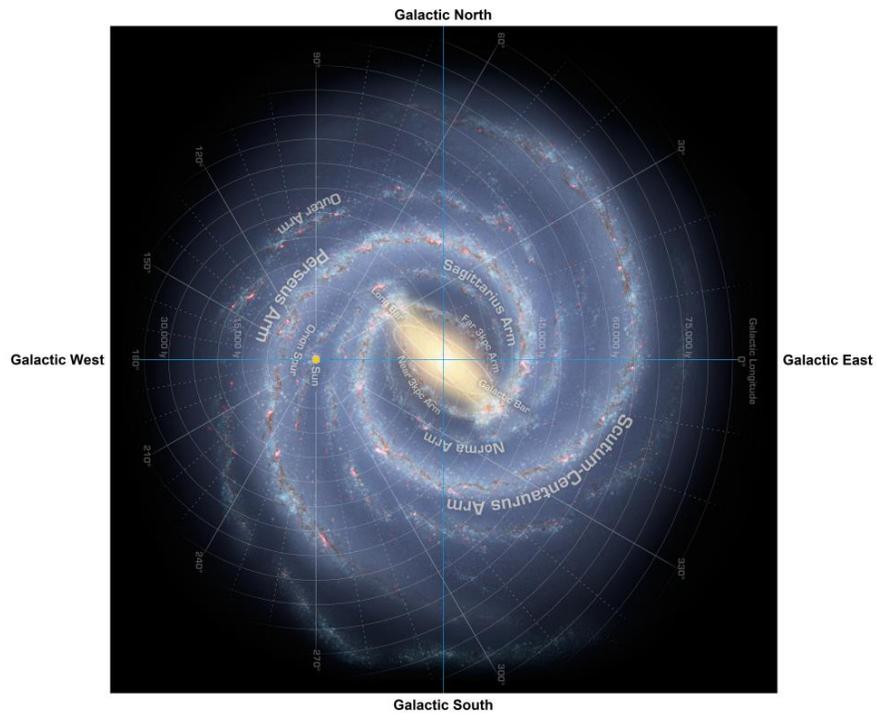


AN ATLAS OF PIPER'S GALAXY



JOHN A. ANDERSON

DECEMBER 2020

LAST MODIFIED: FEBRUARY 10, 2021

1. “A Star Map of Federation and Empire”

From John F. Carr's biography, we know that H. Beam Piper had experience with surveying, and he also appears to have been familiar with topographic maps.¹ Taken together, these suggest that he had more than the average layman's knowledge of geography. In this regard, Jerry Pournelle once wrote that Piper's “extensive notes have never been found; yet I know that he kept a well-organized set of loose-leaf notebooks, with entries color-coded; a *star map of Federation and Empire*; a history of the System States War; and other materials...Somewhere out there is a gold mine.”²

Since Beam was apparently working to a map for his Future History, he must have had some definite ideas on where certain planets were located in relation to each other. However, while he included quite a few distances in his stories (*Space Viking* in particular), these are few compared to the number of planets in the Terran Federation (500), the Systems States Alliance (130), the Sword-Worlds (12) and the First Galactic Empire (1,365). Moreover, directions are hardly ever given.

Nevertheless, from the meager data he provided, plus what we can deduce from his historical models, it might be possible to create star maps of Beam's Federation and Galactic Empires. Of necessity, these will be tentative and imperfect charts. Not only due to lack of data, but because there are inconsistencies and outright errors (many seemingly deliberate) scattered throughout Piper's stories.

2. Galactic Orientation

In “Ministry of Disturbance”, Emperor Paul XXII says that the First Galactic Empire is located “on the western side” of the galaxy.³ It is likely that this is a holdover from the time of the Terran Federation, when interstellar travel first occurred, and large-scale mapping began. Probably under the aegis of “The Astrographic Commission”, which dictates how discovered planets and stars are named,⁴ and thus how they will appear on Federation charts. So the orientation for Piper's galaxy should locate Sol on the left, or western, side. The galactic equator (if we can call it that) would be a horizontal line running through Sol and the center of the Milky Way, while the ‘prime meridian’ would be a vertical line, probably running through the galactic core.

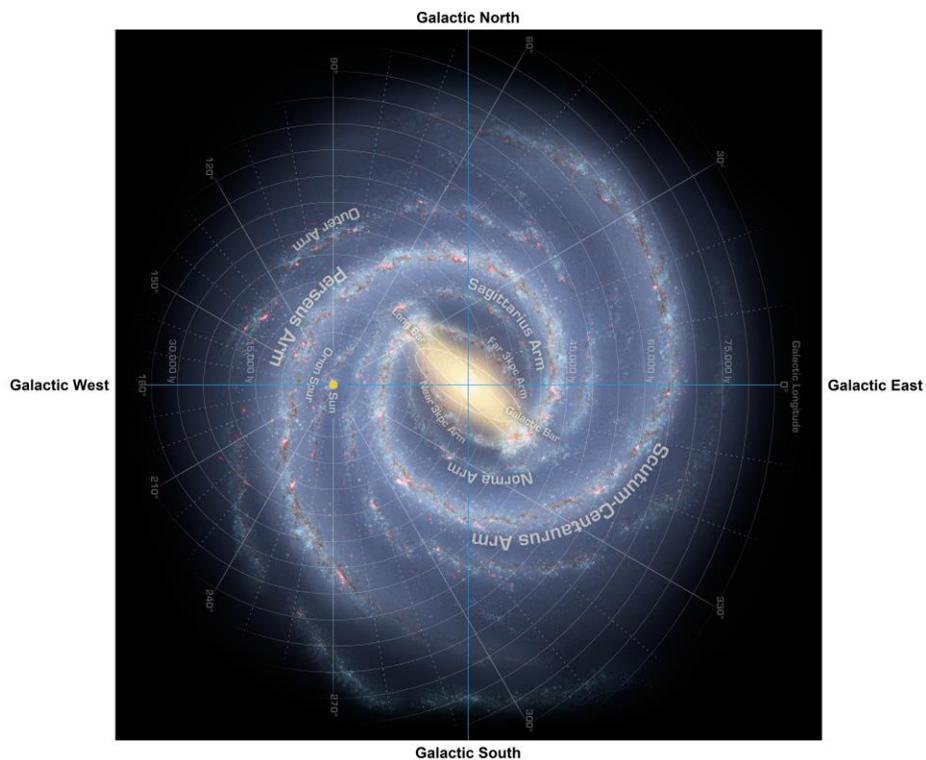


Figure 1. Piper's Milky Way galaxy, with Sol “on the western side”.⁵

3. From the New World to 'New Worlds'

Piper was proud of “the Good Ol’ U.S of A.”, and “always made a big deal out of July 4th!”⁶ And when we compare his galactic orientation with a standard map of the world, the American continents seem to make a pretty good parallel with the western arms of the galaxy. Particularly the Orion Arm, which of course is where we Terro-Humans reside. The Orion Arm is about 10,000 light-years long, a great curve running from the galactic northeast to southwest to south.⁷ In a roughly parallel fashion, the Americas run in a great 10,000 mile long curve from the northeast (Greenland) to the southwest (Mexico) and then turn southeast and south (through Central and South America) to Tierra del Fuego.⁸

Thus, the New World seems to parallel the ‘new worlds’ which will be discovered as Terro-Humanity moves out into the galaxy. The interarm gaps separating the Orion Arm from its neighbors to the east and west, the Sagittarius and Perseus Arms, would then parallel the Atlantic and Pacific Oceans on either side of the Americas.⁹

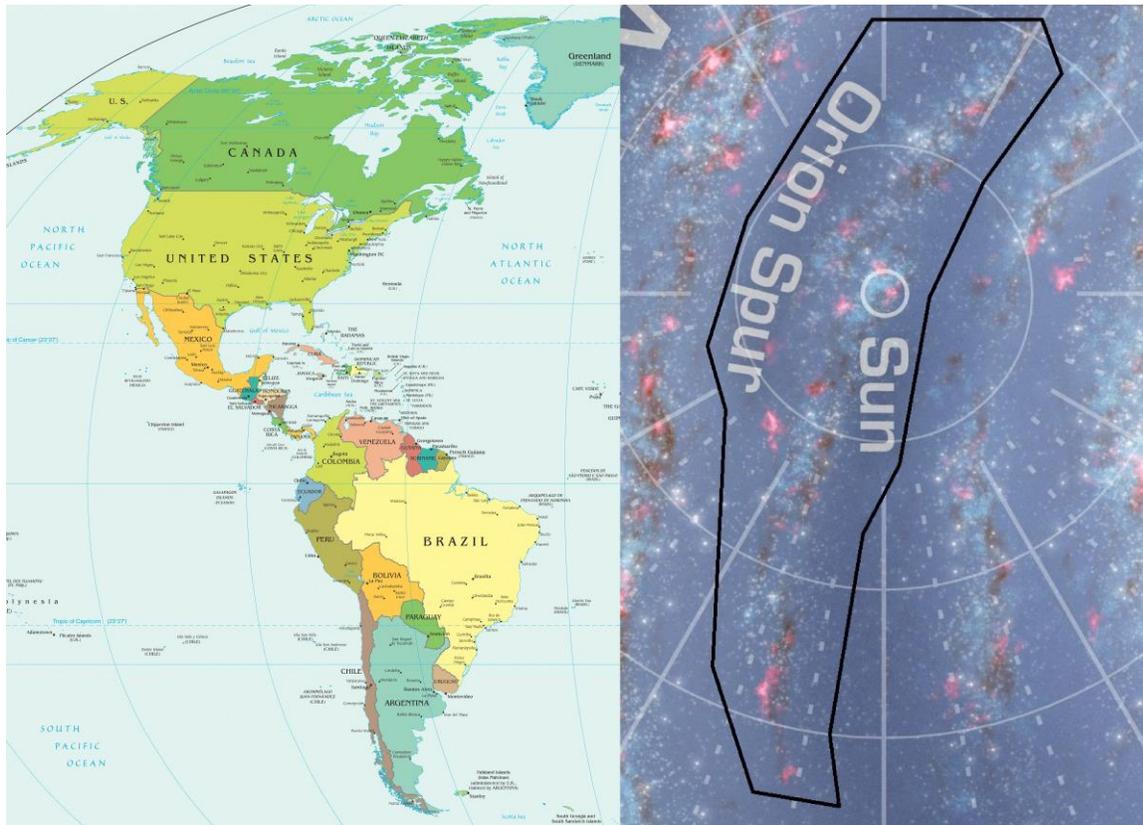


Figure 2. Close up of the Orion Arm in the western galaxy, compared with the Western Hemisphere.¹⁰

4. The Anglo-American Terran Federation

The side-by-side comparison in Figure 2 reveals that the location of Sol, in the north-central Orion Arm and near its inner or eastern edge, is roughly analogous to the East Coast of North America. Specifically, it's not too far south of the locations of Jamestown, Virginia (where the first successful English colony was established) and Washington DC (capital of the United States). This can help to explain Piper's use of Anglo-American models for the Terran Federation. It has an American-style President and Constitution, but also a British-style Parliament,¹¹ and its chartered planetary companies (like the CZC on Zarathustra) parallel historical firms like the British East India Company.¹² Beam also used Anglo-American models for Federation events. The Uller Uprising is modeled on the Sepoy Mutiny in India,¹³ and the System States War seems to combine the American Civil War with elements from the Pacific Theater of WWII, fought mainly between the US and Japan.¹⁴

5. American and Federation Expansion

Given Sol's position, the early expansion of the Terran Federation will be chiefly along the Orion Arm's eastern edge. This parallels the expansion of the English colonies along the eastern seaboard of North America. And since the interarm gaps are largely (though not totally) devoid of stars, the Federation's later expansion will be mainly deeper into the Arm; to the north, northwest, west and southwest. This parallels American expansion deeper into the continent. To the northwest (the old Northwest Territory; now Michigan, Ohio, Indiana, Illinois, Wisconsin and a large slice of Minnesota), west (Kentucky and Tennessee) and southwest (Alabama and Mississippi).

In Figure 3 below, I have also included US attempts to expand north into Canada (unsuccessful) and south into Florida (successful). Because if the British and Spanish (and their successors the Canadians and Mexicans) had not been in the way, the US would have expanded roughly equally in these directions as well, rather than mainly westward across the continent. And with no enemy civilizations in the way, I presume this is how the Federation expands; more or less equally in all directions, rather than mainly westward across the width of the Orion Arm.

Until now, my mental image had Sol at the exact center of the Federation. But as it expands deeper into the Arm, Sol gradually loses its central position, becoming offset to the east, just as Washington did as America expanded. As we will see, this later plays a role in Odin becoming the capital of the Galactic Empire.

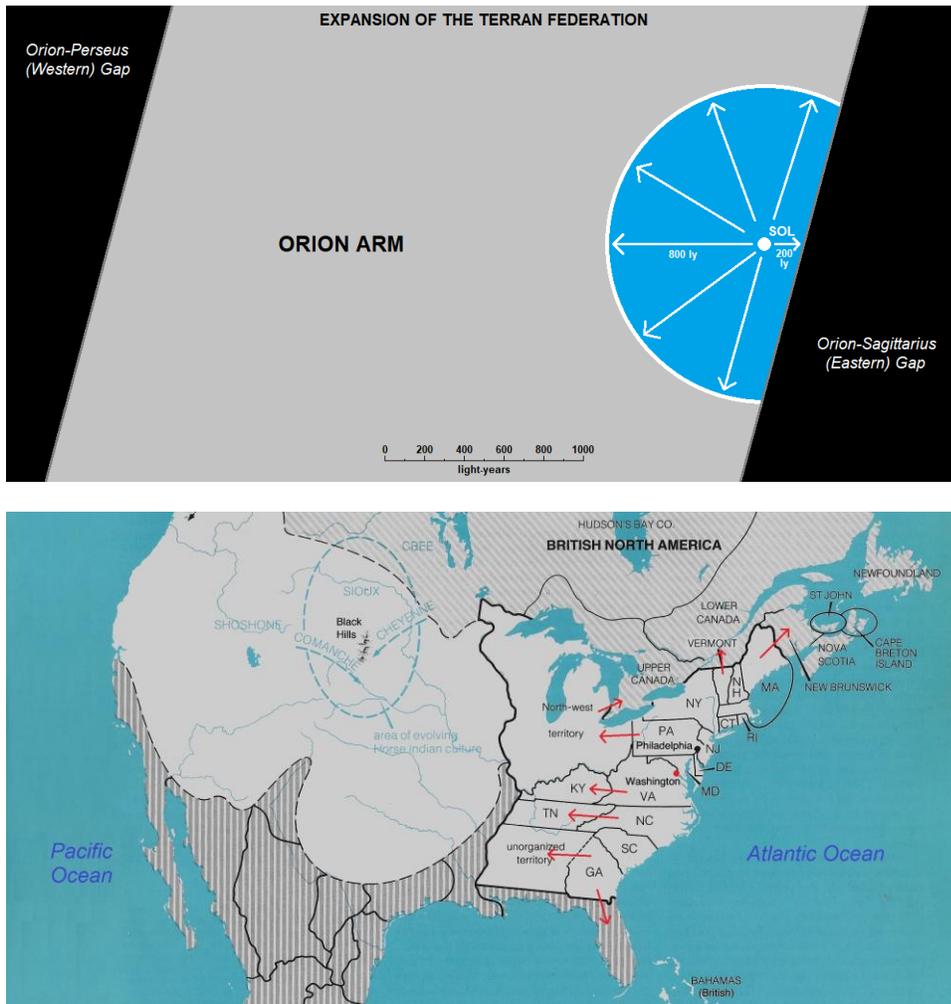


Figure 3. Estimated maximum extent of the Terran Federation, compared with early expansion of the United States. ¹⁵

When Piper began his Future History in 1952, it had recently been discovered that Sol's position in the Orion Arm was "not quite at the inner edge but 100 or 200 light years inside it."¹⁶ Washington parallels this distance fairly well, being about 100 miles west of the Atlantic Ocean (not counting Chesapeake and Delaware Bays).¹⁷ More current maps place Sol 300 to 500 light-years from the inner edge, but in order to stay true to Piper's time, I have located Sol at the upper end of its original range; 200 ly inside the Arm.

Then I gave the Federation an estimated radius of 800 light-years. This may be an underestimate, but I did it because the stated distances to various planets provided by Piper are all much less than 1000 light-years from Sol. For example, Freya at 700 light-years ("When in the Course—"), Fenris at 650 (*Four-Day Planet*), and Zarathustra at 500 (the Fuzzy novels).¹⁸ Another reason was because these distances did not make sense, as the trend is for later-colonized worlds to be *closer* to Terra, rather than farther away. Freya is colonized before Fenris, but is farther from Terra; and that's the case with Fenris as well, which is colonized before Zarathustra, but is farther from Sol. This suggested the presence of at least one of Beam's 'deliberate mistakes'.¹⁹

In any case, the resulting shape of Federation space is a truncated circle, or semicircle; with an east-west diameter of an even thousand light-years, and a north-south diameter of 1600. As seen in Figure 3, this estimated extent seems similar to the expansion of the US out to the Mississippi River. It must be noted that the inner edge of the Orion Arm is not as conveniently straight as I have made it on my simplified chart. But the Arm's irregularities will parallel the bays, capes, peninsulas and other natural features along the American coast. If the gap contains individual stars with habitable planets, and wisps of interstellar gas with such stars, these will parallel offshore islands like Bermuda, and the islands and cays of the Caribbean.²⁰

Parenthetically, this configuration calls into question Otto Harkaman's statement that "the Old Federation...occupies a space-volume of two hundred billion cubic light-years."²¹ In the vicinity of Sol, the Orion Arm was estimated in Beam's time to be about 1300 light-years thick.²² If we multiply the Federation's estimated east-west diameter of 1000 ly by the north-south diameter of 1600 ly, and then by the thickness of 1300 ly, we get a space-volume of slightly more than 2 billion cubic light-years, not 200.

In order for Harkaman's number to be correct, the Federation should have expanded out to roughly 6500 light-years from Sol. In Figure 4 below, this is the large light blue circle which extends beyond the limit of the source map. Multiplying the diameters by the depth (13,000 x 13,000 x 1300 ly) results in a space-volume of 219.7 billion cubic light-years within that circle. But this means the Federation would have not only expanded across practically the entire Orion Arm, it would have crossed the gaps to either side and included large sections of the Perseus and Sagittarius Arms. More importantly, a radius of 6500 light-years grossly violates Beam's Federation stories, in which the mentioned distances from Sol are all less than 1000 ly. That range is delineated by the innermost light blue circle in Figure 4.

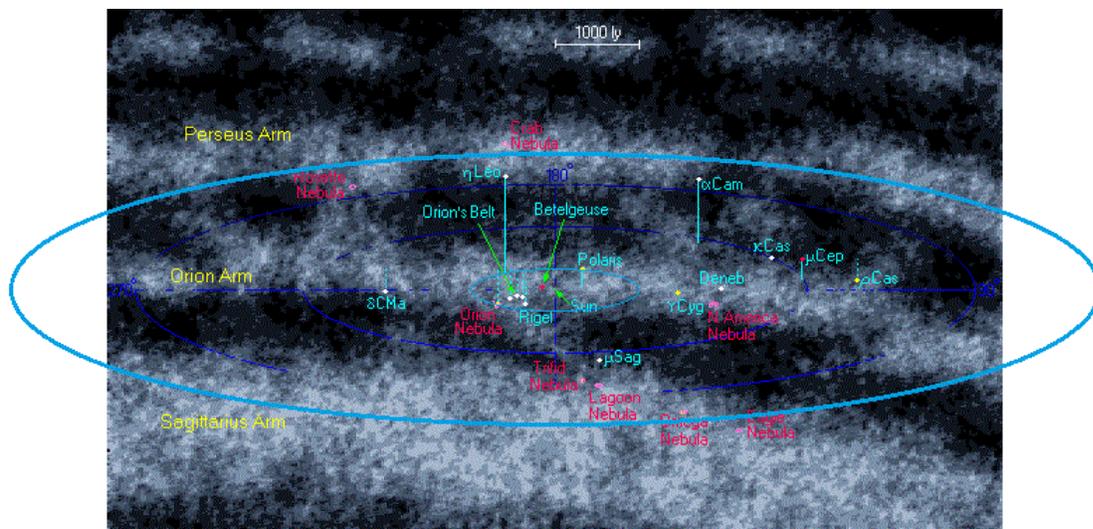


Figure 4. The Terran Federation with "a space-volume of 200 billion cubic light-years", as seen from the galactic east.²³

The 200 billion cubic light-year figure may therefore be another one of Beam's deliberate mistakes. Possibly intended to dramatically emphasize, in the reader's mind, how hard it should be for Lucas Trask to hunt down Andray Dunnan. Harkaman says that "Dunnan could die of old age...before you caught up with him. And your youngest ship's-boy could die of old age before he found out about it." Trask replies that "Well, I can go on hunting for him till I die, then. There's nothing else that means anything to me."²⁴ But the Old Federation appears to be 100 times smaller than Beam says it is, and Trask does finally catch up and kill the villain, at the end of *Space Viking*. It takes him less than 10 years to do it, rather than a whole lifetime—or never—and so was much easier than it could have been.²⁵

Now back to our analysis.

6. From Confederate States to System States

The American parallel can also indicate the location of the System States Alliance. There is plenty of evidence to show that Piper used the American Civil War as the main model for the System States War. John Carr was the first to enunciate this parallel, calling the Federation-Alliance conflict "an economic war as brutal as the War Between the States."²⁶ Thus, the Civil War model suggests that the worlds of the Alliance are to the galactic 'south' of Sol. That is, toward the tail end of the Orion Arm. The Southern States possessed a long seaboard on the Atlantic Ocean (including the Gulf of Mexico), so the Alliance will possess much territory along the eastern edge of the Orion Arm, south of Sol.

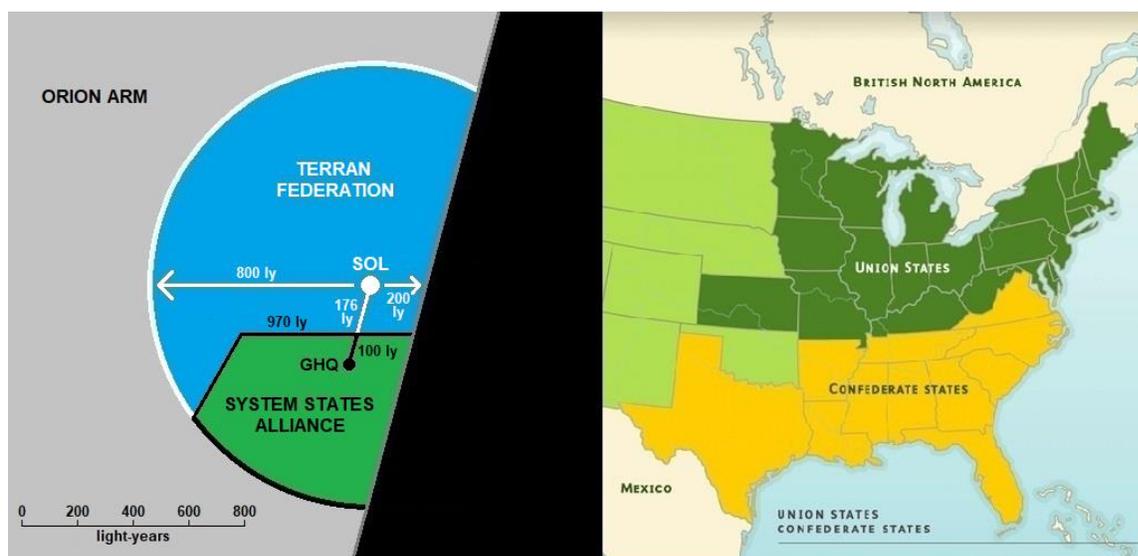


Figure 5. Estimated extent of Federation and Alliance space, compared to the Union and Confederate states.²⁷

At its greatest extent, the Federation contains 500 planets, 130 of which secede to form the Alliance.²⁸ This means the SSA includes about 35% of TF territory; 130 planets versus the 370 still in the Federation. A good parallel of the CSA at the start of the Civil War, which included about 35% of America. Eleven states formed the Confederacy, while the Union retained control of 23 states plus 8 western territories.

The map resulting from these deductions can explain Conn Maxwell's statement that the Federation "fought a war around a perimeter of close to a thousand light-years".²⁹ For as seen on the left side of Figure 5, a simplified, Civil War-like border between the Federation and the Alliance would be about 970 light-years long. The actual border undoubtedly varies a bit, paralleling the varying border between the US and CS states. Including these meandering stretches will add many more light-years to the total, thereby bringing the perimeter closer to Conn's figure.

Also included is the estimated location of the Alliance GHQ, which former SSA Col. Klem Zareff says was "thirty parsecs from the fighting".³⁰ Thirty parsecs is about a hundred light-years. The Federation's GHQ, Terra, would then be about 176 ly from the Alliance frontier. But given the fact that Washington DC was literally right across the Potomac River from the rebel state of Virginia, the Federation-Alliance border

in this section may be much closer to Sol than depicted on my map. The Alliance GHQ, southwest of Terra, would then parallel Richmond, Virginia; the Confederate capital southwest of Washington.

