covers an entire continent is called an eperopolis; parts of the Low Countries have shocking population density now. It is expected that colonies in the interstellar civilization will mirror the variable population density found on Earth; writers love it because it provides endless styles of planetary settings!
- ✓ Imagine the society, the people, the complexity. Imagine Trantor, the imperial capital in Isaac Asimov's *Foundation* series that has a polar heat sink:
 - "Excessive use of energy without adequate disposal of heat, for example, could plausibly make the planet of a civilization approaching Type I unsuitable to the biology of the dominant life-forms and their food sources. If Earth is an example, then sea temperatures in excess of 35 °C (95 °F) would jeopardize marine life and make the cooling of mammals to temperatures suitable for their metabolism difficult if not impossible. Of course, these theoretical speculations may not become problems in reality thanks to evolution or the application of future engineering and technology." – from Wikipedia article, "Kardashev Scale," February 12, 2017.
 - It appears that the "heatsink" (geothermal tap) on Trantor was introduced in *Prelude to Foundation*, published in 1988. The term Heat Sink has been used since 1936 according to Merriam-Webster and is a term used mostly in electronics. The Kardashev Scale was proposed in 1964.
- Salusa Secundus: As mentioned previously, some planets are 'special' in some way and may generate extra *something* for the position that colonizes the planet or controls the colony. Generally, Special Planets are Unpleasant or Hostile places (what else would you expect?), so come prepared. They may also be inhabited already. Yeah, it can get complicated.
 - ✓ **Paul Atreides to the Emperor**: You and your House shall have a throne on Salusa Secundus your prison world and the training ground for your accursed Sardaukar. – Frank Herbert, *Dune* (1965).
- Planet Narn: Planets may be damaged by Orbital Attack or Bombardment, or Ground or Pacification Combats when they are conquered. For every 25 population factors destroyed in Combat, the planet is *reduced by* one Habitability Class *and* 25 Maximum Habitability. Max-

imum Habitability is not affected until the loss of Habitability Class and then both are reduced at the same time; however, the accumulation of damage leading to the loss of Habitability Class and Maximum Habitability will be recorded until the event happens. A planet may reach zero surface Maximum Habitability before it is completely reduced to an Unpleasant or Hostile Habitability Class. A planet may lose any Special Status due to bombardment.

- ✓ In the event of dying, you either got what you deserved or got an end you didn't deserve. Either way, it's an idea that only exists and matters in human literature, just like saying 'they deserved a better result' when your favorite team loses. However, conversely, the concept cannot be stretched to being born, to say that anyone 'deserved' to be born implies a whole set of bizarre and untenable un-causal ideas. Not unlike the equally un-causal damnation of the un-evangelized who lived *before* Christ – the 'fate of the unlearned' and 'virtuous pagans' problems that placed Homer, Socrates and Virgil in the first level of Hell³ in Dante's "Inferno" (first part of the Divine Comedy, 1320) – hell from living in a deficient, diminutive form of heaven!⁴

Whenever a planet loses Maximum Habitability and Habitability Class – whether quickly or gradually – it is a fair certainty that the result is a mass-extinction event of the native life forms, especially those of the higher orders, will occur. A significant increase of Maximum Habitability and/or Habitability Class relative to any alien species – as in terraforming – will likely have the same result (e.g., global warming). The biosphere of the Earth has proven to be rather fragile and delicate, while basic life has proven more resilient than expected (e.g., bacteria has been found down to 5 km under the surface). The result of the strike – as would any Orbital Bombardment – bears similarity to the idea of a Nuclear Winter, which idea originated from the observed global climate and weather changes following a volcanic eruption and from observations of sandstorms on Mars (see *The Air that I Choke* discussion, *ut infra*).