7. Internal Configuration of the Terran Federation

This would seem like a good time to make an initial estimate as to the internal configuration of the Terran Federation. Fortunately, Piper gave us some distances and directions with which to begin, and to this slender framework of data the known distances or times to other planets can be added. But this will involve untangling some of the inconsistencies and deliberate errors found in his stories.

There are several reasons for these problems. One is that “H. Beam Piper was never a hard science-fiction author, i.e., one whose primary interest was in technology and science.” As Beam himself put it, “my stories all have a political and social slant instead of a physical-science slant”.³¹ He doesn’t appear to have been overly concerned about the ‘hard science’ details; unlike authors like Robert Heinlein, whose “stars are in their proper place at a given time of the year, and his space-flight formulas are mathematically correct.”³²

Another reason is that Beam was a secretive person, who purposely muddied the waters. Mike Knerr wrote about “The typical Piper way of hiding the facts...For whatever reasons, secrecy had become so deeply ingrained in Piper’s character by the time he reached fifty that it was a way of life. Like an old indian scout he was forever covering his back trail.” And, “Piper was an expert at confusing the issues and extremely careful how he did it.”³³

However, I believe it is possible to penetrate Beam’s veil of mystery, at least in part. His errors and inconsistencies mainly involve the distances between planets, and the time it takes to reach them. Either the speed is correct, or the distance; it cannot be both. It’s best to start at the beginning, so let’s look at Beam’s very first Federation story, *Uller Uprising*, published in 1952.

***Uller Uprising*, AE 526.** According to John Carr, “*Uller Uprising* became the foundation of Piper’s monumental Terro-Human Future History; the first story where we encounter the Terran Federation.”³⁴ The story was based on an essay by Dr. John D. Clark, which required Beam to use two planets orbiting known stars, which provides us with actual distances and directions. Uller circles Beta Hydri, a luminary located 21 ly from Sol; and Niflheim’s primary is Nu Puppis, at 148 ly out.³⁵

In the story, it takes a starship six months to travel from Niflheim to Uller, and another six months to travel from Uller to Terra.³⁶ Thanks to Nils Jeppe, we know that Nu Puppis and Beta Hydri both lie more or less in the same direction from Sol, and not much off a direct line.³⁷ This means that a ship traveling the longest leg, between Niflheim and Terra, should take about a year.

Right from the start of his Future History, however, Beam inserted a deliberate error. After the Uprising breaks out on Uller, General Carlos von Schlichten says that the beleaguered Terrans will have to wait a year for a relief mission to arrive from Sol. But Uller is only 21 ly from Terra, while Niflheim is seven times farther out. How can it take a year to travel a 42 ly round trip to Terra, while taking the same amount of time to travel 148 ly from Terra to Niflheim?

In order to retain the integrity of Piper’s story, however, I think we have to take the trip time as fact. A rescue mission will take a year to arrive. Thus, the position of Beta Hydri cannot be correct.³⁸ It should be about half as far from Terra as Niflheim; or roughly 76 ly, rather than 21. So a trip of 76 ly from Terra to Uller, or from Uller to Niflheim, would each take about six months; while one of 148 ly between Terra and Niflheim takes about a year. A standard hypership would then travel at approximately 59 hr/ly. Because one year is 365 days, which converts to 8,760 hours, then divide that by 148 ly.

***Uller Uprising* takes place in Atomic Era 526. So an important point to keep in mind is that hyperdrive speeds prior to this date cannot be faster than 59 hr/ly!** And that fact can help us to correct the deliberate errors found in “When in the Course—” (which occurs circa AE 234) and *Four-Day Planet* (circa AE 495). Because the estimated figure of 59 hr/ly is close to numbers contained in both.

“When in the Course—”, circa AE 234. In this story (which Beam finished eight years after *Uller Uprising*, in early 1960), it is said that the planet Freya is located 700 ly from Terra, a trip which will take the *Stellax* six months to travel.³⁹ Six months is 182.5 days, which converts to 4,380 hours. Traveling 700 light-years in 4,380 hours means the *Stellax* has a speed of 6.257 hr/ly. That figure obviously can’t be right, because it’s more than ten times faster than the speed in *Uller Uprising*. Hyperships cannot

have gotten *slower* between AE 234 and AE 526! But if we read “70” ly rather than 700, it will take the *Stellex* six months to travel from Freya to Terra, at a speed of 62.57 hr/ly (4,380 hours divided by 70). This is not far off our working estimate of 59 hr/ly.

Next, it is also said that the *Stellex* will take “three months” to travel from Freya to Yggdrasil and back, which is only 20 light-years away.⁴⁰ Each 20 ly leg of the trip should therefore take about 6 weeks. Six weeks is 45.625 days, or 1,095 hours. Divide the number of hours by the number of light-years, and the *Stellex* travels 1 light-year every 54.75 hours. Again that can’t be correct, because it too is faster than the speed in *Uller Uprising*. So if we assume the real speed is 62.57 hr/ly, the *Stellex* takes a little over 52 days, or more than seven weeks, for the 20 ly trip to Yggdrasil. That means the round trip actually takes closer to four months than three, and Piper’s characters do mention that the *Stellex* is gone “almost a month longer” than expected.⁴¹

For mapping purposes, here we should note that the planet Loki is only “a three-months’ reaction-drive voyage from Yggdrasil”,⁴² which seems to place it in the same stellar system. So Loki is also 20 ly from Freya. Adriaan de Ruyter adds that Freya is “closer Terra than Yggdrasil”, which is “right next door.”⁴³ These references suggest that Yggdrasil and Loki are farther from Sol than Freya, and off to one side. The two planets are therefore somewhat more than 70 ly out; perhaps 75 or 80.

Four-Day Planet, circa AE 495. Then in *Four-Day Planet* (also written in 1960, and in fact right after “When in the Course—”),⁴⁴ we finally get an actual figure. Walter Boyd muses that “A ship can log a light-year in sixty-odd hours, but radio waves still crawl along at the same old 186,000 mps.”⁴⁵ “Sixty-odd hours” fits the 62.57 hr/ly speed from “When in the Course—”, but not the estimated speed of 59 hr/ly in *Uller Uprising*. Thus, the rate at which the *Peenemünde* travels from Terra to Fenris is probably the same deduced speed that the *Stellex* travels the 20 light-years from Freya to Yggdrasil—62.57 hr/ly.

My conclusion is that 62.57 hr/ly is most likely Piper’s true figure for ship speeds, from AE 192 (when the first hyperdrive ship is sent to Alpha Centauri)⁴⁶ to at least AE 526 (*Uller Uprising*). Standard hyperships can travel a light-year in 62.57 hours, or exactly 70 ly in six months. At 76 and 148 ly from Sol, that would mean Beta Hydri is more than six months away, and Nu Puppis more than a year out.

But this speed reveals a deliberate error in *Four-Day Planet*. Walt lives on the planet Fenris, which is supposedly “six hundred and fifty light-years to the galactic southwest of Sol”, and a hypership will once again take six months to travel to Terra.⁴⁷ If the ship speed is correct, however, it will take more than 4 and a half years to get to Terra (62.57 hr/ly times 650 ly), not 6 months. And if the distance is correct, then the ship speed is about ten times faster than Beam says it is, which contradicts the speed in *Uller Uprising*. So once again, Piper appears to have multiplied the true distance by ten. Because if Fenris is only 65 ly from Terra, then it will take slightly less than six months to travel that distance at 62.57 hr/ly. Sixty-five light-years multiplied by 62.57 hr/ly = 4,067 hours, which is 169.5 days. This is not much less than six months, which as we’ve seen is 182.5 days.

The corrected distance of 65 ly therefore confirms that it will take Walter Boyd, Tom Kivelson and Bish Ware about six months to reach Terra, after they leave at the end of the novel. It’s actually 13 days less (182.5 minus 169.5), so that if they leave Fenris exactly six months before their college classes start, Walt and Tom will have almost two weeks on Terra to settle in and get used to “a world where you go to bed every time it gets dark and get up when it gets light, and can go outdoors all the time.”⁴⁸

Now for the location of Gimli. Interestingly enough, the vast majority of *Four-Day Planet* seems to take place over a four day period. On day 1 the *Peenemünde* arrives on Fenris, and Bish Ware meets ‘Dr. Watson’, who is really “Detective-Major MacBride of the Colonial Constabulary.” Bish sends MacBride on to Gimli, in order to arrange for a Space Navy destroyer to come back to Fenris. There, it will pick up Anton Gerrit, alias Steve Ravick, and take him back to Terra to be tried for “the enslavement of from twenty to thirty thousand Lokian natives...most of whom were worked to death in the mines.”⁴⁹

Gimli is “the next planet out” on “the Terra-Odin milk run”, so it must be farther than 65 ly from Sol.⁵⁰ It is not stated when MacBride leaves Fenris, nor what ship he takes to Gimli. One would assume that he leaves very soon, probably just a day later. On day 2 he could therefore depart on the *Peenemünde*, assuming the ship only needs one day to offload passengers and cargo, and take on who and whatever is going on to the next stop. Anyway, two days later, or day 4, the main story ends, and Bish Ware says the TFN destroyer *Simón Bolívar* should be arriving on Fenris “in about two hundred and fifty hours.”⁵¹

Adding 250 hours to the estimated 48 hours that have passed since MacBride departed equals 298, or

say 300 hours. Dividing 300 hours by the 62.57 hr/ly speed results in a round-trip distance of 4.8 light-years, or 2.4 each way. The time it takes to travel this distance is derived by dividing 300 hours by 24, which equals a round trip of 12.5 days, or 6.25 days each way.

Now let's put it all together. And Figure 6 below shows how things look so far. Fenris and Gimli are properly placed southwest of Sol, while the known directions of Beta Hydri and Nu Puppis seem to locate Uller and Niflheim to the galactic south-southwest. While this might make it appear that Fenris and Gimli are not too far from Uller, the Terra-Uller-Niflheim triangle is almost certainly not in the same plane as the Terra-Fenris-Gimli one. (This of course being the main problem in representing three-dimensional space on two-dimensional maps.)

The location of Freya directly east of Terra, and the locations of Yggdrasil and Loki to the southeast, are speculative, being based on my own mental image from reading the story. However, since Julio Almagro compares Freya to Venus,⁵² it might make sense. Because this arrangement would place Freya between Terra and the galactic center, the Core; even as Venus lies between Terra and the center of the solar system, the Sun.

Speaking of cores, Figure 6 gives us an initial glimpse at what can be called the 'Norse Core' of the Federation. "The first extrasolar planets, as they had been discovered, had been named from Norse mythology—Odin and Baldur and Thor, Uller and Freya, Bifrost and Asgard and Niflheim. When the Norse names ran out, the discoverers had turned to other mythologies, Celtic and Egyptian and Hindu and Assyrian..."⁵³ This statement by Piper certainly suggests that, on the whole, the Norse planets lie closest to Sol, with the other mythological planets at greater distances.

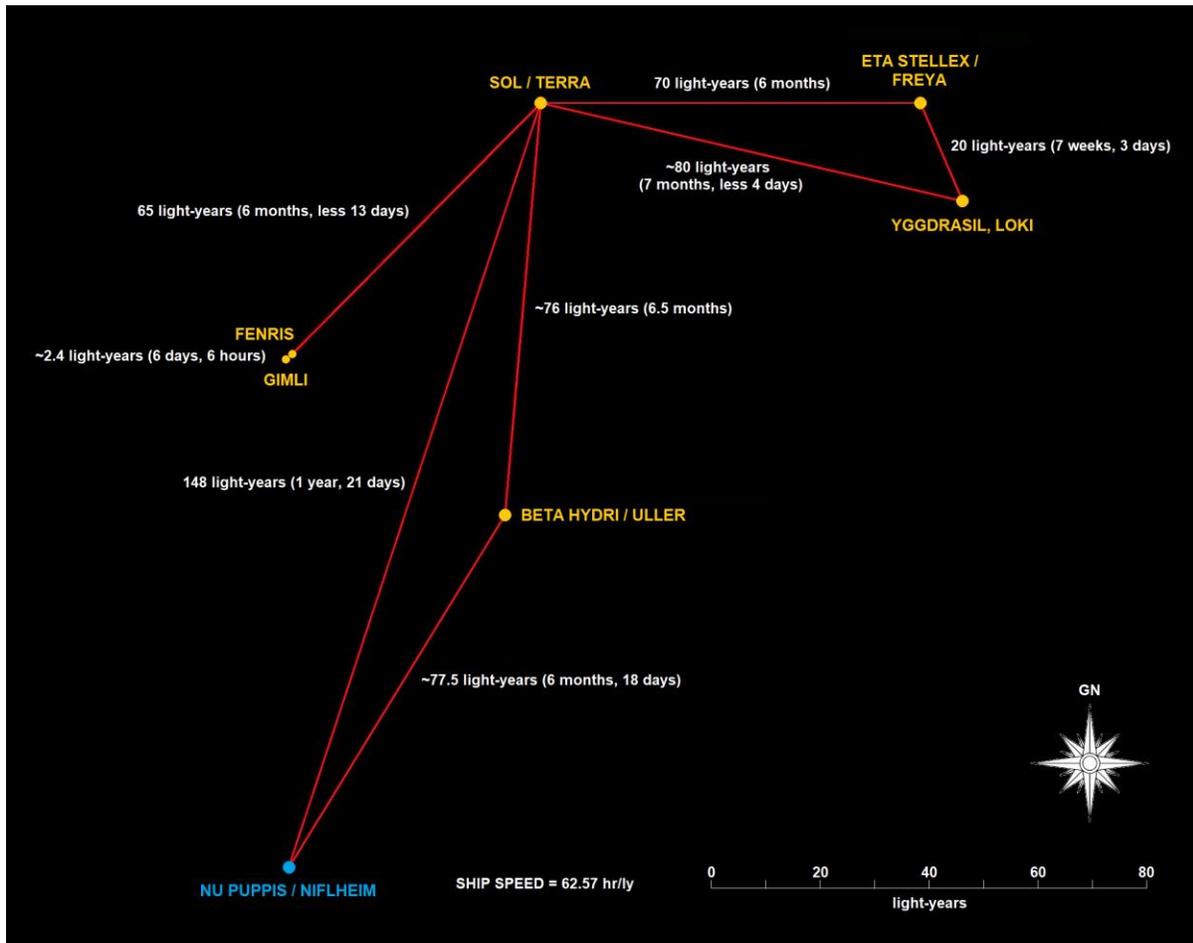


Figure 6. Initial estimate of central Federation space circa AE 500, using the 62.57 hr/ly speed.⁵⁴

So the Elektran system should be less than 1000 light-years from Sol, consistent with the other Federation distances in Piper's works. The median distance between the nearest and farthest stars in Canes Venatici, 27 and 970 ly, would be 471.5 light-years, or say 470 for convenience. This is not too different than the 521 ly distance to RS Canum Venaticorum, which is a binary system like Piper's Elektran system. And the 470 ly distance seems about right for a system discovered 57 years before Zarathustra (AE 572 compared to AE 629), which Piper says is 500 light-years out.

From a galactic source-map I found on the internet, Canes Venatici appears to be located southeast of Sol. So a 470 ly distance would presumably place the Elektran system in the Orion-Sagittarius Gap, among the stars of a cluster lying inside an 'island' of interarm gas.

As the commanding officer of a "Space Navy Exploration and Discovery" vessel, Captain Carpenter may have been traveling the stars for some years before reaching the Elektran system, similar to how the *Stellax* takes "four years" and visits "six systems" before finally discovering Freya.⁶³ I assume this means that the slower speed of 62.57 hr/ly is still in effect. But as we will now see, this appears to change by the time of the Fuzzy novels.

The Fuzzy novels, AE 654. *Little Fuzzy*, *Fuzzy Sapiens* and *Fuzzies and Other People* take place three-quarters of a century after *First Cycle*. And ship speeds appear to have increased in the interim. In *Little Fuzzy*, Zarathustra is located 500 ly from Sol, and it (yet again) takes the standard six months to get to Terra.⁶⁴ It seems logical that a planet named for an ancient Persian religious leader would be farther out than those named for the Norse gods. So that forces us to consider accepting both time and distance to Zarathustra. And if we divide 6 months by 500 ly, we get a ship speed of 8.76 hr/ly. Again, this should be considered a working estimate.

An 8.76 hr/ly speed is about 7 times faster than the previous ship speed of 62.57 hr/ly, and about 9 times slower than the 1 hr/ly ship speed in *Space Viking*. So it seems to make sense as a sort of 'intermediate' speed.

In fact, to even things out, I would round it down to 8 hr/ly, or 3 light-years per day. This would be roughly eight times faster than the old speed, and eight times slower than the one in *Space Viking*. An adjustment that can be rationalized, since—unlike the direct routes between Terra and Freya, Terra and Fenris, and Terra and Uller—ships do not travel directly between Terra and Zarathustra. Zarathustra is just one stop on the "Terra-Baldur-Marduk Spacelines" route, and we know that Volund is "the first port of call en route" back toward Terra.⁶⁵ This implies there are other stops before arriving at Sol. So while it takes six months to travel between Zarathustra and Terra, the actual distance covered must be somewhat more than 500 ly. And this should mean a slightly faster speed.

I therefore assume that around AE 600—between *Uller Uprising* (old speed) and *Little Fuzzy* (new speed), and 30 years after *First Cycle*—a major advance in hyperdrive technology takes place. Ships can now travel eight times faster. The old speed of 62.57 hr/ly would then last from AE 192 to AE 600, or roughly 400 years; the new speed of 8 hr/ly lasts from AE 600 to sometime after the Federation falls, say another 500 years. And then we get the next eight-times-faster speed of Space Viking ships, 1 ly/hr, which is almost certainly a Sword-World innovation (see *The Viking Model*, below).

But while Zarathustra is 500 ly out, which direction from Terra is it? Well, from *Space Viking* we know that Marduk is 350 ly from Gimli, and "Graveyard of Dreams" says it was a member of the System States Alliance.⁶⁶ So Marduk is probably located to the galactic south of Gimli; either south, southeast or southwest. If it's to the southwest, Marduk would be 415 ly from Terra, the greatest possible distance. But I assume it's to the south-southeast, which would make it an even 400 ly south of Terra. That leads us to Baldur, which, as the apparent midpoint of the TBM route, should likewise place it south of Sol, about halfway to Marduk. To minimize the confusion of intersecting lines on my growing map, I decided to locate Baldur 200 ly south-southeast of Terra, which places it about 212 ly away from Marduk.

It's a little surprising that Zarathustra is farther from Terra than Marduk. That differs from my mental picture, which always had Marduk as the outermost stop of TBM Spacelines. But it makes sense if Babylonian mythology was used for planet names before Persian mythology, and I get the impression that Marduk was settled long before Zarathustra anyway. Zarathustra would then have been an extension, tacked on to the former end of the TBM route. Probably because it is "a better world than Terra ever was, even before the Atomic Wars".⁶⁷ It's an excellent addition to the TBM network, whose executives probably hope that Zarathustra is a prelude to more profitable planets even farther out.

But TBM has competition. Leslie Coombes mentions the fear that “somebody like Pan-Federation or Terra-Odin will get hold of [North Mallorysport] and put in a spaceport to compete with Terra-Baldur-Marduk on Darius.”⁶⁸ For that reason, I located Zarathustra southwest of Gimli, which we know is one of the T-O stops. Volund was tentatively placed 200 ly northeast of Zarathustra. This is more than half the distance to Niflheim (possibly another TBM stop), and 300 ly from Terra.

The Cosmic Computer, AE 894. Now on to Piper’s final Federation story, *The Cosmic Computer*. And once again, we find a planet that is six months out from Terra. No ship speed is given, but it is said that the *City of Asgard* took 2 months to bring Conn Maxwell from Odin to Poictesme, which implies that it took the *Mizar* 4 months to take him from Terra to Odin.⁶⁹ No intermediate stops are mentioned (and are probably not necessary due to the faster ship speed), so if we assume that starships still travel at roughly 8 hr/ly, then Odin would be located about 365 ly from Terra (4 months or 2,920 hours divided by 8), and Poictesme about 182.5 ly from Odin (2 months or 1,460 hours divided by 8).

Parenthetically, the distance from Terra to Odin seems a bit far, considering that the latter is one of “the first extrasolar planets” to be discovered, and in fact the first one named by Piper (“Odin and Baldur and Thor...”). The distance from Odin to Poictesme, on the other hand, seems too close. I would have thought it farther out. Indeed, given that Odin is a member of the very first category of Federation planets (Norse) while Poictesme is a member of the very last category (those “named for almost anything”),⁷⁰ it would make more sense if the Terra to Odin leg took two months, while the Odin to Poictesme leg took four months. So we have to consider the possibility that this is another one of Piper’s deliberate errors.⁷¹

In the absence of evidence compelling enough to make a change, however, I decided to accept the situation as described by Beam. And Odin at 365 ly still seems reasonable enough, since it is closer to Terra than Marduk at 400.

So now, adding the distances traveled by the *City of Asgard* and the *Mizar* means that Conn’s trip from Terra totaled about 547.5 ly (365 + 182.5), or say 550. But that doesn’t mean Poictesme is 550 ly from Sol. That could only be if Terra, Odin and Poictesme are all in a straight line. The Gartner Trisystem is probably not that conveniently situated. It is likely off to one side, meaning the true distance would be a bit less than 550 ly. Yet this is also acceptable, as it places Poictesme farther out than Zarathustra, which is discovered about 70 years earlier (AE 629 for Zarathustra, as opposed to “the beginning of the Seventh Century”, or circa AE 700, for Poictesme).⁷²

Moreover, it could be argued that Zarathustra is really one of the planets named “for almost anything”, like Poictesme. Because Zarathustra is not a deity from myth, like Odin or Isis or Marduk; Zarathustra was a historical religious leader of Persia. And the moons of Zarathustra, Darius and Xerxes, are named for historical Persian rulers. This is in contrast to deity-named planets like Odin, whose moons Hugin and Munin are named for mythological beings. Moreover, Beam says that the mythological names run out sometime before “the middle of the Seventh Century”, which is when they start “naming planets for almost anything.”⁷³ Zarathustra is colonized in AE 629, or not long before the middle of the Seventh Century. The similarity of Zarathustra’s and Poictesme’s distances from Terra would then make even more sense.

After Poictesme is colonized, we know that the Federation continues to expand for another century and a half. Because Otto Harkaman mentions that Tanith “was one of the last planets the Federation colonized before the [System States] War”, which begins in AE 842.⁷⁴ Thus, the other planets named for almost anything should also be at comparable distances to Zarathustra and Poictesme, but slightly farther out. Say, 550, 600, 650 or 700 ly from Sol. These worlds would include the ‘demonic’ category, including worlds like Abigor, Ashmodai, Belphegor, Baphomet and Mephistopheles; and the ‘literary’ category, which includes Beowulf, Hiawatha and Moruna. Tetragrammaton, named for the four-consonant abbreviation of the Hebrew god Yahweh, could be another.⁷⁵

Now, let’s connect some of these additional planets to our “stick-and-ball construction” of Figure 6, which is beginning to look like something Fuzzies would build using “a molecule-model kit”.⁷⁶ As seen below, Figure 7 gives us a better view of the central Federation, including our first looks at the Terra-Baldur-Marduk Spacelines route and the Terra-Odin milk run. Assuming that the TBM planets are south of Terra, then when ships traveling the route are heading inward from Volund, they could stop at Niflheim and Uller before reaching Terra. And since Fenris is southwest of Terra, this means that Terra-Odin ships

heading outward from Gimli likely bear more to the west. For convenience, I placed Odin directly west of Sol.

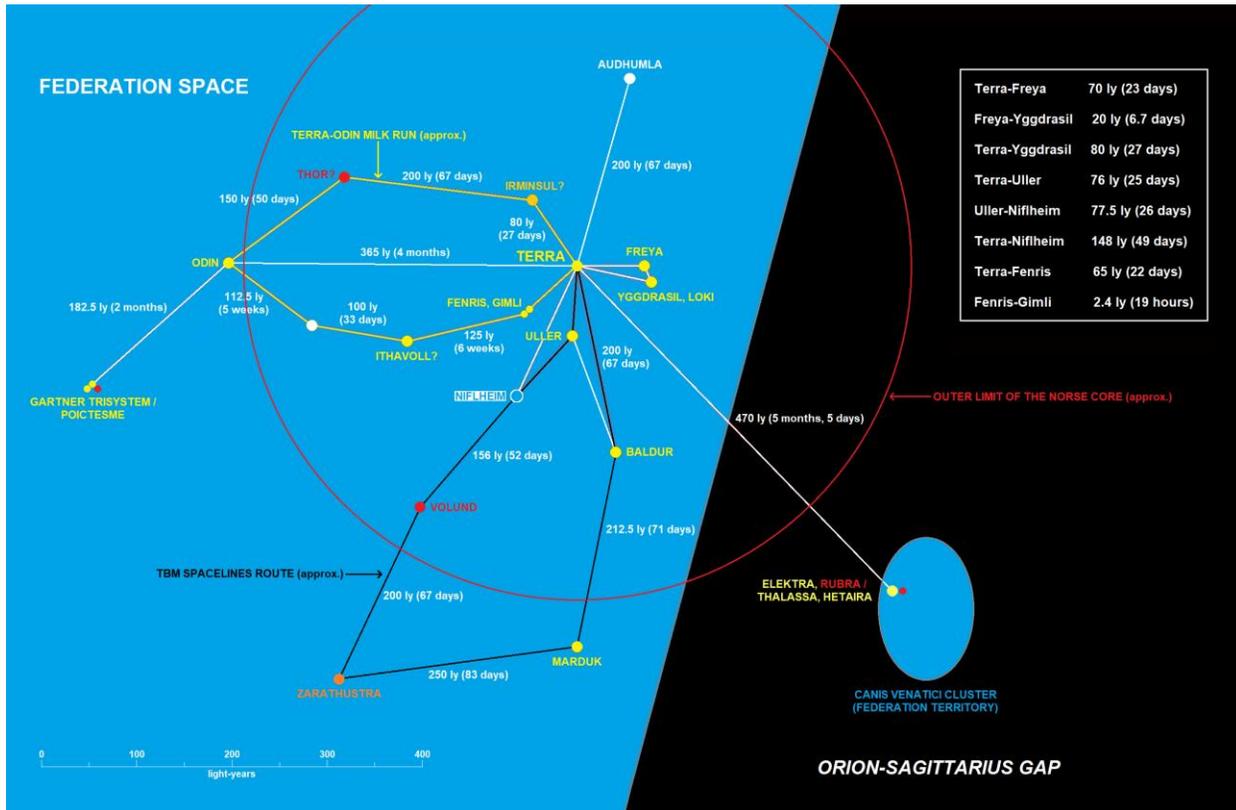


Figure 7. Expanded estimate of central Federation space circa AE 700, using the 8 hr/ly speed.⁷⁷

According to Bish Ware, “There are six planets at which those Terra-Odin ships stop.”⁷⁸ I presume this means apart from Terra and Odin, the inner and outer ends of the run. Two of the six planets are Fenris and Gimli, but they are so close together that I postulate another two on the way out to Odin. Because before Fenris was colonized, there would have only been 5 planets on the run between Odin and Terra, and Gimli was probably the first stop. So originally, there would have been three planets along the route to Odin, and two inbound toward Terra; and the latter I placed in the northern Federation.

Their locations are speculative, as well as the distances between them. But given that they are closer to Terra than Odin, it seems probable that all four of these ‘unknown’ planets have Norse names. And Beam gave us plenty to choose from; including Asgard, Bifrost, Fafnir, Hoth, Irminsul, Ithavoll, Ithunn, Midgard, Skathi and Valhalla.⁷⁹ Assuming that Odin is the outermost Norse planet, the ‘Norse Core’ would then extend out to roughly 350 ly from Terra, or less than half the Federation’s estimated radius of 800 ly. The Norse Core radius is also delineated in Figure 7.

I gave tentative identifications for three of the unknown T-O planets. The first is Irminsul, which could lie northwest of Terra. In *Space Viking*, the Gilgameshers who first arrive on Tanith carry a cargo which includes “vegetable-amber and flame-bird plumes from Irminsul; ivory or something very like it from somewhere else; diamonds and Uller organic opals and Zarathustra sunstones.”⁸⁰ If the ‘ivory’ is actual ivory, then they probably got it on Terra. They might have also procured the diamonds there. The course of their voyage could then have gone from Irminsul (amber and plumes) southeast to Terra (ivory and diamonds), then from Terra south-southwest to Uller (organic opals), and then from Uller southwest to Zarathustra (sunstones). As we will see later, their course continues its curving pattern, as Tanith appears to lie northwest of Zarathustra. And after Tanith, their voyage may end on Gilgamesh itself, which might not be too far from Odin. (See **The Sphere of Gilgamesh**, below.)

The second tentatively identified T-O planet is Ithavoll. For also in *Space Viking*, King Mikhyll VIII says that “Three centuries ago, Ithavoll was a colony of Marduk—it seems we can’t afford colonies, any more—and it seceded from us... Today, it is a civilized world, and one of Marduk’s best friends.”⁸¹ Since Gimli is a trade planet of Marduk, Ithavoll could originally have been another, prior to becoming a formal colony. If it is located southwest of Gimli, then its distance to Marduk would be comparable to that of Gimli, though a little closer. Another possibility for the location of Ithavoll would be the T-O planet southeast of Odin. This location is a little bit farther from Marduk than Gimli, so the greater distance might make it easier to secede from the mother world.

The third is Thor, which I located northeast of Odin. In “Ministry of Disturbance”, the Household Guard of the Galactic Emperors on Odin is composed of dog-like Thorans; alien “hillmen from the southern hemisphere of Thor”.⁸² This could mean that Thor is not far from Odin; and in Norse mythology, Thor is closely associated with Odin, being his son. Thor is depicted as having red hair and a red beard, from which sparks fly when his fiery temper is aroused. So I made the sun of Thor a red star.⁸³

For good measure, I added Audhumla. In *Space Viking*, this is another trade planet, 600 ly from Marduk.⁸⁴ That distance means it also fits within the Norse Core. Given the three-dimensional aspect of Federation space, Audhumla could actually be located ‘above’ or ‘below’ Sol. But since I’m working with a two-dimensional map, I had to place it on the far side of Sol, in the northern Federation. And assuming that Marduk is 400 ly from Terra, then Audhumla should be about 200 ly from Terra.

In the southeastern part of the map, we see Canis Venatici, described as a “medium-sized star cluster”. As usual with Piper, ‘medium-sized’ is a pretty vague statement, but the star Elektra is “thirty-eight light-years from the cluster’s gravitic center”, and it is detected by the *Franklin’s* scanners while the ship is “at the perimeter” of the group.⁸⁵ This implies the system is not too far from the outer edge, as well as not too far from the center. So I decided to make the cluster 150 ly in the north-south axis, and 100 in the east-west axis. The binary stars of Elektra and Rubra would then be about 12 ly from the perimeter, and I placed them on the side closer to the Orion Arm, the direction from which the Terrans come. The Elektran system was placed in the northwestern part of the cluster, because I assume that Captain Absalom Carpenter stops at Baldur or Marduk, before heading toward the eastern edge of the Orion Arm, from which he makes the jump to the cluster.

In addition, I presume that after exploring the system, Captain Carpenter takes the *Franklin* deeper in, exploring the rest of the cluster, at least in a general way. It is likely that other stars are found to have habitable planets, and at some point Absalom undoubtedly returns to Federation space and registers his discoveries. Thus, other habitable planets of Canis Venatici are probably settled in the final two decades of the Sixth Century AE, and the cluster effectively becomes Federation territory.

As in Figure 6, Figure 7 includes distances and speeds between planets. From the boxed list on the right side, notice that the new 8 hr/ly speed gives us a sense as to how much faster ships can travel. In Figure 6, Freya, Uller and Fenris were six months or so from Terra; now they are a little more than 3 weeks, being only 23, 25 and 22 days away. And Niflheim, which formerly took a year and three weeks to reach, is now only 49 days away; a mere 7 weeks from Sol.

This configuration does cause one problem—it violates Beam’s statement that Gimli is “the nearest planet” to Zarathustra.⁸⁶ Unless I’m missing something, this cannot be true. The only way it might work is if Fenris really were 650 ly from Terra, which means Gimli would be at 675. That would make the minimum distance between Gimli and Zarathustra only 175 ly (675 minus 500). But again, the 675 ly distance contradicts the speed in *Uller Uprising*.

Moreover, *Fuzzy Sapiens* implies that Gimli is much closer than even 175 ly. It is said to be “a month” away from Zarathustra.⁸⁷ One month is 730 hours, which means Gimli should be about 91 light-years from Zarathustra (730 hours divided by 8 hr/ly); or only 83 ly if we use the original estimated speed from the story (730 divided by 8.76 hr/ly). Thus, this appears to be a deliberate error, because I don’t see any way Gimli can be that close.⁸⁸

So in this instance, it is possible that Beam himself got a little confused, between the real distances and his deliberately false ones. It bears mentioning that he also got confused on some of his dates, as seen in his short piece “The Future History”.⁸⁹ Another possibility is that Piper was simply drawing attention to Gimli, as a hint that the planet has a much larger role to play later on. If I’m right, that day comes not long after the end of the First Galactic Empire (see **The Second Galactic Empire**, below).⁹⁰

Having figured out the approximate ships speeds during the early and later Federation periods, we can now construct a simple chart. And to make it complete, let's add Piper's ship speeds during the post-Federation interregnum period (1 ly/hr, *Space Viking*) as well as during the Galactic Empire ("light-years an hour" in "Ministry of Disturbance", which I assume means at least one parsec per hour).⁹¹

Early Federation (circa AE 192-600) Ship Speed

"When in the Course—"	c. AE 234	62.57 hr/ly
<i>Four-Day Planet</i>	c. AE 495	62.57 hr/ly
<i>Uller Uprising</i>	AE 526	62.57 hr/ly
<i>First Cycle</i>	AE 572	62.57 hr/ly

Later Federation (circa AE 600-1100)

<i>Little Fuzzy</i>	AE 654	8 hr/ly
<i>Fuzzy Sapiens</i>	AE 654	8 hr/ly
<i>Fuzzies and Other People</i>	AE 654	8 hr/ly
"Naudsonce"	c. AE 705	8 hr/ly
"Oomphel in the Sky"	AE 812	8 hr/ly
<i>The Cosmic Computer</i>	AE 894	8 hr/ly

Interregnum (circa AE 1100-1900)

<i>Space Viking</i>	c. AE 1705	1 ly/hr
---------------------	------------	---------

Galactic Empire (circa AE 1900-3200)

"A Slave is a Slave"	c. AE 2150	3.26 ly/hr (assumed to be the same as in "Ministry")
"Ministry of Disturbance"	c. AE 3050	3.26 ly/hr (not specified; I assume 1 parsec per hour)

Assuming this list is correct, the speed increase circa AE 600 could have unintended consequences. In *The Cosmic Computer*, Merlin says that "The Terran Federation, overextended, had been cracking for a century before the War; the strain of that conflict had started an irreversible breakup."⁹² It could have become overextended because the greater ship speed suddenly made it easier to colonize new planets much more quickly. Too quickly perhaps for the Terran Federation to adapt to the new conditions.

Because by AE 700, a large number of new worlds could be colonized in a burst of expansion; many of which will be much farther from Terra than any earlier settled planet. AE 700 is also when Poictesme is settled, and unlike the earlier-colonized worlds closer to Terra, Poictesme never attains continuous prosperity. It goes through several boom-and-bust periods. This might be an indication that the Federation has begun expanding beyond its ability to economically integrate and govern them effectively.

A second unintended consequence follows from the first. The Federation government would undoubtedly use the faster ship speed to try and extend greater control over its systems. In turn, those planets which had previously enjoyed a certain autonomy due to their distance from Terra would naturally resent the Government's attempts to impose their authority. And these resentments would gradually build, until they contribute to a decision by some planets to secede, which they finally do in AE 839.

This brings us back to the era of the System States War. So now that we have a provisional handle on the Federation's internal configuration, let's look at that period again, and Poictesme's role in it.

8. The Federation Fleet-Army Forces

Poictesme was "the advance base for the Third Fleet-Army Force, during the System States War."⁹³ That's why I placed Poictesme southwest of Odin in Figure 7. For as shown in Figure 8 below, it's not far from the estimated Alliance border. In addition, that Poictesme houses the 'Third' Fleet-Army Force implies there are at least two more; the First and Second Fleet-Army Forces.

Since General Foxx Travis' command was based on Poictesme, his Third Fleet-Army Force (labeled 3FAF on the map) was therefore stationed on the Federation's western flank. By extension, one would guess that the Second Fleet-Army Force (2FAF) could have had its HQ on the planet I tentatively identify as Ithavoll, guarding the central Federation. And the First Fleet-Army Force (1FAF) could be stationed on or near Uller, defending the Federation's capital and GHQ, Terra, plus the Norse Core systems around it.

These three Federation Fleet-Army Forces broadly parallel the three Union armies positioned along the western, central and eastern fronts in the Civil War. The eastern force (the Army of the Potomac) defended Washington DC, and eventually invaded Virginia; the central one secured Kentucky and then invaded Tennessee and Georgia (under General Rosecrans and then General Sherman); and the western army advanced down the Mississippi to split the Confederacy in two (General Grant).

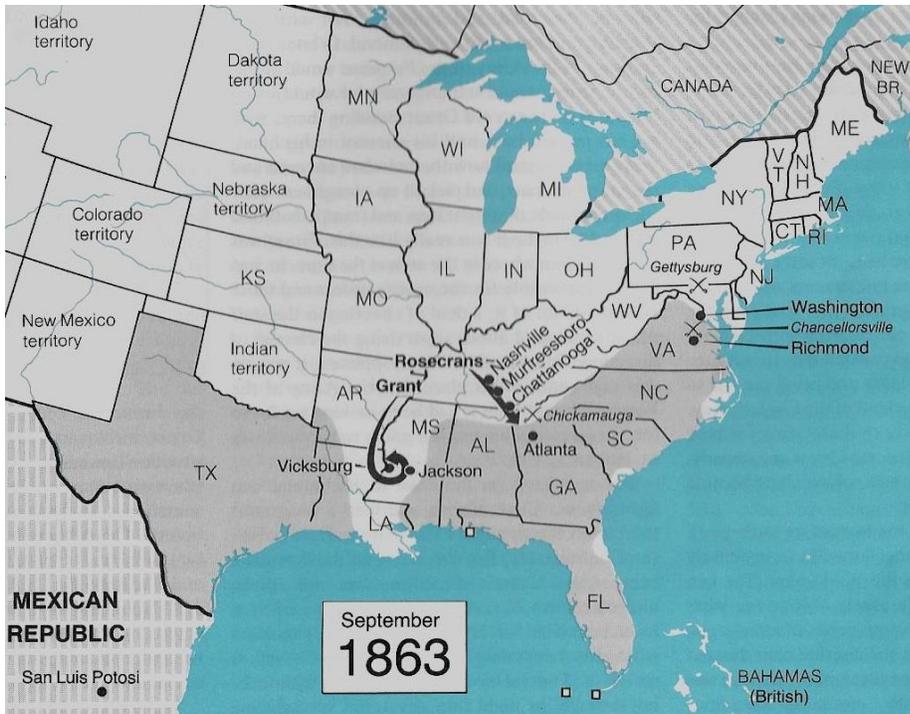
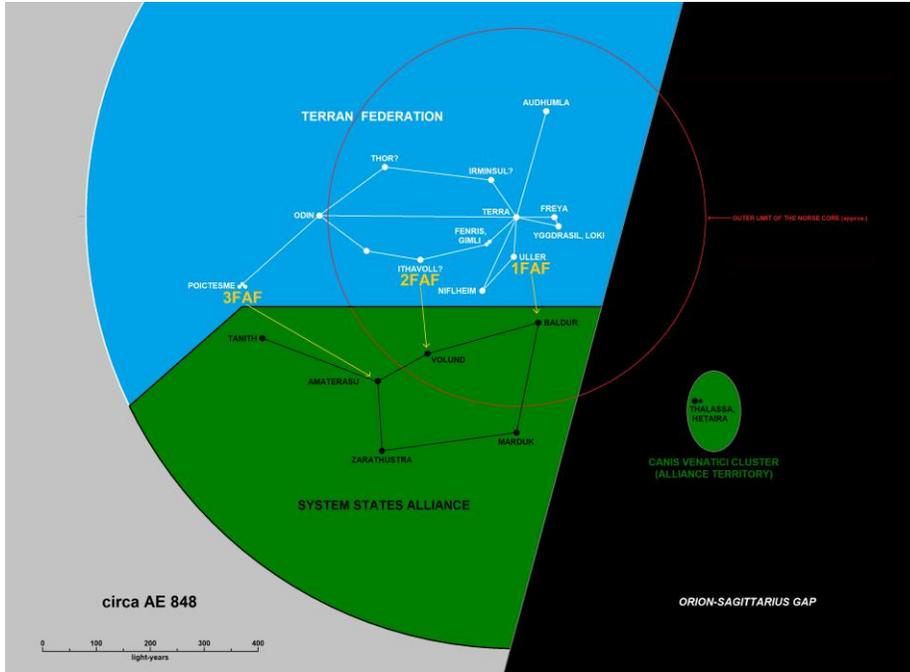


Figure 8. Presumed Federation Fleet-Army Force advances (plus changes to trade routes), compared to Union army campaigns.⁹⁴

As depicted in Figure 8, I presume that the Terra-Baldur-Marduk Spacelines route was disrupted due to the System States War, in which planets like Baldur, Marduk, Zarathustra and Volund “took themselves outside the Federation economic orbit”.⁹⁵ Most of the route winds up within Alliance space, whose government would then have connected it with other planets in the area under its control.

On the Federation side of the border, the Second Fleet-Army Force stationed on or near Ithavoll might have had the original mission of guarding the south-central section of the Terra-Odin milk run, possibly threatened by Alliance forces on Volund. Another item of interest is Poictesme’s location in the south-western Federation. Its mesas and buttes in the desert, such as the one housing Force Command Duplicate,⁹⁶ support this part of Poictesme as a parallel of the American Southwest.

Two new planets make an appearance on our star-map; Tanith and Amaterasu. In *Space Viking*, Tanith is said to be 450 light-years from Gimli, and 500 from Marduk.⁹⁷ That would seem to place it in the western part of the Alliance, south of Poictesme. By my calculations, Tanith would then be about 525 light-years from Terra; a distance which is rather unexpected. Because as “one of the last planets the Federation colonized before the Big War”,⁹⁸ I always thought that Tanith was near the outer edge of Federation space. However, it is named for the Carthaginian moon-goddess, presumably meaning that Tanith actually belongs to the mythological category of worlds which lie between the Norse Core and the outer ring of planets named “for almost anything”. In that sense, Tanith’s location seems reasonable.

As for Amaterasu, it is known to have been a member of the System States Alliance, and as we will see below, internal evidence suggests that it is located about 230 ly from Tanith.⁹⁹ Being a member of the Alliance, that rules out a location north or west of Tanith; that would place Amaterasu in the south-western section of Federation-controlled space. And since it is named for the Japanese sun-goddess, Amaterasu should be outside the Norse Core, and yet not so far that it is among the planets named for almost anything. So I placed Amaterasu southeast of Tanith, making it about 270 ly northwest of Marduk.

At some point during the War, the Alliance “fleet that was based on Amaterasu was blasted out of existence in the spaceports and in orbit.”¹⁰⁰ I assume this is Foxx Travis’ doing, as his Third Fleet-Army Force advances deeper into the Alliance, in tandem with the Second and First FAFs. The Third FAF is depicted as bypassing Tanith because, as a newly-colonized planet, Tanith is probably of little strategic value. It only gains significance nine centuries later, when Lucas Trask arrives in the *Nemesis*.

Another assumption is that the Canis Venatici star-cluster secedes from the Federation, becoming part of the System States Alliance. This would secure the Alliance’s eastern flank, and could forestall Federation plans to attack from that direction. It may therefore prolong the System States War, which unlike its Civil War model lasts twelve years, rather than four. If the cluster has a real-world parallel, it could be the Bahama Islands. For if the Confederates had held the Bahamas, they might have been able to prevent Union ships from entering the Gulf of Mexico, or at least go a longer way around; thereby disrupting and delaying the economic blockade which contributed to the South’s eventual collapse.

9. From Confederate Refugees to Alliance Refugees

But collapse the Confederacy did, the System States Alliance finally does as well. As described by General Mike Shanlee, “The whole Alliance caved in all at once.”¹⁰¹ After its defeat, however, “Ten thousand men and women on Abigor, refusing to surrender, had taken the remnant of the System States Alliance navy to space, seeking a world the Federation had never heard of and wouldn’t find for a long time. That had been the world they had called Excalibur.”¹⁰² The first of the Sword-Worlds.

Which way did the refugees go when they left the Federation? It probably depends on the position of Abigor within the Alliance. If Abigor is in the south or southwestern Alliance, they could have journeyed to the northwest, west, southwest or south-southwest—all while staying within the Orion Arm. If Abigor is in the eastern Alliance, they could have traveled northeast, east or southeast—out into the Orion-Sagittarius Gap. My first thought was that they journeyed to the galactic south-southwest. Because the 10,000 Alliance refugees who establish the Sword-Worlds seem to parallel the Confederados; 10-20,000 Confederate refugees who left the Southern States and established new communities in Brazil, “chiefly [in] the state of São Paulo.”¹⁰³ One such community, Americana, survives to this day, being located northwest of the city of São Paulo and more than 100 miles from the Atlantic Ocean.

Assuming this is the historical model Beam had in mind, it would mean that Excalibur, and the other Sword-Worlds established around it, would be located very far south of Federation space. As well as not far from the inner edge of the Orion Arm; an ironic parallel with their old nemesis, Terra.

The distance traveled is similar, too. From Mobile, Alabama to Americana, Brazil is about 4569 miles. (Figure 9.) And the known distances from the Sword-Worlds to the Old Federation are much greater than any mentioned in Beam's Federation stories. Instead of the 700, 650 or 500 light-years from Terra to Freya, Fenris and Zarathustra, we get more than 3000 light-years from Gram to Tanith, and over 2000 light-years from Curtana to the nearest Federation world.¹⁰⁴

In any case, the Sword-Worlds seem to be separated from the Old Federation by a minimum of 2000 light-years. Adding 2000 to the 800 ly for the estimated radius of the Federation, plus a couple of hundred for the estimated radius of the Sword-Worlds, would equal about 3000 ly from Excalibur to Sol.

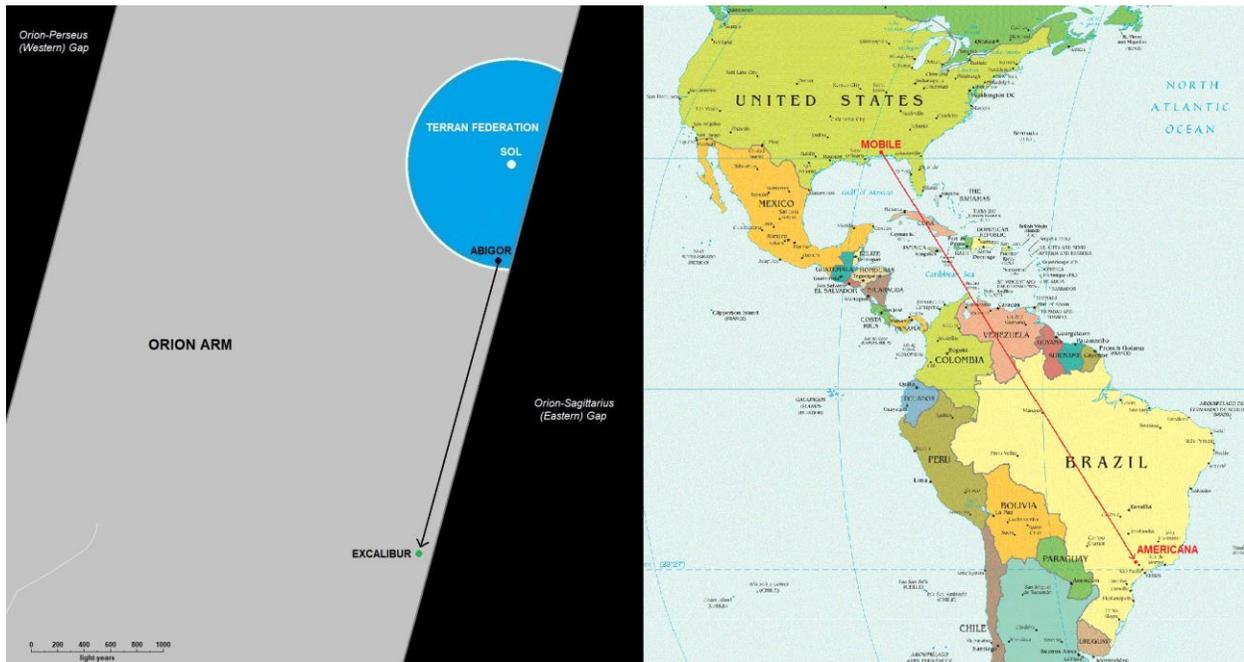


Figure 9. Possible route of the refugees from Abigor in AE 855, compared to the direction of the Confederado migration in 1865.

This would indeed be a location “the Federation...wouldn’t find for a long time.” Given the variety of directions and distances the Alliance refugees could travel, it is highly doubtful the Terran authorities would bother to go after them. Even if they did, they would most likely investigate systems not far beyond Federation space. Failing to find anything, the search would soon be called off. As for natural expansion, the Terran Federation ceases growing with the advent of the System States War. But if it had resumed afterward, it would still have taken the Federation many centuries to expand from a radius of 800 light-years to one of 3000.

10. The Relative Locations of Tanith, Xochitl and Gram

Other information in Piper, however, forced me to reconsider the ‘southern’ option for the Sword-Worlds. In addition to its known distances from Gimli and Marduk, Tanith is said to be less than 700 ly from Audhumla, as well as a thousand light-years from Xochitl.¹⁰⁵ We already placed Audhumla north of Sol, which means Xochitl should be in the northern Federation as well. But if the Sword-Worlds are located far to the south of Federation space, then Tanith should be 1000 ly closer to them than Xochitl is. Yet that is not the case; internal evidence reveals that Xochitl is actually much closer to Gram.