The system of marking planetary damage by increments of population lost by violent means is merely a benchmark system based on the assumption that whatever means is used to destroy that much population must also damage the planet (see also *Collateral Damage in Ground Combat* discussion, 4 *Combat*, p. 995, *infra*). As you can imagine, there are ways to kill or destroy technological sophant populations that would leave the remaining biosphere relatively unharmed (e.g., neutron bomb, plagues, bug spray). There is also the possibility that destruction of population, even violently, will not impact the Habitability Class of the planet, for example, a domed colony on a barren (like our moon) world. This is another area where the Concierge might exercise judgment.

- ✓ The bombardment of Planet Narn by the Centauri using mass-drivers and asteroids, was a ground-breaking (literally) moment in the *Babylon 5* television series. It is quite possibly the first use of mass drivers – railgun and coilgun systems designed for space exploration and colonization – as weapons for planetary bombardment in any science-fiction setting. Consider for a moment the damage done by the meteor strike that made the dinosaurs extinct; or the YouTube videos showing projections of worldwide cataclysm from a sizable meteor strike on Earth now. It would take only a few minutes of mass-driver bombardment to damage the Earth's biosphere significantly.
- Alien Agenda: The data for each planet is relative to the owner's Native Population Type, that is, each Native Population Type will see each planet slightly differently, so 'damaging' a planet may improve the planet's Habitability Class and Maximum Habitability for other Native Population Types⁵ or it may reduce it for all Native Population Types. Other positions

may learn through game actions of the change in Habitability Class and Maximum Habitability of previously-discovered planets. This is more likely to occur if the position does something in-game to look, such as sending a ship (see 2 Information generally, *infra*); whereas, positions who don't look are less likely to discover changes. They may also learn through informal player communications (see Greys Diplomacy, 1 Diplomacy, p. 1097, *infra*).

- ✓ A position's planetary data, exploration information could be 'stolen' or learned in-game by Information Operations, see 2 Information, p. 1349, *infra*.

It seems more likely that the threat of Orbital Bombardment is greater against colonies on planets whose habitability class is unfavorable to the attacker's species and/or whose population is at or near the planet's Maximum Habitability. Not the least concern is that Ground Combat would require the attacking troops to be suited up, whereas, the opposing defenders, if the planet is of their favorable Habitability Class, will have the advantage of fighting in their own environment. But there are a lot of factors to consider...

- ✓ **Ambassador Londo:** [exasperated] Why don't you eliminate the entire Narn homeworld while you're at it? **Mr. Morden:** [menacing calm deadpan voice] One thing at a time, Ambassador. One thing at a time. – Babylon 5, "Revelations" (1994).

"Nigerian leaders cannot put a number on the amount of Nigerian women and girls that have gone missing. Nigeria has never had a credible, successful census." –
Olúfémi Táíwò, Professor of Africana studies at Cornell University

"The Gross National Product includes the destruction of the redwoods and the death of Lake Superior. It grows with the production of napalm and missiles and nuclear warheads... It includes... the broadcasting of television programs which glorify violence to sell goods to our children."

– Sen. Robert F. Kennedy (1968 Democratic Presidential Candidate) ⁶

The Air That I Choke: Would Richard Nixon have become President if Robert F. Kennedy hadn't been assassinated? If you were a time traveler...⁷

When I was young, the environmental problems discussed in school were air pollution, deforestation, and landfills, we talked about electric cars, mass transit, and eco-friendly urban planning and recycling. In 8th grade "Environmental Adventures" class with portly Mr. Greene (who was also my American History teacher), I don't recall any mention of global warming, glacier melt, or much mention of rising sea levels; it was all about air pollution from cars and factories, nuclear testing and power plants, deforestation of the Amazon, urban planning, and landfills and toxic dumps. At that time, the Love Canal and Superfund cleanup were regularly in the news, as was the Centralia, PA mine fire which eventually eliminated the town, and the Three Mile Island accident. Then there was the hole in the ozone layer and aerosol cans.