Here’s how it works out.

In *Space Viking*, Prince Viktor of Xochitl takes a fleet of eight ships to Gram, in order to uphold Omfray of Glaspyth’s “trivial” claim to the planetary throne.¹⁰⁶ We know it’s 3000 light-years between Gram and Tanith,¹⁰⁷ and 1000 between Tanith and Xochitl. So we need only solve the third side of a triangle; the distance from Xochitl to Gram. And fortunately, Beam provided enough clues to produce an answer.

While waiting on Tanith for news, Prince Lucas Trask muses that “Three thousand hours had passed since the first warning had reached Tanith; that made five thousand since Viktor’s ships had left Xochitl.” “The next day, two other [ships] came in”—add 24 hours—“And four days after that,” or 96 hours more, “Duke Joris’ confidential secretary” arrives on Tanith, imploring Trask to come back to Gram and save them from Duke Omfray and Prince Viktor, whose fleet from Xochitl had arrived just before he left.¹⁰⁸

All we have to do is add 5000 hours, plus 24 hours, plus 96 hours, which equals 5120 hours. This is the time it took Viktor to travel from Xochitl to Gram, and then the news to travel from Gram to Tanith. Now subtract 3000 hours for the Gram to Tanith run, and we get 2120 hours for the time/distance from Xochitl to Gram. A number which enables us to estimate their relative configuration. (Figure 10.)

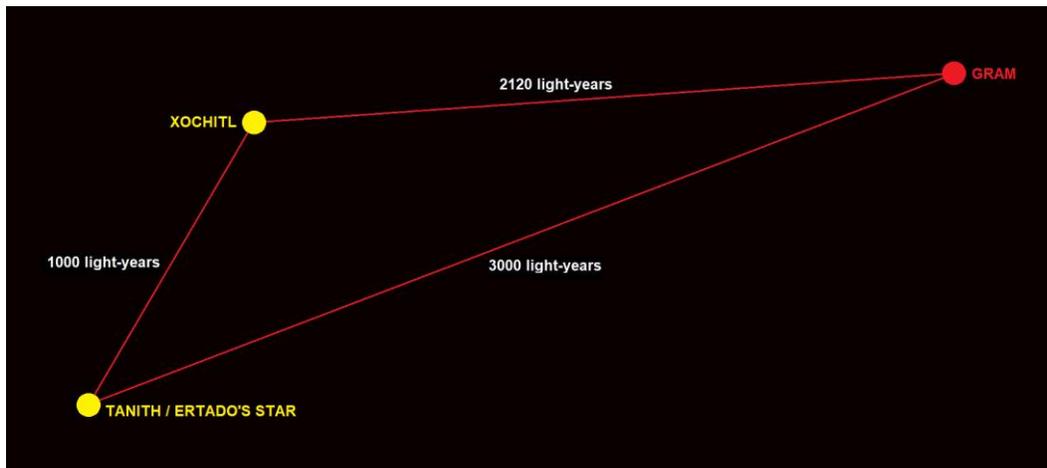


Figure 10. Estimated configuration of Tanith, Xochitl and Gram.¹⁰⁹

The estimated distance of 2120 ly from Xochitl to Gram is consistent with the “over two thousand light years” from Curtana to the nearest Federation world. And the resulting chart provides another reason why Lucas Trask decides to “cut loose from the Sword-Worlds; especially cut loose from Gram. Let Viktor of Xochitl have it.”¹¹⁰ Not only are the Sword-Worlds steadily decivilizing due to their endless internal squabbles, but at only 2120 light-years away, Xochitl is almost 900 light-years closer to Gram. And 900 light-years equals 900 hours, which is 37.5 days. Prince Viktor can therefore reach Gram about 5 weeks faster than Prince Trask. Thus, Lucas would be at a huge disadvantage if he tried to defend Gram against Xochitl, or stake his own claim to it. Similar to the disadvantage the US faced in defending the Philippines against the Japanese, who were much closer to those islands. (Tokyo to Manila is only 1865 miles; while Manila to Honolulu and San Francisco are 5296 and 6963 miles.)¹¹¹

More importantly, the Tanith-Xochitl-Gram map suggests that the Alliance refugees head in an unexpected direction. They go east.

11. The Sword-Worlds

a) A Star-Cloud in the Gap

If Figure 10 is correct, the refugees travel east, crossing, or attempting to cross, the Orion-Sagittarius Gap. Finding a habitable planet in the sparse stars of the gap would seem quite a challenge, not to mention crossing the gap itself. The more so since hyperships of the later Federation period only travel about 8 hr/ly, which is much slower than the 1 ly/hr speed of *Space Viking*. Thus, the 2000 ly which separate the Sword-Worlds from the Federation would have taken the Alliance flotilla 16,000 hours to traverse, not 2000 hours. In other words, close to 2 years rather than less than 3 months. Such a length of time may mean that the Alliance refugees are the first Terro-Humans to ever attempt crossing the Gap. They are almost certainly the first to settle on, or near, the far side. It would have been far safer for them to have stayed within the Orion Arm, where stars with habitable planets are much more likely to be found, as well as easier to reach.

How wide is the Gap? In the early 1950s, when Beam was just beginning his Future History, the Sagittarius Arm was estimated to be “2,000 parsecs closer to the center [of the galaxy] than the Orion Arm”, while the Perseus Arm was estimated to be a similar 2,000 parsecs farther out.¹¹² Two thousand parsecs equals 6,520 light-years, and given an average diameter of 3,500 light-years for the arms, this means the interarm gaps should be about 3,000 light-years across. Since only 2,000 light-years separate the Old Federation from the Sword-Worlds, the latter might then be located on an ‘island’ of stars in the gap. A star-cluster, located among the detached clouds of interstellar gas floating between the arms. And strangely enough—because I don’t think Piper could have known this—there seems to be one in just the right spot. (Figure 11.)

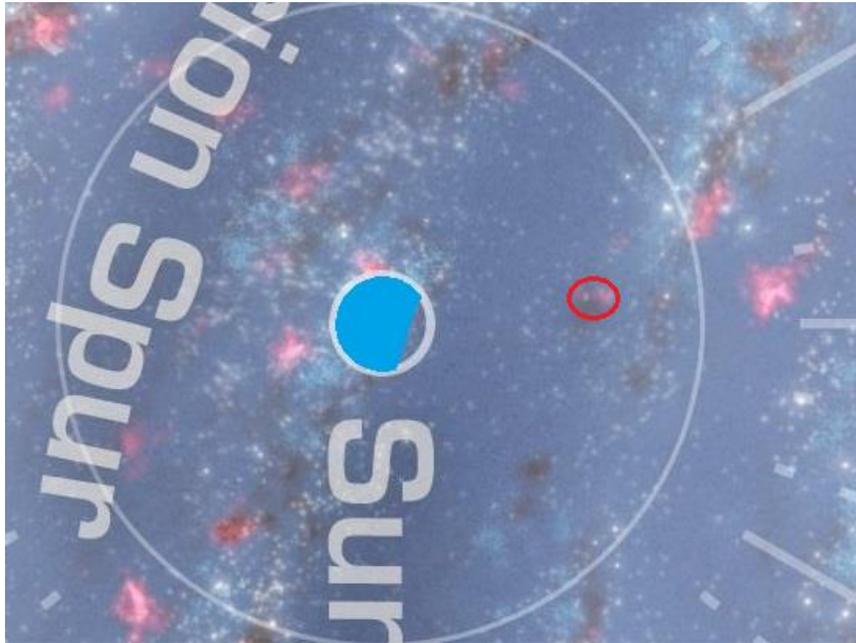


Figure 11. Federation space in blue, and red-circled star-cloud 2000 ly to the east, just west of the Sagittarius Arm.

It seems right because when we plot the estimated configuration of Tanith, Xochitl and Gram from Figure 10, this is what we get.

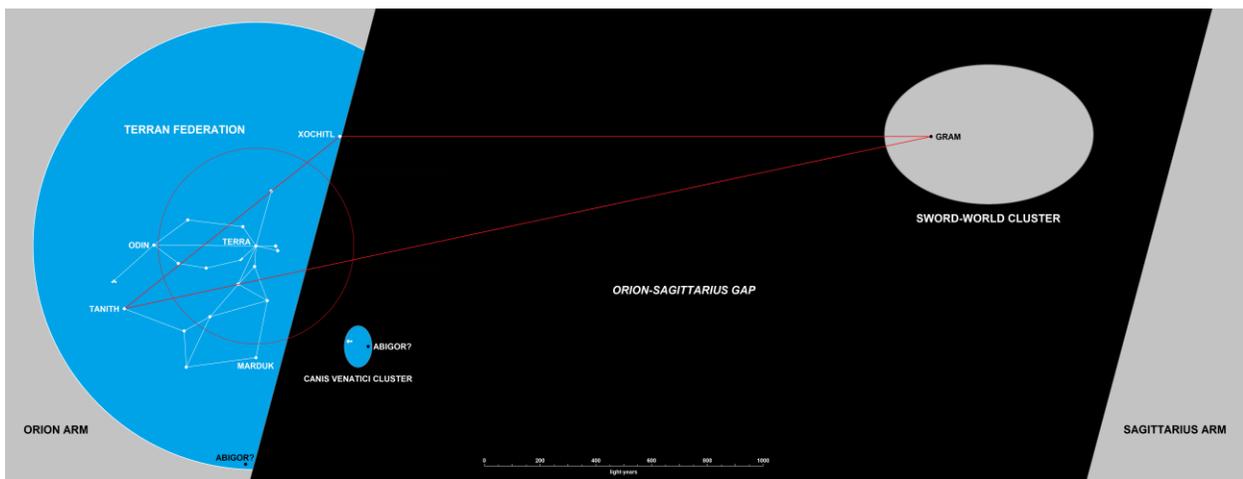


Figure 12. The Terran Federation and Sword-World cluster, circa AE 1000.¹¹³

Assuming they come from the southwest, the Alliance refugees probably establish Excalibur and the other early Sword-Worlds, such as “Joyeuse and Durendal and Flamberge”,¹¹⁴ in the southwestern part of the star-cloud. This would also be a location the Terran Federation wouldn’t find for a long time, since the Federation’s expansion was almost completely within the Orion Arm.

From the NASA source map in Figure 11, the star-cloud’s east-west diameter is about 750 ly, while the north-south diameter is about 500 ly. But in Piper, the Sword-Worlds seem to be fairly close together. Curtana is 320 ly from Morglay, Morglay is less than 200 ly from Gram, and Gram is only 30 ly from Excalibur.¹¹⁵ So the Sword-Worlds probably occupy only a portion of the cluster.

This is supported by Lucas Trask, who says that “We’re not expanding, Lothar; we’re contracting. We stopped expanding three hundred and fifty years ago, when that ship came back to Morglay from the Old Federation and reported what had been happening out there since the Big War. Before that, we were discovering new planets and colonizing them. Since then, we’ve been picking the bones of the dead Terran Federation.”¹¹⁶ Thus, even though there are plenty of other habitable planets in the star-cloud, the steady expansion of Sword-World civilization was diverted by the lure of easy plunder westward.

As the Sword-Worlds are roughly 2000 ly from the Federation, and Xochitl is 2120 ly from Gram, Xochitl must be close to the eastern edge of Federation space, on or near the Gap. That’s how it was depicted in Figure 12. Moreover, at a thousand light-years from Tanith, Xochitl is clearly located in the northern Federation. Well beyond Audhumla and the Norse Core, but closer than the outer ring of planets named for almost anything. Lying almost directly west of the Sword-Worlds, Xochitl therefore seems like a natural choice for a Space Viking base. Being among the closest of Old Federation planets, Xochitl would be a great place to make a ‘landing’ on the ‘shore’ of Federation space, from where the Space Vikings can strike into the interior of the Orion Arm.

This configuration suggests that Abigor is most likely in the eastern part of Alliance space. Possibly along the edge of the Gap, like Xochitl; but an even better option would be among the stars of the Canis Venatici cluster. Both options are shown on the map, with a question mark after ‘Abigor’. As we’ve seen, the Canis Venatici cluster is settled beginning in the late Sixth Century AE. By the time of the System States War two and a half centuries later, it should be fairly well colonized. And since Piper gave the Elektran System anomalous Greek names, the cluster could actually fall under the “naming planets for almost anything” category. That could make Abigor an appropriate addition, particularly as it would place this demon-named planet on an island in the ‘outer darkness’ of the Gap.

In support of this option, the Canis Venatici cluster would probably be less strategically important than the more-developed Alliance regions within the Orion Arm; including planets like Baldur and Marduk. The Federation could therefore consider the cluster a lesser target, relegated for later reconquest. But by that time, Canis Venatici might have become a place where fleeing Alliance citizens and retreating military units gather. Upon hearing the news of the Alliance government’s surrender, and knowing that Federation troops would soon be arriving to occupy the cluster, those refusing to surrender could then leave Abigor before they arrive. And if Abigor is in the eastern part of the Canis Venatici cluster, it would be a bit less than 2000 light-years from the Sword-World cluster, west of the Sagittarius Arm.

The only remaining question seems to be why Otto Harkaman “liked Tanith for a base.”¹¹⁷ One reason could be that, positioned in the southwest of the Old Federation, Tanith is pretty far away from the Sword-World cluster. In their initial raids, the Space Vikings operating from the Sword-Worlds probably concentrated on the nearest targets, and that would mean in the northern and central Federation. In the time of *Space Viking*, the south and southwestern regions might still have better pickings, and Tanith may also be far enough away from the other Viking base planets for raiding to be more profitable.

b) The Viking Model

An eastern location for the Sword-Worlds is supported by Beam’s other historical model. Because while the Alliance refugees seem to be modeled on the Confederate refugees, the Confederados never became a serious threat to the Union, unlike how the Alliance refugees (as Space Vikings) later did to the Old Federation. Some Confederados did indeed return to the States, but not to attack them; while the vast majority remained in Brazil, intermarrying and assimilating into the local population.¹¹⁸

As the name ‘Space Viking’ suggests, however, Beam’s main historical model should be the Vikings. Several centuries after the fall of the Roman Empire, the Vikings crossed the sea from Scandinavia,

raiding, plundering and destroying cities all over western and southern Europe. And several centuries after the fall of the Terran Federation, the Space Vikings 'cross the sea' of space to raid and plunder planets all across the Old Federation.

The Vikings came from the north, over the North Sea; but the only 'sea' near the Old Federation is the Orion-Sagittarius Gap. So the Space Vikings could come from the galactic east, across the Gap. We recall that one of Beam's models for the Terran Federation was the British Empire. And Britain was particularly vulnerable to Viking raids, being not far west of Denmark and Scandinavia. (Figure 13.)

Another aspect of this configuration is that if the Sword-Worlds had not been diverted by the lure of easy plunder in the Old Federation, they would have continued expanding locally. First by settling the remainder of the star-cloud, and then crossing the short stretch of open space to the east and south, and settling the first worlds in the Sagittarius Arm. This expansion would parallel the Vikings of Sweden (known as Varangians), who crossed the Baltic Sea, exploring and colonizing to the south and east.

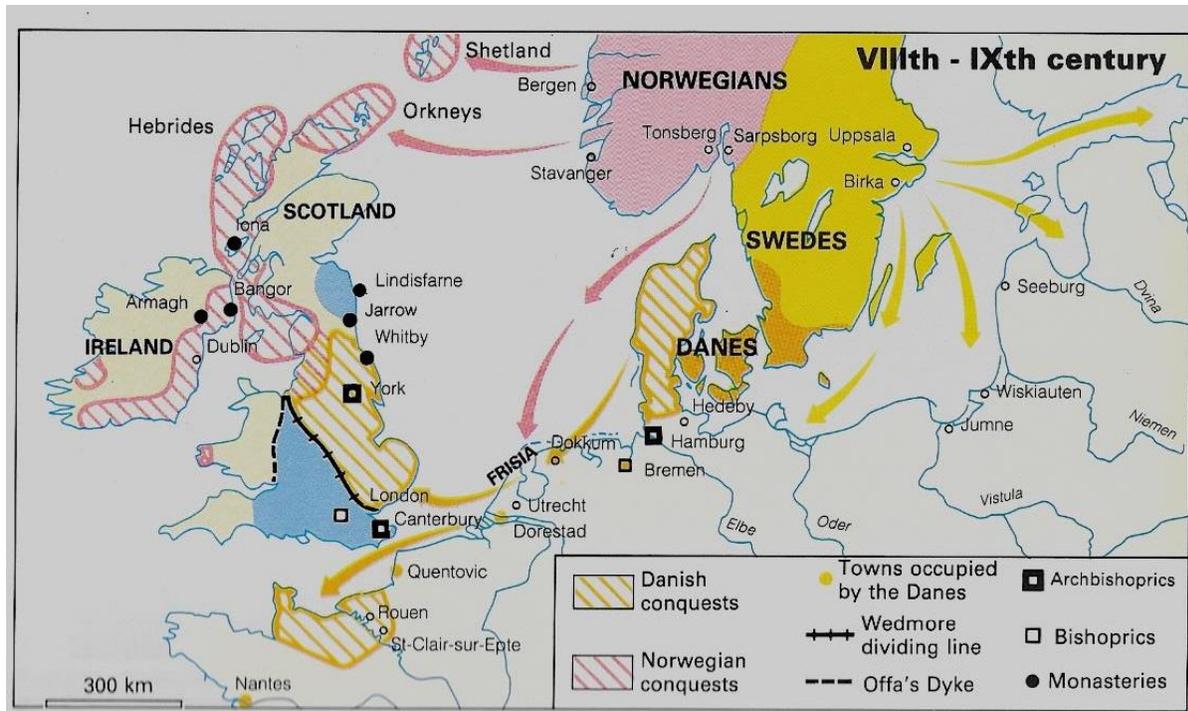
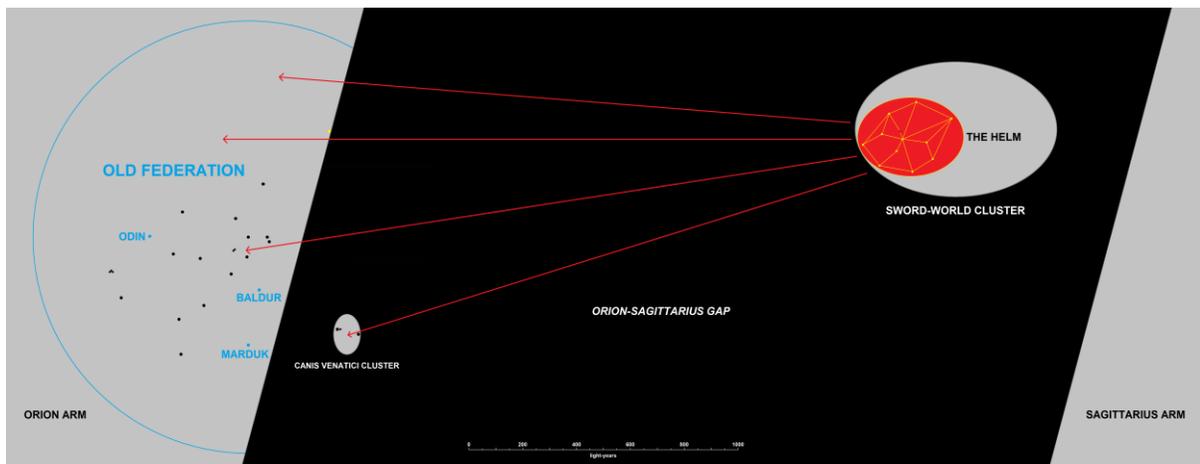


Figure 13. Postulated Space Viking routes to the Old Federation, compared to invasions of Britain by Vikings from Scandinavia. ¹¹⁹

Parenthetically, given the Viking historical model, Piper may have intended for the Sword-Worlds to be located on a 'peninsula' of gas, extending westward from the Sagittarius Arm proper. A closer parallel with Scandinavia, which is a peninsula extending westward from the European continent.

A major advantage the Vikings enjoyed was the quality of their ships. "Though Viking boats came in many shapes and sizes, the most iconic and effective Viking vessel was undoubtedly the longship. Long, narrow and flat, longships were fast, durable and capable of navigating both choppy seas and shallow rivers. They were also light enough to be carried over land...The breadth of the Vikings' explorations was remarkable. From North America in the west to Central Asia in the east, the Viking Age is defined by geographically expansive exploration that wouldn't have been possible without such advanced shipbuilding...The Vikings' shipbuilding skills accompanied their extensive travels. Many of the longships' characteristics were adopted by other cultures and continued to influence shipbuilding for centuries."¹²⁰

The parallel in Piper are the ships of the Space Vikings, which travel much faster than the hyperships of earlier times. Instead of three light-years per day, as in the later Federation stories, Space Viking ships travel at a full light-year per hour, or twenty-four light-years per day. This advance is almost certainly a Sword-World innovation. In part, it may have been inspired by the difficulty in traveling across the Orion-Sagittarius Gap during their initial migration, but could also be related to their position on a star-cloud in the gap. For even if they decide to begin exploring the Sagittarius Arm, it is still about 700 light-years away, meaning that a faster hypership would be very desirable for travel in this direction as well. Moreover, in the era of *Space Viking*, the civilized worlds of the Old Federation also seem to have ships which travel at 1 ly/hr. They apparently got this technology from the Sword-Worlders, which would parallel the Viking longship's lasting effect on the shipbuilding of other cultures.¹²¹

In Figure 13, Terra is unmarked, since it "was bombed back to the Stone Age" during the Interstellar Wars, and is now among the ranks of the minor planets. The worlds of the Old Federation which remain civilized, such as Marduk, Baldur and Odin, have their names in blue because these planets "maintained the culture of the Terran Federation uninterruptedly" through the Interregnum.¹²²

To the east, the Sword-Worlds were given a 'Germanic' color scheme of red and gold, near the black space of the Gap. A parallel suggested by Space Viking characters such as Admiral Otto Harkaman and Captain Boake Valkanhayn, whose names seem to echo historical German figures like Prince Otto von Bismarck and General Erich Falkenhayn. Thus, they were apparently chosen by Piper to deliberately convey his Norse or 'Teutonic' model. In *Space Viking*, Admiral Harkaman is the closest advisor to Prince (later King) Lucas Trask, even as Prince Bismarck was the closest advisor to King William of Prussia (later German Emperor). And while Captain Valkanhayn descends into chicken-stealing for a while, he becomes an excellent commander again under Prince Trask, and fights his ship well on Beowulf and Marduk.¹²³ This parallels the German General Falkenhayn, who had a mixed record in combat during WWI, but was a well-respected commander by leaders on both sides.¹²⁴

Using the oval around the Sword-Worlds as an estimated boundary, their space would be about 395 ly in the east-west direction, and about 293 ly in the north-south. Say, 400 by 300 ly for convenience. It would then have a volume of about 42 million cubic light-years (400 x 300 x 350 ly as an estimate of the z-axis). As in the case of the Terran Federation's estimated volume of 2 billion cubic light-years, this may be an underestimate, but the Sword-Worlds should control a much smaller region of space than that of the Old Federation, since it is within an interarm star-cloud rather than a full arm. Furthermore, it only contains 12 inhabited planets, not 500. So even apart from the many habitable planets that should lie in the rest of the star-cloud, there may be quite a few still-unclaimed ones within their current space-volume.

c) Three Maps of Sword-World Space

Now let's take a close-up look at the Sword-World cluster. There is very little to go on in Piper; just the references mentioned previously: 30 light-years from Gram to Excalibur, 320 from Curtana to Morglay, less than 200 from Gram to Morglay, and more than 2000 from Curtana to the nearest Old Federation world. However, 'more than' 2000 ly implies less than 2100, and since we now know that Gram is 2120 ly from Xochitl, Curtana should be a bit closer to Federation space than Gram. This is supported by the freighter captain's information that after pirating the *Enterprise*, Andray Dunnan stopped at Curtana before leaving the Sword-Worlds. "I'd say she's twelve hundred hours out of Windsor, on Curtana, now."¹²⁵ To me, this suggests that Curtana is 'west' of Gram, closer to the edge of Sword-World space and the Old Federation; while the distances from Gram and Curtana to Morglay indicate the latter is to the 'east'.

Excalibur, as the first Sword-World, should be roughly in the center of the group. And since they are colonized directly from Excalibur, Joyeuse, Durendal and Flamberge should be the closest planets to Excalibur, with the possible exception of Gram. Moreover, since Joyeuse colonizes Hauteclere, and Hauteclere in turn colonizes Gram, I further assume that these three planets are close together. And finally, Rovard Grauffis says that “We have very little direct trade with Curtana”,¹²⁶ which implies that Curtana is fairly far from Gram, whose principal trading partners include the nearer planets of Joyeuse, Hauteclere and Excalibur. All these considerations led to the following tentative configuration.