Then the main environmental threat shifted from air pollution to global warming and climate change. The bottom line problem with global warming is that it is probably a natural and predictable process on any biosphere planet that has a developing sapient technological civilization (see Kardashev Scale quote, p. 316, *ut supra*, regarding planetary heat disposal). This doesn't 'let us off the hook,' but conceptually, it is a good place to begin understanding.

- ✓ “But in the history of the solar system and even in human history there are clear records of extraordinary and devastating catastrophes. We have now achieved the dubious distinction of making our own major catastrophes both intentional and inadvertent.” – Carl Sagan, *Cosmos*, Episode 4.

It is true, we don't have any other examples to look at, ours is the only one we know of; but basically, the Earth (or any solid planet) contains trapped energy and the processes and demands of a technological civilization releases that energy – often wastefully, since, for example, 50% of the electricity put into the power grid is lost. The result of the process is that the technological civilization releases trapped geological and chemical energy into the atmosphere, which if it goes on long enough, will change the air temperature of the planet (like heating a room). Thus, the irony of keeping cool: In cooling our houses in the summer, and refrigerating our perishable foods and drinks, we contribute to heating the planet.

Almost certainly, this process would happen anywhere there is a developing planetary technological civilization, especially if fuels are available near the surface. And bringing resources or energy from space to use on the planet, would only introduce to the system *additional outside energy* to the detriment of the planet's ecosphere. It seems inevitable, unless a significant portion of manufacturing and energy use are moved to orbit, that humanity will have to leave the Earth for elsewhere eventually. And the process will be repeated wherever we go.

And the process will be repeated wherever a technological civilization arises, whether through damage and deterioration of their home world, or search for new energy sources and resources. And given the size and age of the Cosmos, this process may and likely will have happened many thousands of times before. But given the size and age of the Cosmos, it is not likely that we will immediately find a thriving developed interstellar civilization out there; the Galactic Space setting of the game remains a highly unlikely occurrence.

- ✓ “The growth in unconventional gas production involving hydraulic fracturing (‘fracking’) has transformed the energy landscape, reducing energy prices, decreasing conventional air pollution by displacing coal in electricity generation, disrupting international energy trading arrangements, and increasing the prospects for energy self-sufficiency for the United States.... The results of our analysis suggest that the introduction of fracking reduces health among infants born to mothers living within 3 km of a well site during pregnancy. For mothers living within 1 km, we find a 25% increase in the probability of low birth weight (birth weight < 2500g) and significant declines in average birth weight and in an index of infant health. There are also reductions in infant health for mothers living within 1 to 3 km of a fracking site, but the estimates are about one-third to one-half of the size of those within the 0- to 1-km band. There is little evidence of health effects at further distances, suggesting that health impacts are highly local.” – Janet Currie, Michael Greenstone, Katherine Meckel, “Hydraulic fracturing and infant health: New evidence from Pennsylvania,” *Sci Adv* **3** (12), e1603021, December 13, 2017.
- Martian Dust: Mars may be instructive. Mars has regular regional dust storms that, every few years, grow and merge into a *global dust storm that lasts for months*. The Earth dust storm in the film *Interstellar* (2014) was clearly modeled after a real disaster on Earth called the Great Dust Bowl (1935-1938 – look at the historical photos), but on a near-Martian scale.

Back to Mars, scientist recently noticed that water vapor on Mars tends to rise to the upper layers during the regular dust storms, where it may then be bled off into space, and have hypothesized that the dust storms were a major contributing factor to the loss of water on Mars (Viking lander has, however, photographed seasonal light frost on the ground on Mars). This is a self-perpetuating, runaway process, as loss of water makes the surface dry, contributing to a cycle of larger and more violent dust storms. From Elizabeth Howell, “Escape from Mars! Red-Planet Dust Storms Linked to Atmosphere Loss,” Space.com, January 25, 2018.

✓ “The most important fact about Spaceship Earth: an instruction manual didn’t come with it.” – Buckminster Fuller.

➤ Pollution Potentials (optional rules): One Pollution Potential is assigned to each Optimal, Hospitable, Habitable or Unpleasant class planet, each time the owner of a *surface* colony with Industry activates the Taxation or Census Powers, even if the colony does not grow population during the Census. Pollution Potentials differ from Intervention Potentials because they are assigned to a specific planet. Thereafter each time the Taxation or Census Power is activated at a colony on the planet, there is a 5% chance per Pollution Potential that an enviro-event will occur on the colony planet. A random number of the Pollution Potentials are converted to a single Intervention Potential (not an IP+) which *must be used* on the planet by the Concierge in that turn to reflect environmental degradation. Alternatively, normal Intervention Potentials could simply be used for this purpose as fits the game story.

✓ Pollution Potentials is damage to the *planet* which is not specific to a colony or Native Population Type. There can be some grey areas. But any species that had a favorable Habitability Class will see the planet less favorably after industrial pollution.

The baseline percentages can be variable, depending on two factors: The perceived amount of actual time that has passed in Galactic Space between Regular Turns, and that certain planet’s ecosphere/biospheres might be deemed more or less fragile than others. There are many possible variables which are simply expressed here as a basic percentage chance; which the Concierge may adjust for whatever reason.

✓ “The major problem with modern ecological thought, according to [J.B.] Foster, is that it is far too idealistic and spiritual (20). By ‘idealistic’ Foster means that causation is attributed to ideas and ideologies as opposed to material conditions. By ‘spiritual,’ he is referring to the mystical and sacred stance taken toward nature by many ecologists.” – Frank Elwell, Macro Social Theory (2009), Kindle Edition, p. 80.

➤ Low Carb Colonies: Colonies that produce no RPs due to low population and no industry should not be assigned a Pollution Potential in most instances. These are low population and probably low eco-impact colonies. Colonies consisting of only orbital platforms probably will cause minimum pollution, and no Pollution Potentials, on the planet below unless they are strip mining the planet.

✓ See discussion of Romania in 1989, 5 Government Titles, p. 644, *infra*.

➤ Prescriptions: Re-watching Episode 4 of Cosmos, which aired on October 19, 1980, Carl Sagan did warn:

✓ “The hellish conditions on Venus are a reminder that this is serious business. Computer models that successfully explain the climates of other planets predict the deaths of forests, parched croplands, the flooding of coastal cities, environmental refugees,

widespread disasters in the next century unless we change our ways. What do we have to do? Four things. One: much more efficient use of fossil fuels. Why not cars that get 70 miles a gallon instead of 25? Two: research and development on safe alternative energy sources especially solar power. Three: reforestation on a grand scale. And four: helping to bring the billion poorest people on the planet to self-sufficiency which is the key step in curbing world population growth. Every one of these steps makes sense apart from greenhouse warming.”

I did not watch any of Cosmos when it originally aired, but saw it years later in high school science classes, re-runs on PBS, and in undergraduate college courses on VCR tape. If I saw the end of Episode 4 in the mid-80s, it didn't make any impression and it didn't affect by 8th grade courses. But we were first warned of global climate change in at least 1980.

“Polynesian subsistence had the greatest effect on societal development. Some remained or reverted to hunting and gathering because their islands could not support serious agriculture, while others developed advanced agricultural technology to either deal with difficult climates or take advantage of abundant ones. This impacted population growth and densities, which in turn impact political structures.”

– Jared Diamond, Summary of Guns, Germs, and Steel, Kindle Edition (2017), pp. 8-9

Homeworld Habitability: Homeworlds are, or were, Optimal planets for the species that evolved on them. Prior to the game beginning, there may be Fundamental Realities that reduce the Habitability Class and Maximum Habitability of a Homeworld, but barring that, the default assumption is that a Homeworld is automatically an Optimal Planet with a Maximum Habitability of approximately 100 population factors (which can be shorthand written as Optimal 100).