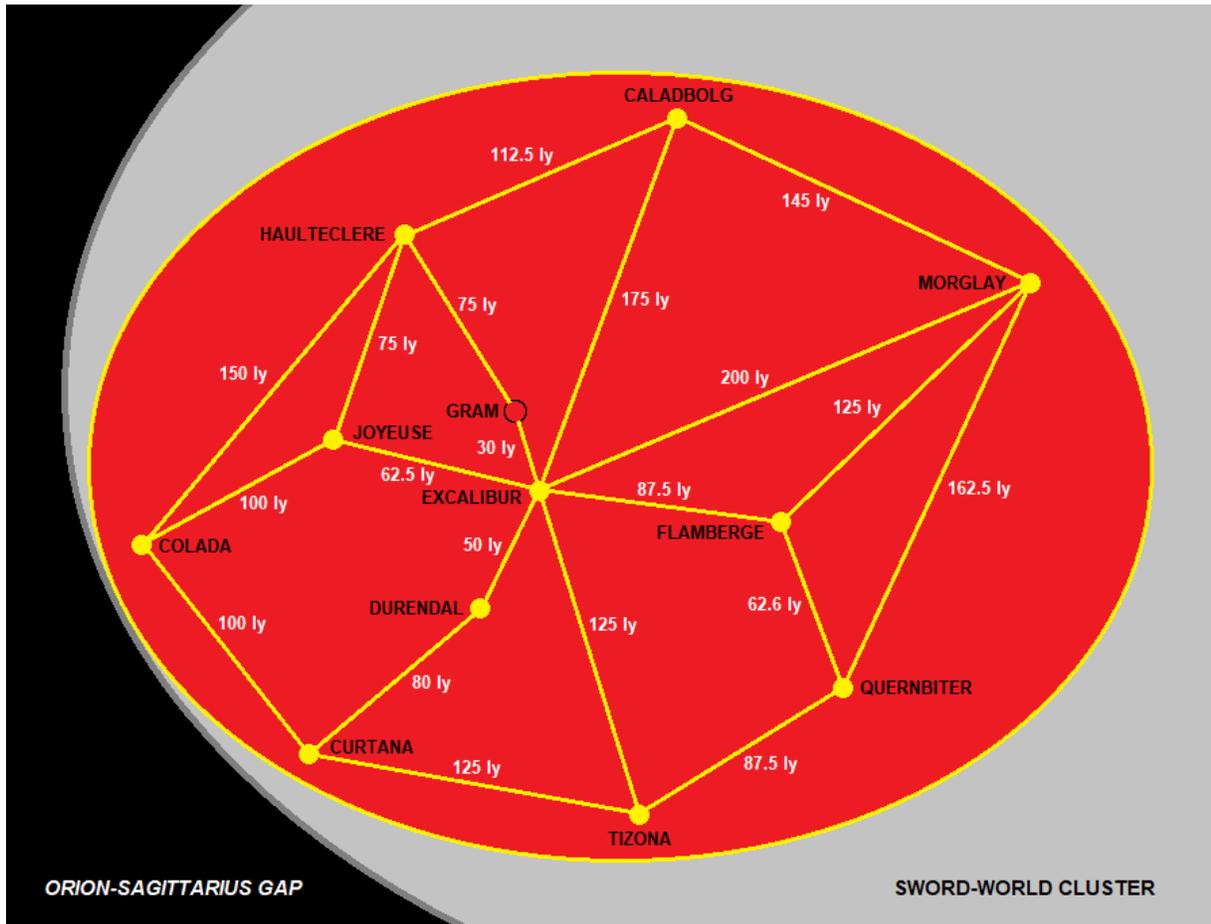


Figure 14. Estimated configuration of the Sword-Worlds.

Curtana, placed southwest of Gram on the map, is about 2,075 ly from the edge of Federation space. (At the time of the freighter captain’s quote, Dunnan and the *Enterprise* are therefore still within the Orion-Sagittarius Gap, having crossed a bit more than half its width.) Morglay is positioned 320 ly northeast of Curtana; this makes it about 194 ly east-northeast of Gram. It therefore ends up being the easternmost of the Sword-Worlds, which colonize less than half of the star-cloud.

John Carr considers the Sword-Worlds as belonging to a cluster, which he calls “Helm”, being in the shape of a helmet. Because many configurations are possible, I tried to suggest that shape to the pattern of the Sword-Worlds. A bit angular and irregular, of course, since a perfect helmet shape would be highly unlikely in real space. Also, it would look better as a three-dimensional structure, but that is beyond my skill and software. Don’t see the helmet in Figure 14? Look at it this way. (Figure 15.) The Excalibur-Joyeuse-Hauteclere-Gram quadrilateral (E-J-H-G) makes one eyehole, the Excalibur-Morglay-Flamberge triangle (E-M-F) is the other. The Excalibur-Durendal line (E-D) is the nose guard. The left side, top and right side of the helmet are delineated by the Colada-Hauteclere-Caladbolg-Morglay-Quernbiter

perimeter (C-H-C-M-Q). Finally, the Colada-Curtana-Tizona-Quernbiter curve (C-C-T-Q) makes the bottom. Dark gray for the exterior of the helmet, light gray for the interior.

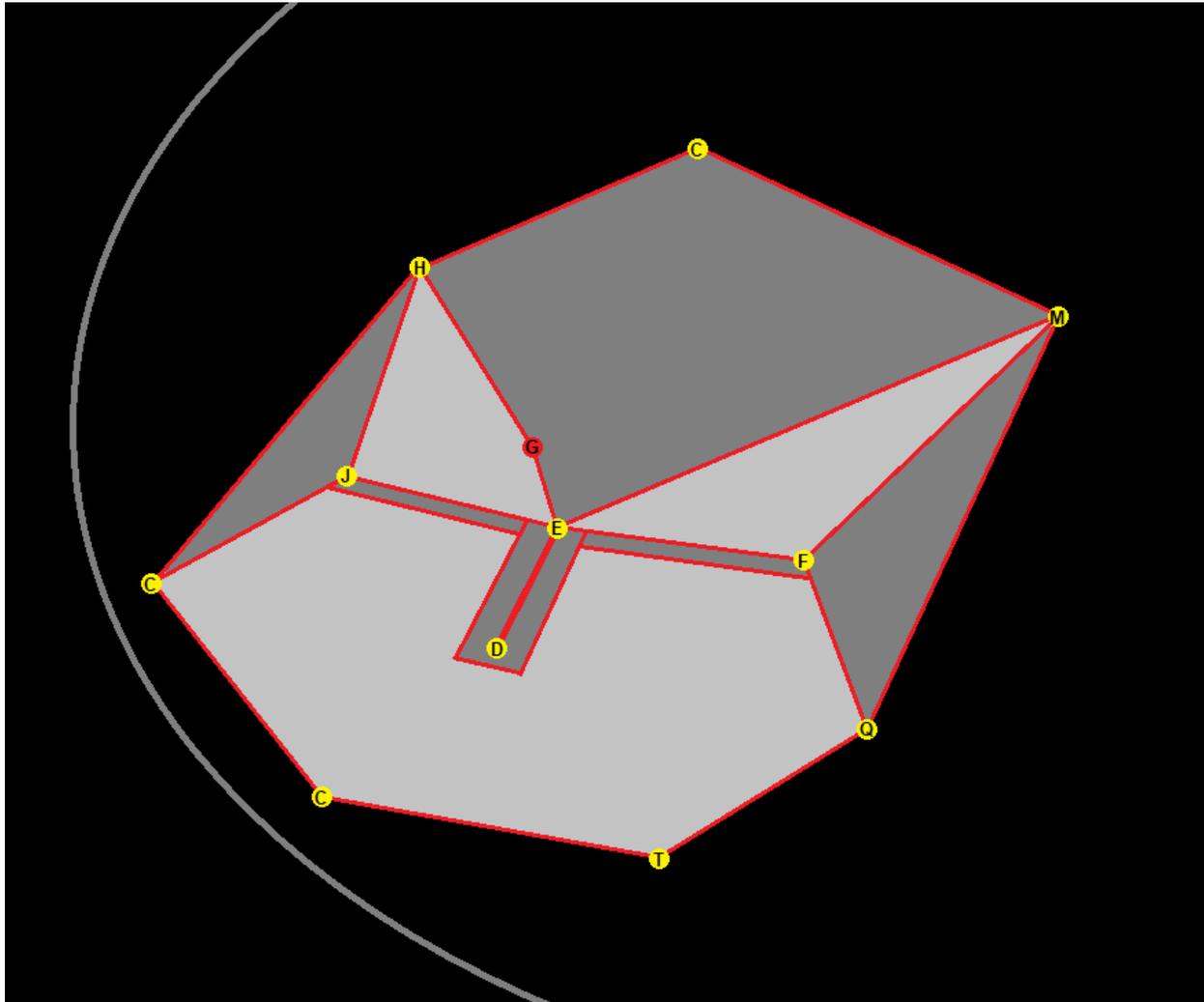


Figure 15. Possible configuration of the “Helm”.

By the time of *Space Viking*, however, the Sword-Worlds are steadily declining. And as one of Piper’s self-reliant men, Lucas Trask seems to be one of the few who realize it. He muses that “Nothing on Gram, nothing on any of the Sword-Worlds, was done as efficiently as three centuries ago. The whole level of Sword-World life was sinking, like the east coastline of this continent, so slowly as to be evident only from the records and monuments of the past.” Cassandra-like, his warnings go unheeded. Because as Rovard Grauffis says “sourly” to Otto Harkaman, “Well, maybe this is all new to you, captain...but Lucas Trask’s dirge for the Decline and Fall of the Sword-Worlds is an old song to the rest of us.”¹²⁷

Furthermore, by the time Trask speaks these words, it’s too late to try and correct the problem. Because like the Terran Federation in *The Cosmic Computer*, Sword-World civilization has already entered its period of irreversible decline. After Trask relocates to the Old Federation, and begins recivilizing Tanith, he declares to Harkaman that “the Sword-Worlds are finished; they’re half decivilized now.” And later, he foresees that Prince “Viktor [of Xochitl] wouldn’t be the last Space Viking to take his ships back against the Sword-Worlds. Sooner or later, [reviving] civilization in the Old Federation would drive them all home to loot the planets that had sent them out.”¹²⁸

One of the major causes of Sword-World decadence is the tendency of noblemen to fight over the various planetary thrones. “The Morglay dynastic war of a couple of centuries ago, still sputtering and smoking. The Oaskarsan-Elmersan War on Durendal, into which Flamberge and now Joyeuse had intruded. And the situation on Gram, fast approaching critical mass.” And apart from having its own dynastic war, Prince Jurgen Trevannion mentions that “Morglay had become involved in one of the interplanetary dynastic wars that had begun the decadence of the Space Vikings”.¹²⁹

Thus, at least half of the Sword-Worlds are involved in these conflicts. Morglay, Durendal, Flamberge and Joyeuse for starters; then there’s Gram, whose throne is disputed by Haulteclere, acting through Prince Viktor of Xochitl and Duke Omfray of Galspyth. And it seems a safe bet that the rest of them, even Excalibur itself, have their own royal intrigues, plots and disputes that could boil over into open warfare.

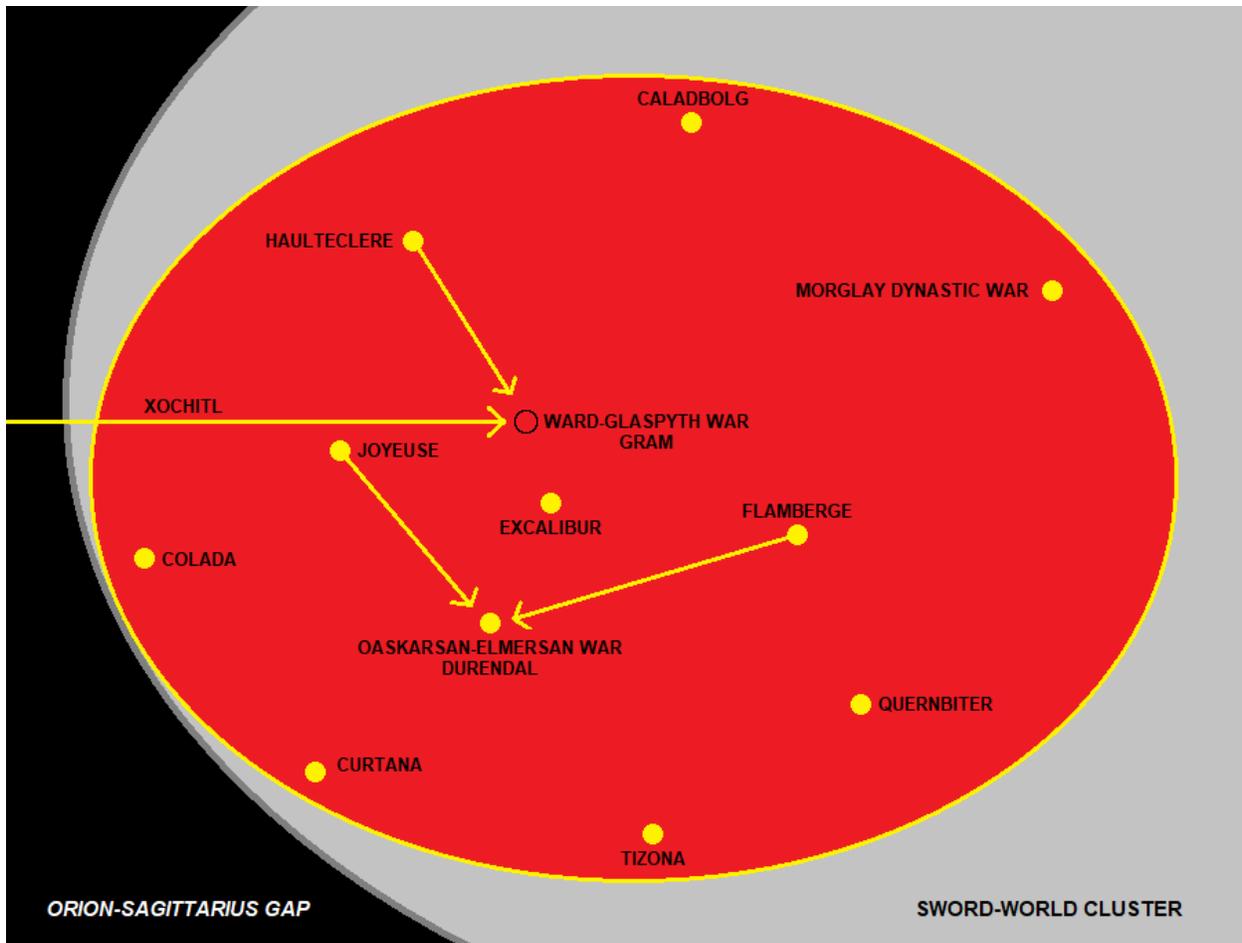


Figure 16. A major factor in their decline; known dynastic conflicts in the Sword-Worlds circa AE 1720.

Moreover, all these wars in the Sword-Worlds drag on for extended periods of time. The Morglay dynastic war has already lasted for 200 years, and its current “sputtering and smoking” status implies that it could reignite into full intensity at any time. Gram has a similarly long-lasting conflict. “All the major barons are at each other’s throats, and they can’t even keep their own knights and petty-barons in order. Why, there’s a miserable little war down on Southmain Continent that’s been going on for over two centuries.” And when Prince Viktor arrives on Gram with his fleet, the Ward-Glaspyth dynastic war which erupts will last for at least fifty years. As Prince Trask of Tanith predicts to Admiral Harkaman, “Great Satan, Otto; you were in the Durendal War. This is the same thing, and it’ll go on for another half century.”¹³⁰ These interminable conflicts spell the inevitable end of the Sword-Worlds.

12. The Relative Locations of Tanith, Khepera, Beowulf and Amaterasu

Before proceeding into the next stage of the Future History, however, let's take a closer look at the *Space Viking* period. Starting with the three-planet raid by the *Nemesis* and *Space-Scourge*. We've already determined that Tanith is in the southwestern Federation, and Amaterasu was tentatively placed 200 ly to its southeast. As a planet named for a deity of ancient Egypt, Khepera¹³¹ should be closer to Terra, while Beowulf, named for a character from Anglo-Saxon literature,¹³² should be farther out. The relative locations of all four planets can be estimated from evidence in *Space Viking*.

When Lucas Trask decides to raid a few nearby worlds for supplies needed to establish a base on Tanith, he consults his expert on such matters, Otto Harkaman. Harkaman recommends Khepera, Amaterasu and Beowulf from among "half a dozen within five hundred light-years". When they return from the three-planet raid, Trask realizes that "they had been gone only thirty-odd Galactic Standard days".¹³³

If we assume that by "thirty-odd", Piper meant 32.5 days (like his sixty-odd hour ship speed in *Four-Day Planet* means roughly 62.57), then their trip takes about 780 hours. And their itinerary gives us some real clues about distances, because Space Viking ships travel a convenient one light-year per hour, and Beam was unusually specific on many details of their raiding expedition.

First, Khepera is "only thirty light years from" Tanith, so it takes 30 hours to reach that planet. While on Khepera, they raid "three cities in five days", which equals 120 hours.¹³⁴ The time to Amaterasu is not given, so we'll tentatively place mark that with question marks; as ??? hours. They spend seven days on the planet, which is 168 hours.¹³⁵ Then, from Amaterasu to Beowulf is at least 3 days, because after the successful double-crossing of both Eglonsby and Stolgoland, "the parties lasted three Galactic Standard days, and nobody was at all sober." I would assume the crew needs at least one day to recover from such a binge (aided by their alcodote-vitamin pills),¹³⁶ and probably a few more to prepare for what is going to be a very tough fight against Beowulf. So if we assume seven days to Beowulf, that equals another 168 hours. They only seem to be on Beowulf for one single, hellish day,¹³⁷ which means that we can add another 24 hours. The distance from Beowulf to Tanith is given later in the story, being "sixty-five hours", or light-years, away.¹³⁸

So here's what we get.

Total trip time, about 32.5 days = 780 hours
Tanith to Khepera is 30 lys, which = 30 hours
On Khepera for 5 days, which = 120 hours
Khepera to Amaterasu = ??? hours
On Amaterasu for 7 days = 168 hours
Amaterasu to Beowulf, approximately another 7 days, which = 168 hours
On Beowulf for 1 day = 24 hours
Beowulf to Tanith = 65 hours

Adding the known times together, plus the estimate for Amaterasu to Beowulf, equals 575 hours. Subtracting that from 780 hours equals 195 hours from Khepera to Amaterasu; or say 200 hours for convenience. This solves the final unknown. As the approximate time between Khepera and Amaterasu, 200 hours would make this the longest leg of the trip. It's more than 8 days, or about a day longer than the estimated time between Amaterasu and Beowulf.

The greater distance is supported by the way Harkaman talks about their plan before they leave on the raid, which makes it sound like Beowulf is actually closer to Khepera than Amaterasu. "We won't take enough damage on Amaterasu to make any difference there [Beowulf], but if we saved Amaterasu for last, we might be needing too many repairs [after raiding Beowulf]."¹³⁹ They go to Amaterasu first because, even though it is much farther away from Khepera than Beowulf, Beowulf is the tougher planet, so they save that planet for last. After that, it's a fairly short hop back to Tanith and much-needed repairs; only 65 hours rather than nearly 230. (Figure 17.)

Thus, at roughly 200 light-years from Khepera, and less than 230 from Tanith, Amaterasu is well within the "five hundred light-years" that Trask suggests to Harkaman for candidates in their first Viking raid. Later on, Harkaman makes "quick raids on half a dozen planets",¹⁴⁰ which presumably includes a couple of these nearby planets not chosen for the first raid.

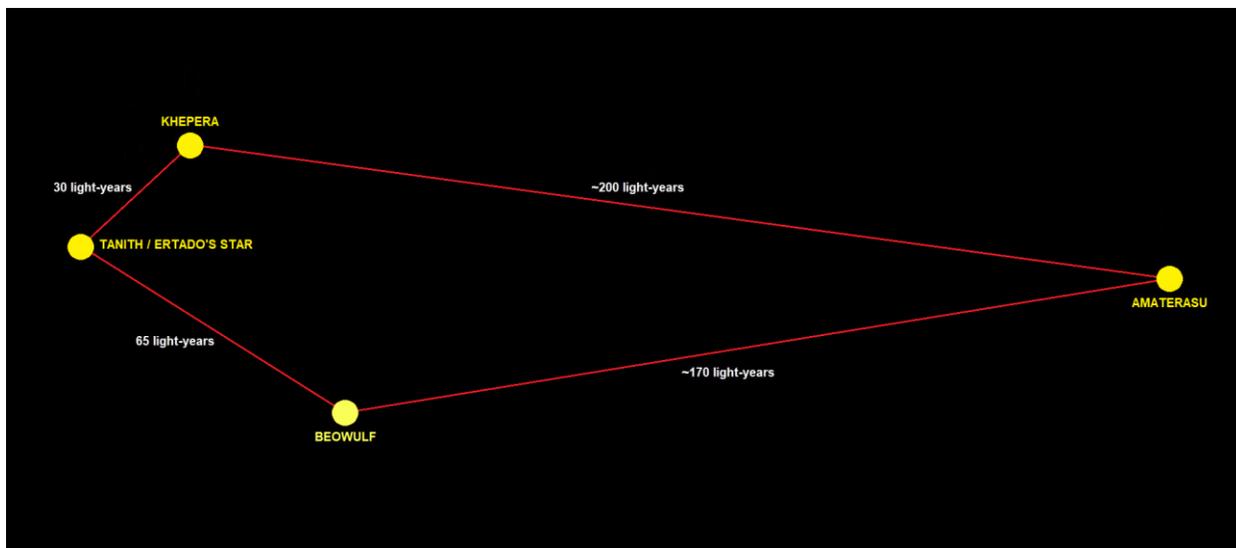


Figure 17. Estimated configuration of the three-planet raid in *Space Viking*.¹⁴¹

13. Base Planets and Trade Planets

Now let's look at Viking base planets and trade planets. During their period of dominance, some Sword-Worlders take over several planets in the Old Federation, and use them as operational bases. This is due to the "distance and voyage time" involved. Instead of wasting more than 4000 hours in hyperspace traveling from the Sword-World cluster to the Orion Arm and back, their base planets in the Old Federation allow the Space Vikings to directly engage in their "raid and trade" expeditions.¹⁴² Xochitl is one of these Old Federation worlds, currently ruled by Prince Viktor, a nobleman from Haulteclere. Tanith is another, ruled by Prince Trask, a nobleman from Gram. And Piper mentions several others; Tobbin of Nergal, the Evertards of Hoth, Fedrig Barragon of Dagon and Nikky Gratham of Jagannath.¹⁴³

There are also "planets known to be temporarily occupied by Space Vikings". The reason being that "A crew could have fun there, much less expensively than on a regular Viking base planet". One of these temporary base planets is Melkarth. It is occupied for 8 years by Captain Niall Burrik of the *Fortuna*; "taking his ship out for occasional quick raids and spending most of the time living from day to day almost on the local level." Then the *Honest Horris*, *Enterprise* and *Starhopper* arrive, and Burrik joins them when they leave, abandoning Melkarth.¹⁴⁴

In addition to base planets, the Space Vikings also have trade planets. In the case of Tanith, after raiding Khepera, Amaterasu and Beowulf, Prince Trask begins trading with all three. And he has at least a few others, since Trask hands "a list of planets...with which Tanith was trading" to the captain of the *Viking's Gift*, to prevent him from raiding them. Indeed, Prince Trask does so much trading, he receives a rebuke from his sovereign, King Angus of Gram, who thinks he should concentrate on raiding. "[A]fter all, why barter with barbarians when it was possible to take what you wanted from them by force?"¹⁴⁵

Can we locate any of these base planets and trade planets on our map? Well, Boake Valkanhayn says that Hoth is "about a thousand hours" from Tanith, or roughly the same distance from Tanith as Xochitl. That would place Hoth in the northern Federation, and—strangely for a Norse-named planet—well outside the Norse Core. Valkanhayn adds that while he and Garvan Spasso were on Hoth, "a Gilgamesher brought the news from Xochitl" about the proposed Gram base on Tanith. This suggests that Hoth and Xochitl are not too far apart.¹⁴⁶ So I placed Hoth 300 light-years northwest of Xochitl.

Sometime after Trask establishes his base on Tanith, he begins trading with Vitharr. And sometime after that, Vitharr is raided by a ship from Xochitl. Otto Harkaman, in the *Corisande II*, happens upon the scene. "He had fought a short but furious ship-action, battering the invader until he was glad to hyper out. Then he had gone directly to Xochitl, arriving on the heels of the ship he had beaten, and had had it out both with the captain and Prince Viktor, serving them with an ultimatum to leave Tanith trade planets alone in the future."¹⁴⁷

Vitharr is presumably somewhere between Tanith and Xochitl. And fortuitously, the Norse Core also lies between them, wherein Vitharr, as a Norse-named planet, should be located. I also assume that Vitharr is closer to Tanith than Xochitl, but farther from Tanith than Amaterasu. So I placed it in the central Federation, 400 ly from Tanith and 600 ly from Xochitl.