- ✓ **Doctor Who:** You forgot the last time. You remembered the fear and you put it into fairy stories. It's a human superpower, forgetting. If you remembered how things felt, you'd have stopped having wars. And stopped having babies. – Dr. Who, “In the Forest of the Night” (2014).
- **Lebensraum:** Each Native Population Type may have only *one colony* per planet, *all* factors of a Native Population Type on a planet surface and in orbit (i.e. Orbital Cities) are considered *one colony*. Any number of different Native Population Types may colonize a planet – which becomes a ***Balkanized Planet*** – which is to say that the only way to prevent aliens from Landing on and colonizing planet is combat. When two or more species occupy the same planet, the Maximum Habitability of the planet for each population type is reduced by the percentage of the planet occupied by all of the other races.
 - ✓ For example, Populations A and B occupy a planet. Population A sees the planet as a Habitable Planet with 40 population Maximum Habitability, while Population B sees the planet as an Optimal Planet with 100 population Maximum Habitability. Population A has 30 population factors on the planet, therefore, they occupy 75% of the planet, leaving only room for 25 population factors of Population B.
 - ✓ A position may, through conquest, come to own more than one colony on a Balkanized planet, each with a different Native Population Type; this does not violate rules. For all purposes in GGDM, each colony on a Balkanized Planet ***is treated separately***

even if owned by the same position, including in defense. Cooperation may be developed in-game by means such as Trucking, Carting (4 Commerce, *infra*) and Writs.

- For the scheming types... owning two colonies on a Balkanized planet may be Constructural Elements insurance for placing adjacent Fuzzy Groups and Research Groups (see 4 Culture, p. 405; 2 Technology, p. 700, *infra*).

Any game mechanic that is dependent upon the number of population factors on a colony is pro-rated on Balkanized Planets where appropriate. One purpose in activating the Census Power might be to fill remaining spaces on Balkanized Planets, squeezing the aliens.

- ✓ It's a cold evening, I have six cats that live on my porch. I have five heated cat houses, three single and two double, theoretically, there is room for seven cats in the heated cat houses. I have even seen three cats in the double cat houses and two cats in singles in the past. But there's always the social aspect; some cats do not want to sleep with some others. And so I have a small adult tabby neutered female shivering because she either doesn't want to sleep with certain horny tomcats, or a juvenile almost-a-tomcat male kitten, or a rival neutered female, or doesn't want to squeeze into a single cat house where her neutered long-time boyfriend is sleeping. I went out later and she was sleeping in the single cat house where her boyfriend *had been sleeping*.
- Structural Sophistication: The Late Bronze Age collapse in the Middle East was occasioned, in part, by the inability of the political and cultural structures (mainly city-state kingdoms) to handle both the pressure of expanded populations and mass migrations from the North and East (piracy and invasion by the Sea Peoples also jeopardized cities and the supply of tin).
 - ✓ The collapse in Mycenaean Greece was particularly complete, as for two centuries following the widespread and mysterious destruction of the Mycenaean palaces (around 1100 B.C.) there is evidence of very sparse population and little metal working. The classic explanation of Dorian invasion has not worked out well upon investigation, as there is little evidence of the 'Dorian' society until at least 950 B.C. Still, there was clearly movement from the north of Danubian tribes, clans, and families gradually filtering southward into the available lands until enough population density accrued that cities arose again. The semi-mythical foundation of classical Sparta, for example, coincides roughly with the first evidence of the 'Dorian' period.

China is currently testing the limits of how much population can be governed by a mid-late 20th Century political structure. There have been many proposals to divide California into smaller states. For GGDM purposes, participants should assume that the Homeworld is populous enough that very sophisticated cultural and political structures developed pregame.