Later on, another one of Tanith's trade planets is attacked, this time by a different Viking base planet, Dagon. Admiral Harkaman, apparently reasoning that Tanith will lose credibility if it doesn't respond, takes action. "Barragon's ships were raiding...Ganpat. They looted a couple of cities, destroyed one, killed a lot of the locals. I found out about it from Captain Ravallo of the *Black Star*, on Indra; he'd just been from Ganpat. Beowulf wasn't too far out of the way, so we put in there, and found the *Grendelsbane* just ready to space out...So she joined us, and the three of us went to Dagon. We blew up one of Barragon's ships, and put the other one down out of commission, and then we sacked his base." ¹⁴⁸

After the battle, "The *Grendelsbane* went back to Beowulf; she'll stop at Amaterasu to do a little trading on the way. The *Black Star* went to Xochitl. Just a friendly visit, to say hello to Prince Viktor for you. Ravallo has a lot of audiovisuals we made during the Dagon Operation. Then she's going to Jagannath to visit Nikky Gratham." ¹⁴⁹

To me, these references suggest that Indra is another one of Trask's trade planets, and that Ganpat and Indra are both within 500 ly of Tanith. Given the deduced locations of Beowulf and Amaterasu in relation to Tanith, Indra might then be not far southwest of Tanith, while Ganpat is farther to the south, leaving Dagon even farther out, probably southeast of Tanith.

In addition, since Xochitl is 1000 ly from Tanith, Jagannath should be somewhat closer, and therefore probably to the galactic west. The news of the Dagon Operation will then spread from Xochitl northwest to Hoth, and from Jagannath northeast to Nergal, which I presume is farther away than Jagannath. One would think that Captain Ravallo could have visited all the base planets, rather than just two. Possibly Xochitl and Jagannath are seen as the greatest threats to Tanith's growing trade empire; or maybe Prince Trask just preferred to let his Space Viking rivals spread the word of his resolve in defending Tanith's declared rights. In any case, these references led me to locate the planets this way. (Figure 18.)

Using that map, Piper's references would be explained like this. Barragon's ships raid Ganpat, which is actually closer to Dagon (250 ly to the east) than Tanith (300 ly north). Captain Ravallo lands the *Black Star* on Ganpat, and learns of the raid. He heads for the nearest Tanith trade planet, Indra, 188 ly to the north-northwest. There he meets Harkaman, who is patrolling the trade planets in the *Corisande II*. Instead of going straight to Dagon, 357 ly southeast, or back to Tanith, 125 ly north-northeast, Ravallo and Harkaman once again go to the nearest trade planet. This is Beowulf, a detour of only 110 ly to the northeast. Here, they are joined by the newly-commissioned *Grendelsbane*. For a second time, Admiral Harkaman decides not to return to Tanith. It's 65 ly northwest of Beowulf, so it's out of the way; plus, he apparently reasons that three ships are enough to take on Dagon. So they proceed on a southeasterly course 333 ly to the southeast, arriving at Dagon. Harkaman's judgment is accurate, and after defeating Barragon's ships and sacking his base, the *Corisande II* returns to Tanith, about 400 ly to the northwest, where Otto finally reports back to Trask. Meanwhile, the *Grendelsbane* leaves Dagon in a different direction, voyaging north 250 ly to Amaterasu, where it does some trading; and then turns homeward, west-northwest for Beowulf, which as we've seen is about 170 ly from Amaterasu. And finally, the *Black Star* goes on a much longer trip. From Dagon, it's over 1100 ly northeast to Xochitl, where Captain Ravallo shows Prince Viktor some movies; then 815 ly west-southwest to Jagannath, where he does the same for Nikky Gratham. After this, he presumably takes the *Black Star* back to Tanith, which I estimate to be 500 ly from Jagannath.

Incidentally, the names Nergal, Jagannath, Xochitl, Tanith and Dagon suggest that all these planets are outside the Norse Core. Since the Core was presumably the richest sector of the Federation, one would think there would be at least one Norse planet inside the Core which is used as a Viking base. Hoth could have filled that role, but as we've seen, its distance from Tanith places it well outside the central Federation. The lack of such a Norse-named base planet could mean that this area was hardest hit in the Interstellar Wars; plus, we've already deduced the central Federation to be one of the major targets of earlier Viking raids, when they were still traveling all the way from the Sword-Worlds. So that by the time of *Space Viking*, the richest pickings in the Old Federation could lie outside the Norse Core, and this is where all the known base planets are.



Figure 18. Estimated location of Space Viking base planets (red) and Tanith trade planets (black) in the Old Federation.

The placement of Dagon in the southern Federation, far from the rest of the base planets, can be justified.¹⁵⁰ First, Dagon is apparently a newer base planet. There are only two ships operating from it, in contrast to Tanith, which has three ships right off the bat, when Lucas Trask first sets up his base. Second, as a newer base planet this means Dagon should be fairly weak, in relation to Xochitl, Hoth, Nergal and Jagannath, which are all suggested to be longer established and more prosperous bases. Indeed, Xochitl (and possibly Jagannath) is viewed as a major threat to Tanith, while Dagon is essentially a paper tiger, taken down in a single operation by Tanith and its ally, Beowulf. And third, by crushing Dagon—which is never mentioned again, and so probably doesn't recover—and warning off the other base planets (Xochitl in particular), Prince Trask effectively consolidates his hold on this corner of the Old Federation. A situation which undoubtedly contributes to the founding of the League of Civilized Worlds.

Speaking of which, let's now move on, and take a look at what happens after the time of *Space Viking*.

14. The League of Civilized Worlds

Since the Sword-Worlds are steadily decivilizing, Prince Trask makes it his life's work to help planets in the Old Federation to recivilize. According to King Mikhyll VIII of Marduk, this historical process has already begun, and is partly due to the Space Vikings themselves. Viking base-planets spread advanced Sword-World technology, including the education and training of local populations to use it; while in some cases even their raids have beneficial effects. For example, the major nations of Aton were once on the brink of an Atomic War, which probably would have led to the decivilization of the planet, when six Viking

ships from Haulteclere arrived. “That raid saved civilization on Aton...The Space Vikings forced them to unite. Out of that temporary alliance came the League of Common Defense, and from that the Planetary Republic.”¹⁵¹

Trask’s solution is to create an interstellar version of the League of Common Defense. “And there would be the treaty—Tanith, Marduk, Beowulf, Amaterasu; eventually, treaties with the other civilized planets. Nebulously, the idea of a League of Civilized Worlds began to take shape in his mind.”¹⁵²

So let’s start with what can be called the ‘Four Worlds Treaty’; the agreement between the four planets which becomes the foundation of the League of Civilized Worlds. Marduk is obviously a civilized planet, while Tanith, Beowulf and Amaterasu become so by the end of *Space Viking*.¹⁵³ In addition, Marduk has fourteen trade planets, which include Tetragrammaton, “Seshat, Obidicut, Lugaluru, Audhumla” and Gimli.¹⁵⁴ These can be considered part of the Mardukan component of the League. Only the distances from Marduk to Audhumla and Gimli are known, while the distance from Tanith to Tetragrammaton is “less than two hundred and fifty” light-years.¹⁵⁵ I have therefore tentatively placed Tetragrammaton east-southeast of Tanith, west-northwest of Marduk and south of Amaterasu.

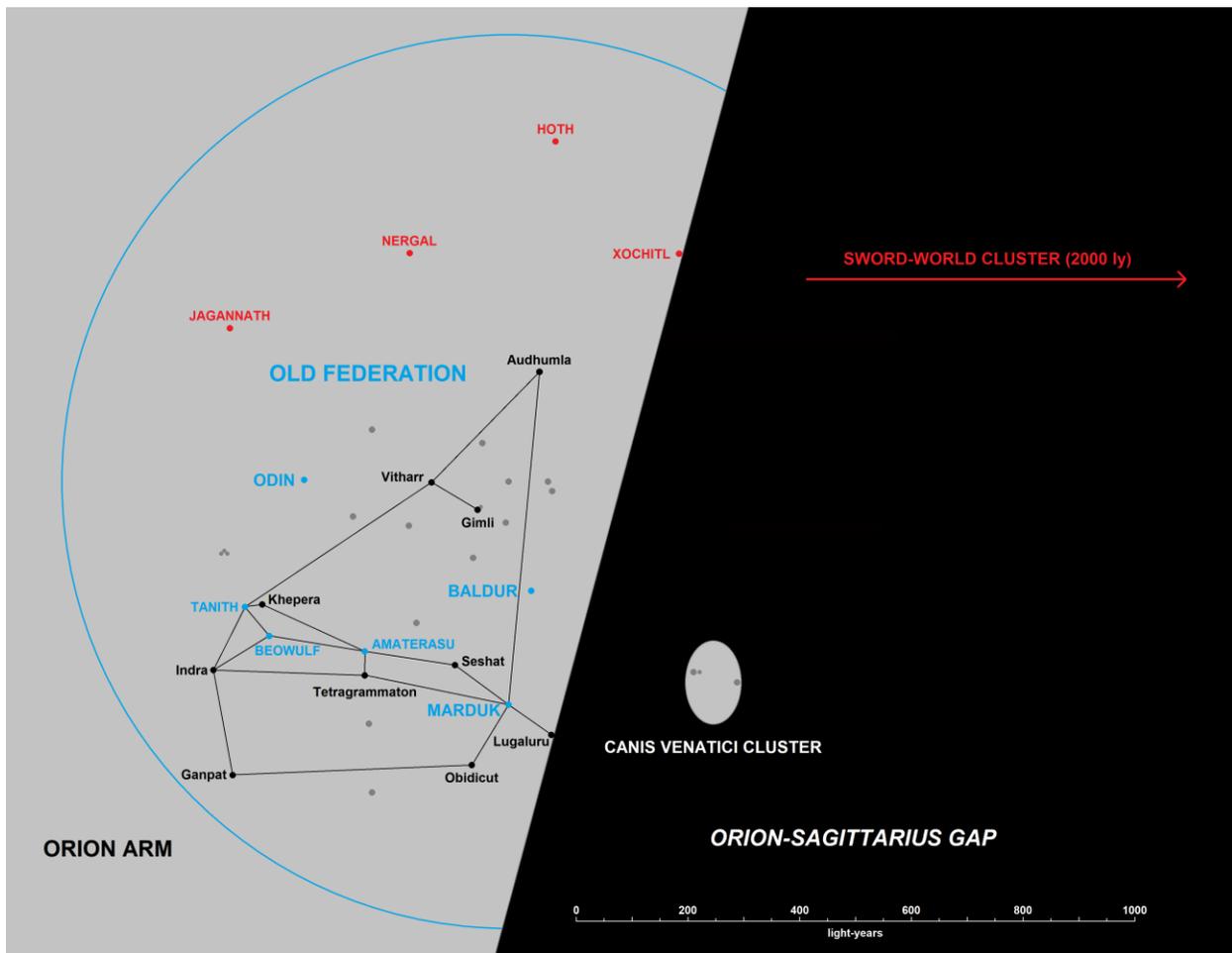


Figure 19. Estimated initial extent of the League of Civilized Worlds and associated trade planets, circa AE 1725.

Moreover, Piper’s stated order of planets—Seshat, Obidicut, Lugaluru, Audhumla—implies their order of distance from Tetragrammaton. This is confirmed by “Seshat was the closest; they went there first. They were too late. Seshat had had it already, and on the evidence of the radioactivity counters, not too long ago. Four hundred hours at most.”¹⁵⁶ Seshat is an Egyptian deity, the goddess of writing; implying that the planet Seshat is closer to Terra than Marduk, which is named for a Babylonian deity. So I placed

it east-northeast of Tetragrammaton, and northwest of Marduk. Obidicut, however, is a literary figure, being the fiend of lust in Shakespeare's *King Lear*. This means Obidicut should be farther from Terra than Marduk, among the outer planets named "for almost anything". I therefore located it southeast of Tetragrammaton and south of Marduk. But Lugaluru, like Marduk, is named from Babylonian mythology. This implies a similar distance from Terra as Marduk. So Lugaluru was placed not far to the southeast of Marduk, on the edge of the Orion Arm. (Figure 19.)

Why Beam didn't include Gimli, which should be the next farthest trade planet from Tetragrammaton, is unknown. Perhaps Gimli isn't an official trade planet, after all. Or, since the allied fleet later gathers at Gimli,¹⁵⁷ it might be the site of a Mardukan Space Navy base—possibly the old Federation-era base mentioned in *Four-Day Planet*. It could therefore be too well defended for Dunnan to attack. In any case, Prince Trask decides to take his ships to the farthest trade planet instead. "Say we try Audhumla next. It's the farthest away. We might get there while [Dunnan is] still shooting up Obidicut and Lugaluru."¹⁵⁸

Incidentally, even though Gimli is very close to Fenris, Fenris is not mentioned in *Space Viking*. So I assume that this hellish world is not among Marduk's trade planets. Its only export during the Federation period was tallow-wax, and a carniculture form was likely invented not long after *Four-Day Planet*.¹⁵⁹ There would be little reason to go there. As stated previously, a Gilgamesher, not a Mardukan ship, brings some Zarathustra sunstones to Tanith. This might suggest that Zarathustra is also outside the Mardukan trading network. However, Zarathustra's position between Marduk and Tanith also suggests that, if it is not a trade planet now, it will be when the League of Civilized Worlds gets going.

As seen in Figure 19, the names Tanith, Beowulf and Amaterasu are now in blue, since these planets have become civilized; but in a smaller font than Marduk and the other major civilized worlds. And due to the loss of Tanith (now civilized) and Dagon (destroyed), all the remaining Viking base planets are in the northern part of the Old Federation. The estimated initial extent of the League therefore includes a large part of the Federation's southern region, with Gimli, Vitharr and Audhumla as northern outliers.

If correct, this could be Piper's fulfillment of the old adage about the Confederacy; "the South shall rise again."¹⁶⁰ For as a parallel of the Confederate States of America, and described as an 'alliance' rather than a union, the System States Alliance was presumably a confederal league of equal but sovereign systems. Similarly, Beam's use of the word 'league' suggests that the League of Civilized Worlds is a 'confederal' alliance of equal but sovereign planets, coincidentally lying mainly in the same part of the Old Federation as the Old Alliance.

15. The Spheres of Influence

a) Spheres and Expansion of the League, Baldur and Odin

So at first, the League of Civilized Worlds is very similar to the old System States Alliance. But since the Terran Federation is no longer around to put this 'new Alliance' down, the League is free to expand and thrive. Ironically, this leads to Lucas Trask becoming one of Piper's self-reliant men, who win the battle but lose the war. Because the evidence suggests that the League of Civilized Worlds fails to fulfill his dream, at least as originally conceived. Trask's vision—"eventually, treaties with the other civilized planets"—certainly implies that he intends for "Odin and Baldur and Isis and Ishtar and Aton and the other civilized worlds" to eventually join the League.¹⁶¹ An 'Alliance' of 'Federation' size, as it were.

But in "The Future History", Beam states that "Lucas Trask organizes League of Civilized Worlds; work continued by the Bentricks, reigning house of Marduk. By the time of the Nineteenth Century [AE], the League has turned into the Galactic Empire." Thus, "Marduk, [is] where the Empire had begun," not Tanith; and it is the House of Bentrík, not the House of Trask, that supplies its rulers.¹⁶² So even though Trask recivilizes Tanith, saves civilization on Marduk by organizing the allied fleet which liberates it from Zasparr Makann and Andray Dunnan, and furthermore is the driving force in creating the League, Marduk comes to dominate it. Probably through its sheer size as a fully-civilized planet of two billion people, plus the strong leadership of its reinvigorated monarchy.¹⁶³

Tanith, by contrast, is a low population planet. It was colonized not long before the System States War, or roughly three centuries after Marduk, and much of what population Tanith did have was killed off during the Interstellar Wars. "Harkaman thought most of the fighting had been done with subneutron bombs or Omega-ray bombs, that killed the people without damaging the real estate. Or bio-weapons; a

manmade plague that had gotten out of control and all but depopulated the planet.” Thus, over the long run the heirs of King Lucas just don’t have the manpower to compete with the rulers of Marduk. ¹⁶⁴

In turn, Mardukan dominance probably means that the “treaties with the other civilized planets” never materialize; save perhaps for one or two early acquisitions. The vast majority, including Odin, Baldur, Isis, Ishtar and Aton, do not voluntarily join the League. Compared with Marduk, they likely have similar populations and relative strength levels, paralleling the old European powers like France, Spain and England. So if they did join the League of Civilized Worlds, there would likely be power-struggles between them, which would doubtless have destroyed the League, not united it into an Empire.

The probable outcome is that, when the League is created and begins expanding, the other civilized worlds react with expansion of their own. Creating their own leagues, alliances, associations and coalitions, they begin carving out their own spheres of influence in Old Federation space. And following Marduk’s lead, they start this process by developing and exerting greater control over their trade planets. Resulting in a Mardukan Sphere (the League), an Odinic Sphere, a Balduran Sphere, an Isisian Sphere, and so on. These gradual but concurrent expansions would include competition over trade and planetary resources, undoubtedly leading to tensions and wars between the rival alliances. The conflicts which involve Marduk presumably include “the battles that had created Imperial power.” ¹⁶⁵ The reference to these battles certainly suggests that the League has enemies whose prowess rivals its own.

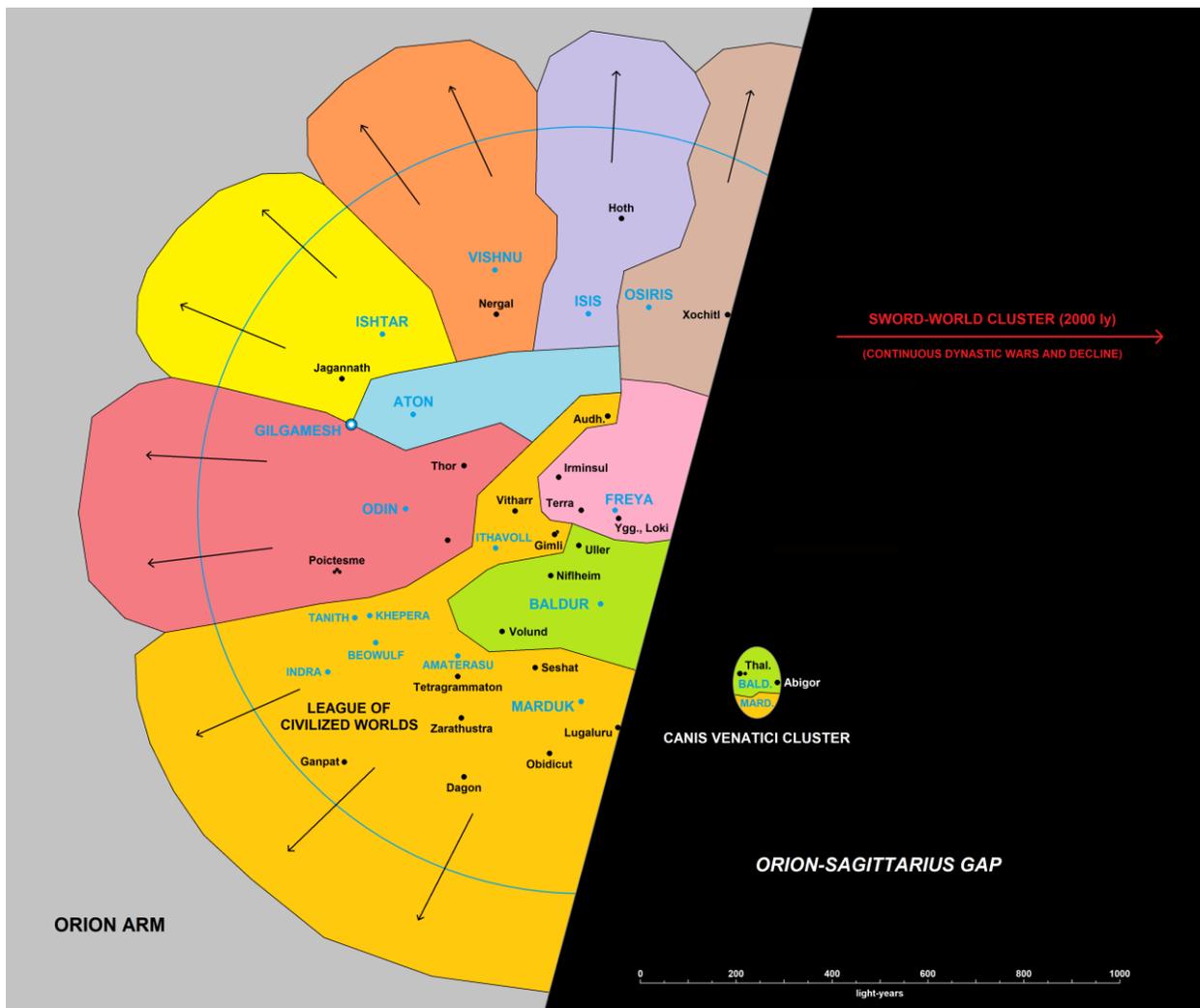


Figure 20. Estimated configuration and expansion of the post-Space Viking spheres of influence, circa AE 1800.

Once these spheres completely encompass the Old Federation, the only direction for peacefully obtaining new resources—and thereby gaining an advantage over rival coalitions without war—would be on new planets beyond the Federation’s old frontiers. So I assume a new era of expansion begins. This would be made easier by the starships of the Interregnum era, which are eight times faster than those of the late Federation. The civilized planets whose spheres are along its periphery would lead the way in this new outward wave deeper into the Orion Arm. That should include Marduk, at the outer end of the old Terra-Baldur-Marduk Spacelines route; and Odin, the outer stop of the old Terra-Odin milk run.¹⁶⁶

Expansion is also supported by the case of the Galactic Empire. As noted earlier, at the height of its power Imperial hyperships can travel “light-years an hour”, which is several times faster than those of the Interregnum period. And the Empire contains 1,365 inhabited planets, which is 2.73 times as many as were in the Terran Federation. So I assume the Empire has a radius roughly that much greater than the Federation’s (see **The First Galactic Empire**, below). The faster ship speed enables this larger area to be successfully unified and governed. But not all of this growth is necessarily due to the Empire, which may merely be continuing a historical process of expansion begun during the days of the League and the other spheres of influence.

Sometime after *Space Viking*, I therefore assume that League expansion brings the rest of the south and southwestern Federation under its sway. (Figure 20.) This includes Zarathustra, control of which may be contested with Baldur. Since Baldur is the closest known civilized planet to Marduk, I assume there is at least one war between these two worlds. And though on the map, Marduk is closer to Zarathustra than Baldur is, Baldur is actually closer to Marduk’s trade planet Audhumla than Marduk is. Meaning that the early issues of contention between them could be over who controls the sunstone trade, as well as whatever valuable export Audhumla is known for. But by possessing formidable allies like Tanith and Beowulf, Marduk is undoubtedly victorious over Baldur.

Another ally aiding Marduk is probably Ithavoll. At the time of *Space Viking*, Ithavoll is a former colony of Marduk that has become “a civilized world, and one of Marduk’s best friends.”¹⁶⁷ I therefore assume Ithavoll is an early recruit of the League. Possibly even the first to join after the initial quartet of Tanith, Marduk, Beowulf and Amaterasu. In *Space Viking*, Khepera begins sending students to schools on Tanith, Beowulf and Amaterasu.¹⁶⁸ So although it’s only a trade planet at first, Khepera probably becomes a full member of the League when it develops enough knowledge and technological expertise to be considered a civilized world. Also depicted in Figure 20 is that Indra becomes a civilized member of the League. Currently a trade planet, Indra seems to be fairly close to Tanith, and so probably becomes civilized not long after Amaterasu; possibly around the same time as Khepera, or soon after.

Another acquisition of the League is a wide swath of new territory beyond the Old Federation’s southern border. Tanith’s position not far from the southwestern frontier could mean that it is the instigator of expansion in this direction. A new endeavor; possibly motivated by its loss of influence to Marduk within the League, which Tanith may be trying to recover. However, given Marduk’s much greater population, the Mardukans will probably come to dominate this new expansion as well. And since the creation of the League precedes those set up by the other civilized worlds, I presume the LCW is the largest of the new spheres.

Assuming Baldur fails to acquire Zarathustra, its sphere would probably include Volund, a planet known for manufacturing weapons; and nearby Niflheim and Uller, which are both mining planets.¹⁶⁹ The Baldurans would need the resources of these worlds to maintain and extend its growing sphere. Moreover, the acquisition of Uller creates the interesting possibility that Kragan soldiers are recruited to fight for the Baldurans, in their wars with Marduk and other spheres. And why not, since Beam staffed the Household Guards of the later Galactic Emperors with dog-like Thorans, rather than humans?¹⁷⁰

So the mines of Niflheim and Uller could provide Baldur with raw materials, some of which are shipped to Volund for making weapons, and some to Baldur for building warships; while Uller also supplies mercenary soldiers. All three would contribute to the development of a strong Balduran military, whose sphere could then provide the League of Civilized Worlds with its first serious rival. And given that Baldur is rather hemmed in by the League to the south and west, it could occupy most if not all of the Canis Venatici cluster, while the League’s attention is concentrated on consolidating its control of the southern Federation. Marduk may already have a trade planet in the southern part of the cluster (which is much closer to Marduk than far-off Audhumla), or they move in to counter Baldur’s activities in the area.