- Global Civilization: Global Civilization is a hot-button topic, one with enough weight to influence elections in the 21st Century. The sides agree on one point: It seems to be inevitable and unstoppable as a process. Those who want it cheer, those who don't want it scream, grumble, wave their arms, some are caught in the middle because it is their livelihood.
 - ✓ "In recent decades Western civilization has arguably starting [sic] to morph into the first truly Global civilization. Of course it has been a 'Global civilization,' in one sense, for centuries, ever since it started to span with planet with its trade networks and colonial off-shoots. What has been new, since the Second World War, is that non-Western countries around the world have been emerging a centres of political,

economic and cultural influence, whilst the influence of the old centres of Western civilization in Europe and North America have been in comparative decline. ...

As time goes by these trends will all become clearer. Of course, it will – already is – provoke some people all over the world to draw in on themselves. But, though it takes longer than some people expect, it is a process that cannot be stopped. What will emerge is a civilization which puts down roots in, and draws inspiration from, different parts of the world. Scientists, programmers, thinkers, poets, artists, architects, entertainers, entrepreneurs and statesman from right around the world are already playing their part on global advance, and this will become more and more the case in the future.” – TimeMaps Encyclopedia (timemaps.com) article, “A Global Civilization,” (no author attributed), captured August 27, 2019.

- One and All: c.f. “The modern world arguably features four global civilizations, each of which spans much of the world’s population and territory. The nations within a global civilization share a common cultural foundation, despite their vast cultural diversity.” – from essential-humanities.com, article “Global Civilization,” captured August 27, 2019.

The Essential Humanities article then goes on to identify the four current global civilizations as Islamic, South Asian (India and neighboring regions), East Asian (China-Japan and Indochina) and Western (European and all of the colonial offshoots). The map with the article shows the areas of each civilization, but sub-Saharan Africa is not included in any of them.

I found this concept at least interesting and colorable at first glance, but of course, it depends on whether you are thinking of global civilization as one wholistic idea or as four globe-spanning spheres of influence (i.e. how to slice the pie). The author doesn’t cite to any references for this idea, and I could not find any mention of it except on essential-humanities.com, so this may be an original concept of the author of the article. The article is very bare bones and basic, as is the site, and the site may be inactive since about 2013.

Compare this to the concept evident in the TimeMaps.com article cited above: TimeMaps implies that Western Civilization is becoming *the* global civilization; that other civilizations have been westernized by contact and are becoming part of that civilization. This is not a view – echoing 19th and 20th century ‘White Man’s Burden’ ideology, even if unintentionally – that will make non-Western readers happy, but it is colorable. In this view, global civilization is one wholistic idea, which, because of the history of the world, consists of Western civilization and it’s naturalized ‘satellites’ slowly morphing into *a* global civilization.

“Hollerith, in a scientific paper published in the School of Mines Quarterly in 1889, suggested that ‘few who have not come into contact with a census office can form any adequate idea of the labor involved’ in taking a census. It was estimated that the census of 1890 would count around 62 million Americans, yet the method employed would be essentially the same one used since the Babylonians: ‘that of making tally marks in small squares and then counting and adding such tally marks...’ Hollerith pointed out that the increase in cost of the census greatly exceeded the growth of the population.”

– Joel Shurkin, Engines of the Mind (1984) ⁸

Endnotes.

¹ **Commentary:** The English-language Russian-made movie *Attraction* (2017) is an example of a cheesy first contact film. The film started out fine, but after all the alterity buildup, we find out that the aliens are just humans from another planet. Because they didn't have the budget (or intellect) to do that kind of movie, humans are cheaper. Then it turns into an alien-teen human romance with the daughter of the Russian Colonel, who has daddy issues, who is also associated with a group of Russian teens who seem to act just like American movie teens. It seemed to have been quickly forgotten (after about the 45 minute mark) that over 200 people were killed, and a section of Moscow laid waste by the alien craft crashing into the city – because Russian aircraft shot it down with air to air missiles, despite the fact that no electronics are supposed to function in the vicinity of the ship (a standard SF trope). There are also multiple narrative discontinuities where scenes jump and situations resolve themselves without explanation or imagery – because they had to trim the movie to 2 hours 12 minutes, which is twice as long as the idea merited. Or because the writers didn't have any idea how their characters would escape that ridiculous situation they created, so they just cut to the next scene of them walking away free and unhurt, without explanation. I turned it off a little more than halfway through – when she took the alien back to her daddy's apartment for dinner, I could see awkward stupidity about to ensue – and instead read the plot summary on Wikipedia which didn't make me sorry to have skipped the remainder of the movie. Yet apparently the film received good reviews, has a good rating and did well financially. I am sure the young female audience enjoyed it, the alien-teen human romance is not functionally different than the vampire-teen human romances (e.g., *Twilight* (2008)) that swooned the screen over the years – the 'love conquers all differences' trope.

² **Commentary:** In recent years, scientists have discovered billions of tons of biomass in the form of bacteria living under the surface of the Earth, down to 5 km on land and 3 km under the sea bed. This life never sees the sun.

³ **Commentary:** Picture the scene. A Christian is preaching to a crowd in the square, saying that those who do not accept Jesus in their hearts will go to hell when they die. Then someone yells out, "What about Socrates, Plato, Aristotle?" Uh-oh, confused looks, the crowd is murmuring, house of cards just collapsed, beat a hasty retreat!

⁴ **Commentary:** And while we are at it ... to make the absurdity even worse, Dante learned that Adam, Abel, Noah, Moses, Abraham, David, and Rachel – all of whom lived in the old testament before Christ and could not then have been evangelized – were previously resident in the first level of hell with the virtuous pagans, but were scooped in the Harrowing of Hell and taken (undeservedly) to heaven! Humph! My mind is doubled over with laughter!

⁵ **Commentary:** Before the movie *Arrival* in 2017, there was a different sort of aliens movie called *The Arrival* in 1996, in which, the aliens, seeing that we were intent on polluting our planet (which made the climate better for them), decided to help us along toward climate change oblivion so that they could colonize Earth after we perished.

⁶ **Commentary:** Back around the turn of the millennia, I played in a PBEM game where population was converted directly into armies and missile units, or would grow slowly if left untouched. This mechanic – unrealistic in anything but a zombie apocalypse movie – led to the game being dominated solely by 'steamroller' tactics (as the players called them) where players would conquer, convert the entire population into armies and missile units (like zombies), and roll on to the next province, leaving nothing behind (no need to garrison) because the victory conditions were 'last-man standing.' Steamrollers completely dominated the game (which was becoming boring, the flaws of its over-simplicity were becoming apparent) until I won the first World of Kaomaris "World Championship" game, against the top steamrollers, by playing differently, oppositely. The steamrollers destroyed each other, such that I was left with only two opponents when I finally made a move; I trapped them into damaging each other greatly in a huge final battle and I was able to clean the table with my fresh armies against two diminished enemies. During the six months approximately that the Championship game was in progress, discussions were raging on the forum about how to 'fix' the game and by the time the Championship game had finished, the game was radically different.

⁷ **Citation & Commentary:** "Sirhan had violated three California laws merely by possessing the pistol he used to kill Robert Kennedy. Thus, if Sirhan were simply an unwitting patsy involved in a conspiracy, the conspirators must have knowingly chosen a man who had been risking the whole conspiratorial venture by possessing an illegal weapon and firing it at a police range. Had Sirhan been caught with the illegal weapon, the purported conspiracy would have collapsed." – from Wikipedia article, "Assassination of Robert F. Kennedy," citing to Mel Ayton, *The Forgotten Terrorist – Sirhan Sirhan and the Assassination of Robert F. Kennedy* (2007), pp. 109-110.

- ✓ Would there be so many conspiracy theories about the assassination of Robert F. Kennedy if John F. Kennedy had not been previously assassinated?

⁸ **Commentary:** Hollerith invented the electric tabulating machine that was first used in the 1890 census. His company was one of four that merged to become IBM in 1911. IBM is iconic in the history of modern computing.