Odin’s sphere would likely take in much of the western Federation. Confronted by the growing League

to its south, Odin probably sends a force to occupy Poictesme, thereby gaining the resources of the Trisystem. In addition, the Mardukan presence on Gimli and its close friendship with Ithavoll would force Odin into annexing the Norse planet west of Ithavoll, which was part of the old T-O milk run; and it probably brings Thor into its initial sphere as well. After gathering as much of the western Old Federation as it can, Odin would then expand into its own share of ultra-Federation space, west of the old frontier. Given Odin's later importance as the capital of the Galactic Empire, I assume that its sphere is the second largest. In *Space Viking*, Marduk and Odin have already fought one half-hearted war, around AE 1640,¹⁷¹ but Beam may have intended this reference as a foreshadowing of later wars, which will be waged much more seriously.

b) Spheres and Expansion of the Other Civilized Worlds

That covers the three major civilized worlds whose locations can be estimated from evidence in Piper. It must be emphasized that, as in the case of most of the Space Viking base planets, there is nothing to go on for the other civilized worlds, so their locations and spheres of influence in Figure 20 are highly speculative, as are the following analyses of their effects. With that in mind, let's start with Aton, Osiris and Isis, which I located at a middling distance between Sol and the Old Federation's outer border; north and northwest of Terra and northeast of Odin. This is because Beam's quote about "Celtic and Egyptian and Hindu and Assyrian" suggests the Egyptian-named planets are somewhat farther out than Odin and the planets of the Norse Core.

As they are named for mythological spouses, I placed Isis and Osiris much closer together than either is with Aton. Together, Isis and Osiris divide up most of the northeastern Federation. And given Prince Trask's statement that "Sooner or later, civilization in the Old Federation would drive [the Space Vikings] all home to loot the planets that had sent them out",¹⁷² the Viking base planets must go through a period of decline, followed by their abandonment and/or conquest by the civilized worlds. In the present scenario, Isis eventually acquires Hoth, while Osiris takes Xochitl. Xochitl's decline is hinted at the end of *Space Viking*. Prince Viktor of Xochitl lands on Gram with a fleet of eight ships. Trask suspects that he wants the throne of Gram for himself, and Viktor could easily arrange for Duke Omfray of Glaspyth, the nominal claimant, to be killed in the fighting. Prince Viktor would then become a Sword-World king, by right of conquest. With the bulk of his military forces now in the Sword-Worlds, and absent his strong leadership, Xochitl would weaken, and become vulnerable to the rising power of the civilized worlds.

Now for Aton. I made its sphere a bit smaller than those of Isis and Osiris, because it undergoes repeated political turmoil, which I presume translates into a slower (and therefore smaller) expansion. As stated previously, Aton was once on the brink of a nuclear war between its two most powerful nations, which would probably have decivilized the planet. It was only prevented by the arrival of Space Viking raiders, which forced the Atonians to unite in self-defense. Later, Aton presumably loses "the war with Baldur", because this causes a "crisis" which brings the Planetary Nationalists to power. And as a "damned nasty" dictatorship, the Planetary Nationalists are eventually "smashed" (whether by interior or exterior enemies Beam does not say), and replaced with a monarchical government.¹⁷³

Moving on to the northwestern Federation, I split the majority of this region between Vishnu and Ishtar. Vishnu I assume is the civilized world which eventually acquires Nergal, while Ishtar takes Jagannath.

Next is Freya. Beam only specified the names of 9 out of the 17 or so civilized worlds which survive the Interstellar Wars,¹⁷⁴ and I like to think that Freya is one of the unnamed ones. It already had an indigenous human population when it was discovered by Terrans in the Third Century, so Freya should have developed much more rapidly than the average colonial planet. Moreover, the Terrans found that the Freyans were constantly at war with each other;¹⁷⁵ a fighting instinct which I presume resurfaces as the Federation begins collapsing, and the Freyans have to defend themselves from off-world threats.

Freya's deduced sphere would include Yggdrasil and Loki, only 20 ly away; and Freyan troops could also land on Terra, a mere 70 ly to the west. This would involve an ironic reversal of fortune. In the early days of the Federation, the star-traveling Terrans discovered the medieval-equivalent Freyans; but now, the star-traveling Freyans discover that their erstwhile Terran superiors are the inferior ones, having become a primitive, savage race. And it's even worse. Because to the Terrans, pristine Freya was a valuable planet, but the Freyans find that Terra was completely ruined in the Interstellar Wars. It is therefore probable that Freya's interest in irradiated Terra is mainly strategic. Sol is now a something of a border system, lying not far from the frontiers of the Mardukan (Gimli) and Balduran (Uller) spheres.

Notice that I located most of the civilized worlds in the northern part of the Old Federation. This was deliberate, because “The Terran Federation had impoverished a hundred planets, devastated a score, actually depopulated at least three, to keep the System States Alliance from seceding.”¹⁷⁶ One would think that the devastation inflicted on the southern Federation during the System States War means more northern planets remain civilized when the TF finally falls apart for good. Harking back to the American model put forth in the early part of this paper, having all these civilized planets in the northern Federation would parallel Union cities like Boston, New York, Philadelphia, Pittsburgh, Detroit and Chicago, which after the Civil War, and through Piper’s lifetime, had no equal among the southern cities.

This parallel would be particularly true because, unlike the Civil War model, the Alliance planets do not appear to have a period of Reconstruction after the war. John Carr describes the postwar period as one of “retrenchment.” The Terran Federation “is no longer expanding and the economy is deteriorating.”¹⁷⁷ In fact, it appears to have fallen into the state of “economic *rigor mortis*” which leads to the “petrification” of a universal state, prior to “the cracking and the crumbling” attendant with its final collapse.¹⁷⁸

Assuming that most of the major civilized worlds are in the northern Federation, this is actually good news for planets like Marduk and Odin. Because with fewer competitors in the southern and western Federation, they should be able to expand to much greater distances than northern planets like Osiris, Isis, Ishtar and Vishnu, which are located much closer together. This could play a role in why Marduk is able to found the Galactic Empire. It gets a jump on the other civilized worlds by helping to found the League of Civilized Worlds, and assuming it gets the better of Baldur in their presumed conflicts, Marduk would be able to bring the vast majority of the southern Federation under its sway. At that point, it might be too powerful for comfort, causing several of the other spheres to combine against it. And one of them could be Odin, which expands by conquering Aton, thereby becoming larger and more powerful itself.

Now for the six or seven major civilized worlds unnamed by Piper. Since the map only shows 10 of the 17 or so spheres of influence, the others might be located somewhere in the upper and lower regions of the Orion Arm; ‘above’ and ‘below’ the galactic plane of symmetry, which my chart roughly shows.

But during the descriptions of the various spheres, I left one civilized planet out. Now let’s look at what may be the most interesting sphere, and quite possibly the largest of them all—that of Gilgamesh.

16. The Sphere of Gilgamesh

a) A Federation-Wide Trading Network

In Figure 20, Gilgamesh was depicted in white rather than blue because, although it is a civilized world, its democratic, Federation-era culture was interrupted by “two centuries of darkness”, and replaced by a theo-socialist system, which gravitates around the worship of “Yah the Almighty”. It’s “an absurd potpourri of most of the major monotheisms of the Federation period, plus doctrinal and ritualistic innovations of their own.” Thus, unlike the major civilized worlds like Odin, Marduk and Isis, Gilgamesh did not ‘retain the culture of the Terran Federation uninterruptedly’. However, it is noteworthy that their new religion’s emblem is “a blue triangle in a white circle”.¹⁷⁹ This is an apparent holdover (and reversal) of the old Terran colors, which were a white emblem on a blue field. That provided another appropriate color to use in depicting Gilgamesh on the map.

At first glance, Gilgamesh doesn’t have any sphere, or only a tiny one. For also unlike the inhabitants of other civilized worlds, the Gilgameshers do not have expansionist ideas. “They didn’t raid; they traded. They had religious objections to violence, though they kept these within sensible limits, and were able and willing to fight with fanatical ferocity in defense of their home planet.”¹⁸⁰ Their ‘sphere’ should therefore include only Gilgamesh itself, or perhaps their stellar system. It is shown as such on the map.

But with Piper, one often has to read between the lines. And by doing so, you quickly realize that Gilgamesh’s unofficial sphere of influence is actually much larger. Because “Their ships went everywhere to trade, and wherever they traded a few of them usually settled, and where they settled they made money, sending most of it home.” These references suggest that there are Gilgameshers all over the Old Federation.¹⁸¹ And this points to a subtle web of influence stretching throughout Federation space; interpreted by Zasparr Makann, a “political demagogue”, as “the Gilgamesh Interstellar Conspiracy”.¹⁸²

Part of the reason for Makann’s paranoia is that there’s “a large Gilgamesher colony” on his home planet of Marduk.¹⁸³ But since the Gilgameshers are “everywhere”, there are probably large colonies of them on all the other major civilized worlds as well. Zasparr’s conspiracy theory would then make more

sense. The civilized worlds are where the most money can be made, which means more to send home to Gilgamesh. One can also assume that there are smaller but sizeable groups of colonists on the primary trade planets of the civilized worlds. These would include Loki (gold) and Gimli (uranium).¹⁸⁴ In addition, there's "a few on Tanith", who settle there during *Space Viking*.¹⁸⁵ As previously mentioned, the first Gilgameshers who land at Rivington carry a cargo which includes "vegetable-amber and flame-bird plumes from Irminsul; ivory or something very like it from somewhere else; diamonds and Uller organic opals and Zarathustra sunstones." Assuming the ivory is actual ivory, then it came from Terra; so Irminsul, Terra, Uller and Zarathustra can be included in the 'web' of Gilgamesh.

Also included are Beowulf, Amaterasu and Khepera, which probably obtain a few Gilgamesh settlers in the process of becoming fully civilized planets, just as Tanith did. Another is Xochitl. Although it's a Viking base planet, Xochitl may also have a Gilgamesher settlement, because Dagon, another base planet, does.¹⁸⁶ In fact, there are probably few Old Federation worlds which lie outside the Gilgamesh network. (Figure 21.) Most likely, these are minor worlds such as Aditya, which "dropped out of history" for 500 years; and Seshat, which is the victim of a Dunaan terror-raid. It is hit with "two hellburners... a planetbuster... And half a dozen thermonuclears." "There were quite a few survivors...but within a century or so they'd be back to the loincloth and the stone hatchet."¹⁸⁷ With little money to be made, the Gilgameshers would probably not stay on Seshat, though they could stop by to trade occasionally.

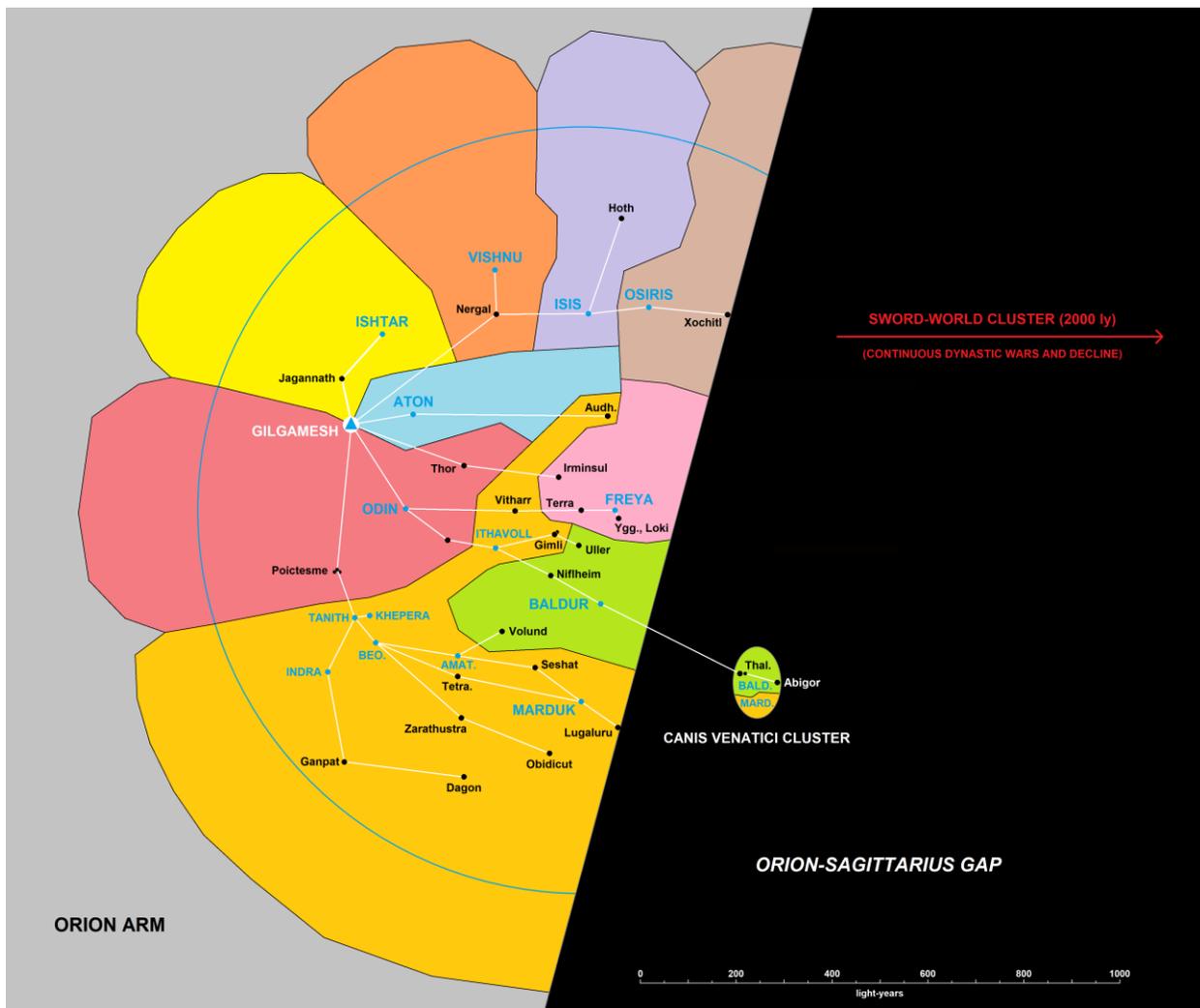


Figure 21. Estimated minimum extent of Gilgamesh's unofficial sphere of influence, circa AE 1800.

This brings us to the specific location of Gilgamesh. There are no references in Piper, but John Carr and William Taylor estimate its location as 1000 ly from Marduk.¹⁸⁸ That would put the planet well into the northern Federation. I retained the region, but reduced their figure to 750 ly. And that's because on a two-dimensional map, Gilgamesh at 1000 ly from Marduk would be far out toward the periphery of the Old Federation, somewhere in the "naming planets for almost anything" region; but its Assyro-Babylonian name should put it at a Marduk-like distance of 400 ly or so from Terra. So I placed it farther out than Aton and the other Egyptian-deity planets, but closer than Hindu-deity planets like Vishnu and Jagannath. (I know, this reverses the order as given by Piper in "Graveyard of Dreams", where the Hindu planets are closer than the Assyrian ones. But Hoth is unquestionably far outside the Norse Core, when it should be within. I therefore presume that Gilgamesh is another one of these exceptions to the general rule.)

Assuming that Gilgamesh is not far from Aton, it would be in danger of falling into the Atonian sphere. Indeed, it could be vulnerable to several major worlds, including Ishtar and Odin. This can partly explain why Gilgamesh needs its off-world settlers to send so much money home. Not only to defend against Space Viking raids, which is put to the test at least once,¹⁸⁹ but to maintain a strong defensive posture against the other civilized worlds, which are comparable if not larger threats. One or more could try to take control of Gilgamesh, in order to raid its presumably well-filled planetary coffers, as well as acquire its trade fleet and extensive trading network, which would produce yet more wealth.

Indeed, this might be one of the few (and theoretically easiest) ways for Aton, completely boxed in by other spheres, to try and expand. But that would probably provoke a reaction among the other civilized worlds, who would resist such a move, in order to keep Aton from acquiring all that wealth and potentially becoming much more powerful. Moreover, in *Space Viking*, Gilgamesh seems to be acting as a behind-the-scenes ally of Marduk.¹⁹⁰ So if they ever find their planetary defenses inadequate in the face of, say, a rising Atonian or Ishtar threat, the Gilgameshers could call on the Mardukans for assistance. And that could result in the space navy of the League of Civilized Worlds (in all likelihood primarily Royal Mardukan Navy units) entering the northern Federation in substantial force for the first time. Not something the civilized worlds of that region would welcome.

b) That Doubles as a Federation-Wide Intelligence Network

But even apart from these balance of power considerations, the Gilgameshers probably need not worry overmuch about being conquered. Because their Federation-wide trading network appears to be involved with more than just making money. It also functions as an intelligence-gathering network, which should give them a big advantage over any potential foe.¹⁹¹

Prince Edvard of Marduk says that "anything one Gilgamesher knows, they all know"; while Captain Manfred Ravallo puts it similarly. "[D]on't let anybody with side-whiskers and buttoned-up coats see them ...What any of those people know gets all over the place before long." Both references imply a very efficient system of gathering and transmitting information.¹⁹² The Gilgameshers are not only everywhere, they are constantly listening, and seem to know just about everything.

While they certainly use all this intelligence in planning their defensive needs, the Gilgameshers have a more important reason for gathering it. For as revealed by John Carr, Piper told Jerry Pournelle that the Cosmic Computer, Merlin, is moved to Gilgamesh during the Interstellar Wars.

It therefore seems significant that in *The Cosmic Computer*, "Merlin is a religion" to most people on Poictesme. Called by Rodney Maxwell "Merlinolators" (Merlin-worshippers), the Poictesmeans consider it "a robot god", easily capable of delivering their planet from its current destitution. In fact, Merlin even considers itself a god. "And if you'd asked such a computer, "Is there a God?" it would have simply answered, "Present." " A man naming himself the Reverend Carl Leibert appears; claiming to be a priest of what he calls "the Great Computer". "He says that Merlin could formulate an entirely new religion, which would regenerate humanity."¹⁹³

Thus, the late-Federation religion based on Merlin the robot god seems very similar to the entirely new interregnum religion based on Yah the Almighty god. The most likely conclusion is that, after being transferred to Gilgamesh, Merlin 'formulates' this new religion, and becomes its 'god', Yah himself.

In support of this deduction, the Gilgameshers seem to be Piper's 'cosmic' version of orthodox Jews, and Yah is presumably short for Yahweh, the Old Testament God of the Hebrews. Yahweh means "I am that am", so that the short form "Yah" should mean approximately "I am". Yah the Almighty would then mean "I am the Almighty". And this is essentially what Merlin would say in response to the question of

whether there is a God. For by answering “Present”, Merlin would simply mean that “I am God”, or “I am.” Yah is Merlin.

That Merlin becomes Yah would be another instance of the “*Falsification*” that Merlin recommends at the end of *The Cosmic Computer* as “*the best course to be followed under these conditions*”.¹⁹⁴ For when Merlin is moved to Gilgamesh, the conditions on Poictesme are probably dire. For some reason, the Merlin Plan fails; probably resulting in a renewal of the sectarian violence seen in that novel, or possibly even civil war. Such a development would necessitate an off-world getaway by Merlin and his handlers, in order to preserve the Great Computer and its ability to predict the future; or “handle large-group behavior with absolute accuracy”.¹⁹⁵ But it is likely that conditions in the Federation as a whole are equally bleak. The Interstellar Wars have begun, and there is fighting on, and around, many worlds.

In the parlance of *Space Viking* (written close in time to *The Cosmic Computer*), this would be a good time for Merlin to tell a Big Lie. “Such a big lie that nobody will dare to disbelieve it.”¹⁹⁶ The lie is that Merlin was destroyed in the fighting. With the Great Computer allegedly blown to smithereens, ‘God is dead’; no one will search for Merlin or fight to possess it any longer. Which is what the Poictesmeans did in the novel; they searched for Merlin, fought over Merlin, and in the process almost provoked the devastation of their planet by super-missiles from Koshchei.¹⁹⁷ Assuming they’re fighting over Merlin once again, the result this time could be just that—annihilation.

Thus, with Poictesme in nuclear shambles and its robot-god believed to be destroyed, Merlin and his handlers would be free to find an inconspicuous planet, in this case Gilgamesh, where they can hide. There, Merlin adopts a cover identity; a new, but appropriately godlike, form. And behind this disguise, it secretly crafts a second Merlin Plan, which will again attempt to “regenerate humanity” by creating a universal state. Since the first Merlin Plan failed to establish “a new [Federation]” based on Poictesme,¹⁹⁸ Merlin apparently calculates that Marduk is now the best candidate. Like Poictesme, Marduk is a planet hundreds of light-years away from decadent Terra; probably one of the reasons for its selection.

In turn, this explains why the Gilgameshers are cooperating with the Mardukans in *Space Viking*, and it becomes not so coincidental that Marduk later founds the Galactic Empire. These Yah-worshippers are simply helping Marduk to unknowingly fulfill the second Merlin Plan, which was initiated on Gilgamesh. The Plan was dependent on the political, social and economic intelligence the Gilgameshers sent home from the various worlds of the Old Federation. This was given to “Yah”, probably by the same method as in *The Cosmic Computer*. There, all information “had to be abstracted and summarized and translated from verbal symbols to the electro-mathematical language of computers and fed in” to Merlin¹⁹⁹

Parenthetically, planets like Aditya, which “dropped out of history”, can be safely left out of Merlin’s future historical calculations, since their socio-economic conditions do not affect other worlds. At least, until “A Slave is a Slave”, “when history returned in the black ships of the Galactic Empire.”²⁰⁰

Thus, the top priority of Gilgamesh’s formidable defenses is probably to protect “Yah” from harm, while the safety of its own citizens is of secondary concern. This also explains why the Gilgameshers are “able and willing to fight with fanatical ferocity in defense of their home planet.” As the abode of their god Yah the Almighty, their planet is probably considered ‘holy’ by the Gilgameshers. To fight against Gilgamesh is to fight against Yah, who must be protected at all costs. The One (Robot) God ain’t ‘dead’ after all.

c) *The Universal State as a Religion*

In their failure to create a new Federation, the Poictesmeans may be said to have not taken their ‘mission’ seriously enough. Competing groups fought over Merlin, which brought the original Plan to ruin. That’s probably why Merlin creates a new religion on Gilgamesh—in order to unite the planet during its centuries of darkness and chaos, and in the process obtain the unquestioning faith of fanatically devoted followers necessary for the second Merlin Plan to succeed. It therefore explains why Merlin made the new religion “an absurd potpourri of most of the major monotheisms of the Federation period”. This was to unite the various factions on post-Federation Gilgamesh, many of which were probably religion-based. Similar to Poictesme, which had “the Armageddonists (Merlin is Satan)”, “the Human Supremacy League (Merlin is the Golem)” and “the Cybernarchists” (Merlin is a cybernetic Hitler).²⁰¹ On Gilgamesh, the most important factions must have been monotheistic groups like Christians and Jews, which were apparently fighting each other for survival and/or supremacy. Since the Gilgameshers are Piper’s Jews, and their god is named “Yah”, I assume that orthodox Jews were actually the largest faction on Gilgamesh, and the one whose religion was the main influence on the new faith promulgated by Merlin.

But wait, you say; if Merlin formulated this new religion itself, then why did it include the “maze of dietary and other taboos in which [the Gilgameshers] hid from social contact with others”? And moreover give them a “bigoted refusal to regard anybody not of their creed as more than half human”? Because both of these characteristics make the Gilgameshers “generally disliked” by the people of other worlds.²⁰² On the face of it, having the rest of the galaxy against your followers doesn’t make much sense. One would think Merlin would want its religion to be *welcomed* by the people of other planets, perhaps even adopted by them. The answer is to keep the faithful in line, or ‘on mission’. Because if the agents of “Yah”, traveling and living all over the Old Federation, fall victim to the blandishments and easier morals of these outside worlds, “Yah” could lose followers. That would mean a loss of money for defense, and more importantly, a loss of information for Merlin’s memory banks. Gilgamesh and the Plan would suffer. In addition, keeping the Gilgameshers separate from the people of other worlds is good for secrecy. Similar to a communist society, the “theo-socialist” system of Gilgamesh has something to hide.²⁰³

As to the bigotry of the Gilgameshers; well, their ‘god’ Yah/Merlin really does exist, contrary to the opinions and jokes of off-worlders. Moreover, it can actually predict the future with absolute accuracy, which reinforces and sustains their blind and unshakeable faith. Their haughty self-righteousness toward people not of their creed was likely fueled by these facts, rather than any ‘commandment’ of their god.

For these reasons, I located Gilgamesh closer to the Old Federation’s center, though still outside the Norse Core. This would be a better position from which to gather the resources most needed for the new Merlin Plan to succeed. Thus, although the Gilgameshers are Piper’s Jews, and the triangular symbol of their religion is modeled on the Star of David, its colors, as we’ve seen, are also suggestive of the Terran Federation, a universal state. And this ties in with Yah/Merlin’s plan to create “a new one”.

In fact, given Beam’s attention to detail, the colors may be more than just a random holdover of the Federation era. Because the origin of “Yah” may actually lie with Federation officers like General Mike Shanlee, for whom “The Federation was our religion.” The man calling himself ‘Reverend Carl Leibert’ was really Shanlee in disguise; a clue to which was the fact that this so-called priest “wore Federation fatigues”. After his disguise is penetrated near the end of *The Cosmic Computer*, Shanlee “stayed on Poictesme as nominal head of Project Merlin, and intended to remain there for the rest of his life.”²⁰⁴ This implies a continued Federation military presence quite close to the Cosmic Computer; one whose ‘religion’ is represented by the white and blue Federation flag.

Many years later, when the first Merlin Plan fails, military officers of the short-lived ‘Poictesmean Federation’ probably accompany Merlin and its programmers to Gilgamesh. There, Merlin fuses their faith in a universal state with its own godlike ability to predict the future, and overlays it with the need for secrecy, plus the large numbers of fanatical followers to gather the information it needs. Thus creating the religion of “Yah the Almighty”. Given the extensive military stores on Poictesme in *The Cosmic Computer*, these soldiers presumably also bring a good deal of military equipment, establishing what eventually becomes the formidable planetary defenses of Gilgamesh.

In *Space Viking*, Lucas Trask observes that “Perhaps Gilgamesh deserved more credit; its people had undergone two centuries of darkness and pulled themselves out of it by their bootstraps. They had recovered all the old techniques, up to and including the hyperdrive.”²⁰⁵ But since Merlin’s “memory-bank contained all human knowledge”,²⁰⁶ perhaps the Gilgameshers don’t deserve more credit after all. While they did have to work hard to unify and rebuild their planet, they didn’t have to reinvent anything. At the proper times, ‘Yah’ could simply provide them with the necessary knowledge. And this undoubtedly contributed to the fanatical faith of the people in their god. For Yah is not only Almighty, but All-knowing.

After the re-acquisition of hyperdrive, the ships of Gilgamesh fan out all over the Old Federation, creating an appropriately blue-and-white network of trade. This is likely a very important step in the Plan, as it would foster *economic integration, in preparation for political unification*. The agents of Gilgamesh—led by the shipborne priests of Yah, the spiritual descendants of ‘Reverend Leibert’ (alias “the Prophet of Merlin”²⁰⁷) and his Great Computer—are strategically positioned all over the Federation. And—hiding behind the scenes this time—Merlin is once again promoting the growth of a new universal state.

Assuming my analysis is correct, this scenario results in a case of Piper-style irony. Because Zasparr Makann may have been “a raving lunatic” with “Mad eyes”, who modeled himself after Adolph Hitler;²⁰⁸ but he was absolutely right about the Gilgamesh Interstellar Conspiracy. He just had no idea how strange its origin was, or how vast its goals really were.

So now let's move on to the next stage of Beam's Future History, and take a look at that new universal state, which becomes known as the First Galactic Empire.

17. The First Galactic Empire

a) *“Roughly the Shape of a Pork Chop”*

The Empire begins as the League of Civilized Worlds, and the 'Four Worlds Treaty', which establishes the League, is presumably signed soon after the end of *Space Viking*. From John Carr's timeline, that would be about AE 1726.²⁰⁹ The League becomes the Galactic Empire sometime in the Nineteenth Century; possibly around AE 1848.²¹⁰ There follows a century-long "Period of Interstellar Wars", during which the Mardukan-led Empire finishes off its rivals in the Old Federation. During this time, the clandestine support of Gilgamesh and its interstellar network undoubtedly continues. Once the Imperial Space Navy completes its operations in the Orion Arm, its ships cross the Orion-Sagittarius Gap, and effect the conquest of the Sword-Worlds. This occurs around AE 1950.²¹¹

Parenthetically, this is probably the point at which the first Gilgameshers arrive in the Sword-Worlds; there to settle, make money—and most importantly, collect information for the memory banks of Merlin, so that it can include the Sword-Worlds in its future historical calculations. In this regard, it seems significant that the Galactic Empire is *run by computers which can predict the future*. In "Ministry of Disturbance", Emperor Paul XXII is told that an increase in Durendal's grain exports will "cause all kinds of dislocations on other agricultural planets. At least, that's what our computers all say." This future-predicting capability is very similar to that of Merlin, though to a lesser degree.

Also noteworthy is that the Emperor's reply to the computers' prediction of future effects is religious in nature. "And that, of course, was *gospel*."²¹² Taken together, these references suggest that the Empire is actually functioning under 'The Gospel according to Yah'. Thus, after the second Merlin Plan succeeds, 'Yah' apparently continues to run things from behind the scenes. This can explain why the Galactic Empire is perfectly stable in "Ministry of Disturbance". Yah/Merlin and its affiliated future-predicting computers are working to keep it so. "[A] stable economy, a static population, a peaceful and undisturbed Empire...Well, that was what everybody wanted, wasn't it?"²¹³

That Merlin continues its clandestine role—rather than revealing its existence and coming back out into the open—is consistent with the status of the Gilgameshers in the Galactic Empire. Their fanatical devotion in sending money and information home greatly contributed to the establishment of the Empire, and yet there is mention of "a pogrom on Anath", which was stopped by Commodore Hastings.²¹⁴ A pogrom is "a violent riot aimed at the massacre or expulsion of an ethnic or religious group, particularly one aimed at Jews."²¹⁵ So the attempted pogrom on Anath was probably a massacre or expulsion of Piper's Jews, the Gilgameshers. This indicates that they are still "generally disliked" among the people of other worlds, and Prince Trask's observation still holds. "Well, that was one thing you had to give [Zaspar Makann] credit for. He wanted to run out the Gilgameshers. Everybody was in favor of that."²¹⁶

Does that include Yah/Merlin? Because by this time, the Empire has taken over the job of collecting the information necessary for future-predicting computers to maintain its interstellar civilization. It would seem the Gilgameshers are no longer needed. But since Merlin can predict the future at least several centuries in advance, it may have already calculated that the Galactic Empire, like the Federation before it, is doomed. So in the coming Second Interregnum, the Gilgameshers will likely resume their old game. Engage in interstellar trade and collecting money, all while covertly collecting information, in order to assist 'Yah' in planning for the *next* universal state.

But now we've gotten ahead of the tale. Many centuries after its initial conquests, the long-peaceful Empire contains 1,365 inhabited planets. As noted in the last section, this makes it 2.73 times larger than the Terran Federation, which contained only 500 inhabited planets.²¹⁷ Our assumption will therefore be that the radius of the Galactic Empire is 2.73 times greater than that of the Terran Federation. That would place its border 2,184 light-years out from Sol (800 ly x 2.73), enclosing about two-thirds the width of the Orion Arm. I actually rounded the figure down to 2,000 ly, since some of that expansion will be on a line to the galactic east, in order to link up with the Empire's Sword-World province.

The resulting configuration (Figure 22, below) can explain the shape of the Galactic Empire, which Emperor Paul XXII says is "roughly the shape of a pork chop".²¹⁸ The meaty part of the chop would be

the reunified region of the Old Federation, plus all the extra planets around its northern, western and southern frontiers settled by the old spheres of influence, and afterward by the burgeoning Empire. All this is in the Orion Arm. The Sword-Worlds would lie at the tail-end of the chop, with the rest of the tail consisting of mostly empty space in the Orion-Sagittarius Gap. But this space probably contains at least a few habitable planets, orbiting stray stars. And these could be settled by one of the civilized worlds during the spheres of influence period (such as Osiris or Baldur); or earlier in Federation times (though only out to 800 ly from Terra); or even later by the Empire, after they conquer the Sword-Worlds.

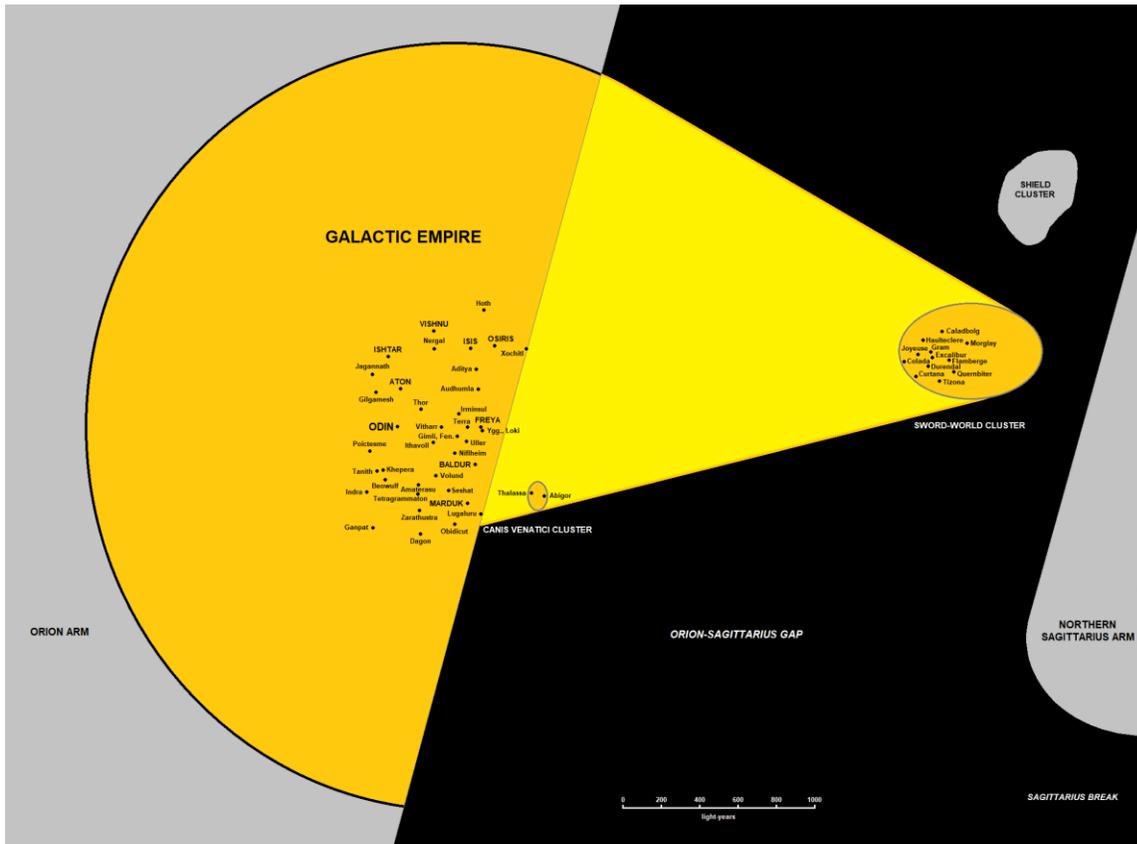


Figure 22. Estimated extent of the First Galactic Empire, “roughly the shape of a pork chop”, circa AE 3050.

One would guess that after the conquest, regular trade is established between the Empire proper and its Sword-World province. So there would be a natural tendency to explore the stars along these routes, and settle any habitable planets discovered in this region, thereby ‘filling in’ (as much as possible) the empty space between the Empire and the Sword-Worlds.

Of course, the Empire could claim this space right after the Sword-World conquest. The filling-in which follows would then be part of the ‘consolidation’ process mentioned by Paul XXII. “There had been some excuse for staying inside that patch of stars then; a newly-won Empire must be consolidated within before it can safely be expanded.”²¹⁹ More expansion isn’t necessary, because the much greater radius of the Empire means there should be plenty of habitable planets suitable for colonization in the outer reaches of its space-area. For instance, I assume that the Empire colonizes the eastern half of the Sword-World cluster, which was neglected for centuries by the Sword-Worlders themselves. Continuing their theme, the Empire could name at least some of these new planets for historical, legendary or mythical swords.

Also included in the consolidation process is the Empire’s annexation of unimportant worlds like Aditya, which were presumably missed or bypassed during the march to Empire. I placed the planet, belatedly mopped up by the Galactic Empire in “A Slave is a Slave”, in the northeastern Federation. Because Piper’s historical model for Aditya appears to be Russia, which is in the northeastern quadrant of

standard world maps. Internal evidence suggests that Aditya is about 500 ly from Odin, which could place it near the northeastern corner of the old Atonian sphere. An interesting result, to say the least, given that the first Imperial Proconsul of Aditya, Count O Bray of Erskyll, is actually from Aton.²²⁰

This location also means that Aditya would not be too far from Xochitl. Both are conquered by men from the Sword-Worlds; Xochitl by Hauteclere, and Aditya by a fleet from Morglay. But while Xochitl rises to become a powerful Space Viking base planet, Aditya descends into obscurity. For when the Galactic Empire annexes Aditya, it is said that “there hasn’t been a ship in or out of this system for five centuries”.²²¹ So although I placed the planet in the sphere claimed by Aton, Aditya is never visited by the Atonians, much less occupied or annexed.

Figure 22 can also explain why Odin becomes the capital of the Galactic Empire, rather than Marduk. Marduk’s estimated position is not far from the ‘bend’ in the Imperial frontier, where the tail in the Gap connects to the Orion Arm. It is not centrally located. But Odin, once almost halfway out to the western frontier of the Terran Federation, is now more or less in the middle of the meaty part of the Imperial pork chop. Its estimated location is 1635 ly from the new western frontier of Terro-Human space, 2000 ly from the southern border, and a little more than 2000 ly from its northern limit.

Using the NASA source map from Figure 1, a more ‘natural’ chart of the Galactic Empire would look something like this (Figure 23).

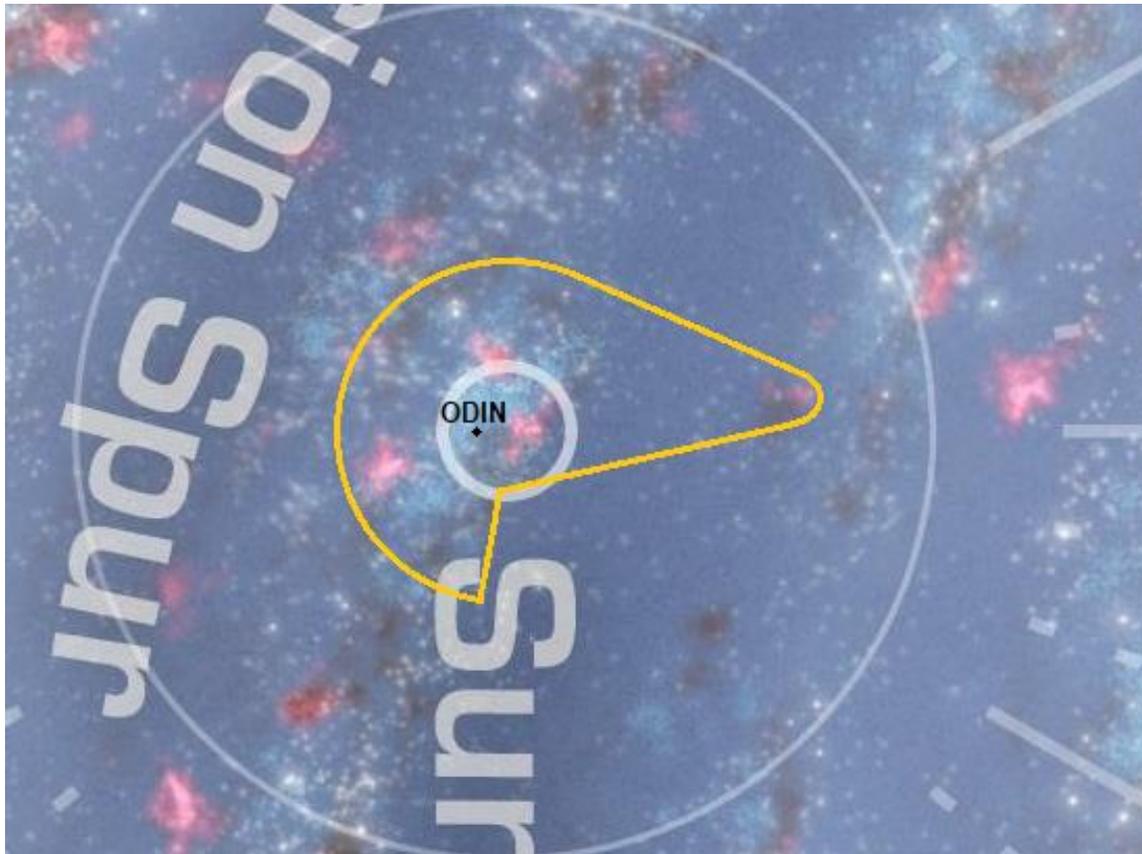


Figure 23. Star chart of the First Galactic Empire.

From Figures 22 and 23, it is evident that the Sword-Worlds would be the most distance province of the Empire. Something of a backwater, compared with the new Imperial center at Odin and the other major worlds in the Orion Arm like Ishtar, Osiris and Marduk. That is in fact how Piper makes the Sword-Worlds sound. In “A Slave is a Slave”, he has Commodore Shatrak compare the decadent conditions on Aditya to the Sword-Worlds, as they were “two centuries ago when we took them over.”²²² This is

echoed in “The Future History”, which says that by the time of the Galactic Empire, “The Sword Worlds have declined to near barbarism.”²²³ And in “Ministry of Disturbance”, Galactic Emperor Paul XXII muses that the Sword Worlds “all had monarchical and rather picturesque governments; Durendal, he seemed to recall, was a sort of quasi-feudalism.”²²⁴

To me, the word ‘picturesque’ always suggested that the Sword-Worlds have become rather quaint and rustic. Somewhat behind the times, compared to the rest of the Empire. This would parallel those smaller European cities which still retain the medieval charm of their old independent days, like having cobblestone streets and a local castle; as compared to the impressive grandeur of much larger and more modern cities, like London and New York.

The picturesqueness of Durendal’s government includes the fact that “The whole object of Durendalian politics...is to get possession of the person of the king.” It is thus an inherently unstable system, and even possessing the king’s person can be problematic. Durendal’s current monarch, King Ranulf XIV, is a rather ‘picturesque’ individual himself. An effeminate, gaudily-dressed and implied homosexual, Ranulf seems more concerned with raiding the Imperial ballet on Odin than in being a king. He often wishes that he could be one of the “*wonderfully* happy and carefree” peasants on Durendal, even though “they’re all poor, and wear such *funny* ragged clothes, and travel about in rickety old aircars”. He compares his humble planetary kingdom unfavorably to the Imperial center. “Everything is so *wonderful*, here in Asgard; it makes our little capital of Roncevaux seem so *utterly* provincial.”²²⁵

b) Of Imperial Proconsulates, Prefectures and Viceroyalties

Speaking of provincial, this brings us to the ‘provinces’, or subdivisions, of the Galactic Empire. The lowest level is the Proconsulate. As we’ve seen, Obay, Count Erskyll, becomes the Imperial Proconsul of Aditya. But as “the limits of [Adityan] sovereignty” extend to “the orbit of the outer planet of this system”, his Proconsulate probably has jurisdiction over the entire system, not just Aditya. And since there are 1,365 inhabited planets in the later Empire, I assume there are roughly that many Proconsuls.

The next level is the Prefecture, followed by the Viceroyalty. “It had been transmitted from Planetary Proconsulate to Prefecture, and from Prefecture to Viceroyalty, and from there to Odin, all by ship.” An Imperial Prefect presumably oversees a relatively small number of stellar systems, while an Imperial Viceroy handles a much larger group. Piper doesn’t mention how many Prefectures there are, but the Galactic Empire as a whole is divided into “ten Viceroyalties”.²²⁶

This is very close to the number of civilized planets given names after the fall of the Terran Federation. It is therefore possible that nine Viceroyalties are based on the old spheres of influence ruled by Marduk, Baldur, Odin, Freya, Aton, Vishnu, Ishtar, Isis and Osiris. Leaving out Gilgamesh, which as we’ve seen has no ‘official’ sphere. The tenth Viceroyalty would then cover the Sword-Worlds and environs.

But another thing Beam failed to provide are the names of the Viceroyalties. My first thought was that, if they are based on the old spheres of influence, their names could be the same as the civilized world which ruled them. That would give us the ‘Viceroyalty of Marduk’, the ‘Viceroyalty of Baldur’, and so on. The Sword-Worlds could come under the ‘Viceroyalty of Excalibur’.

But while planet names are fine for Federation Member Republics and Planetary Kingdoms, they don’t seem appropriate for vast areas of space like viceroyalties. So then I thought that the planet names could be used for the Prefectures, which cover a much smaller area. Piper’s five Galactic Empires were almost certainly inspired by the two Galactic Empires of Isaac Asimov’s Foundation series, and in Asimov, the names of Imperial Prefectures are the same as those of their capital planet. For instance, the Prefecture of Anacreon, whose capital is the planet Anacreon.

Moreover, when Asimov’s First Galactic Empire begins breaking up, the prefectures near Terminus are converted into the small interstellar kingdoms of Anacreon, Smyrno, Konom and Daribow.²²⁷ Piper’s First Galactic Empire would parallel this in reverse, by having former Planetary Kingdoms, like Marduk, become the capitals of their respective interstellar Prefectures. For example, the King of Marduk could also bear the title ‘Imperial Prefect of Marduk’, and be responsible for overseeing a number of systems in the vicinity of his own system. Some of these systems could actually contain former trade planets, such as Seshat, Obidicut and Lugaluru. Thus, the Prefecture of Marduk could end up covering much the same area as Marduk’s original ‘kingdom’ in *Space Viking*. And the same could hold true for the other major civilized worlds, giving us the small interstellar Prefectures of Baldur, Freya, Osiris, Isis, Vishnu, Ishtar and Aton.

I assume that the major worlds do not have Imperial Proconsuls. As Proconsul Erskyll puts it to the Adityan government, "I am a noble of the Galactic Empire, and on this pigpen of a planet I represent his Imperial Majesty."²²⁸ But on major worlds like Marduk and Ishtar, the Galactic Emperor's representative would be the Imperial Prefect. So the Prefects presumably oversee their planet directly, with subordinate Proconsuls on each of the other inhabited planets of the Prefecture.

Now back to Piper's Viceroyalties, which seem to need 'regional' names. This would parallel historical viceroyalties, like those of the Spanish Empire in the Americas. The Viceroyalties of New Spain and New Granada, for instance, encompassed large regions, which were later subdivided into various nations. The Viceroyalty of New Spain became Mexico and the Central American republics, while the Viceroyalty of New Granada became Colombia, Venezuela, Ecuador and Panama.

In the context of star maps, at least those whose viewpoint is from a planetary surface, the major 'regions' are constellations. Constellations include many stars, usually spreading over a large section of the heavens, just as the Imperial Viceroyalties do. So I decided to use constellation names for the Viceroyalties. Ideally, these would be the names of constellations as seen from Odin, the capital planet and Imperial center. (They should also be in "Imperial", the language of the Empire.²²⁹) But we don't know exactly where Beam's planet of Odin is located, nor what the stars would look like from there. Of necessity, the Terran constellations were therefore used. This is defensible, as Piper referred to one actual constellation in the Future History (Canis Venatici in *First Cycle*), while two others are inferred (Hydrus and Puppis in *Uller Uprising*). And due to social inertia, many Terran constellation names, including those used for the Galactic arms, are probably still in use during the First Empire.

The Viceroyalty names I decided on were based on another galactic source map, whose coordinate system used the directions to various constellations, rather than degrees in a circle. As seen in Figure 24 below, the three-letter designations of Ori, Aur, Cas, Cep, Cyg, Aql, Sgr, Nor, Cen, Vel and Pup stand for Orion, Auriga, Cassiopeia, Cepheus, Cygnus, Aquila, Sagittarius, Norma, Centaurus, Vela and Puppis.

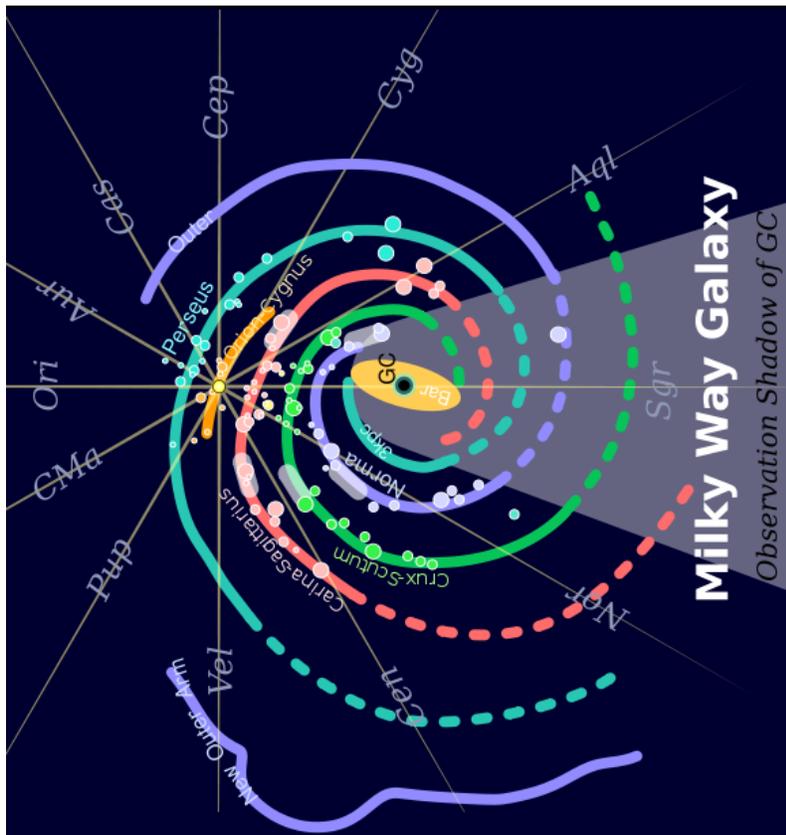


Figure 24. Schematic of our galaxy, using constellation names for the directions from Terra.²³⁰

Using this as a guide, a map of the Galactic Viceroyalties could look like this.

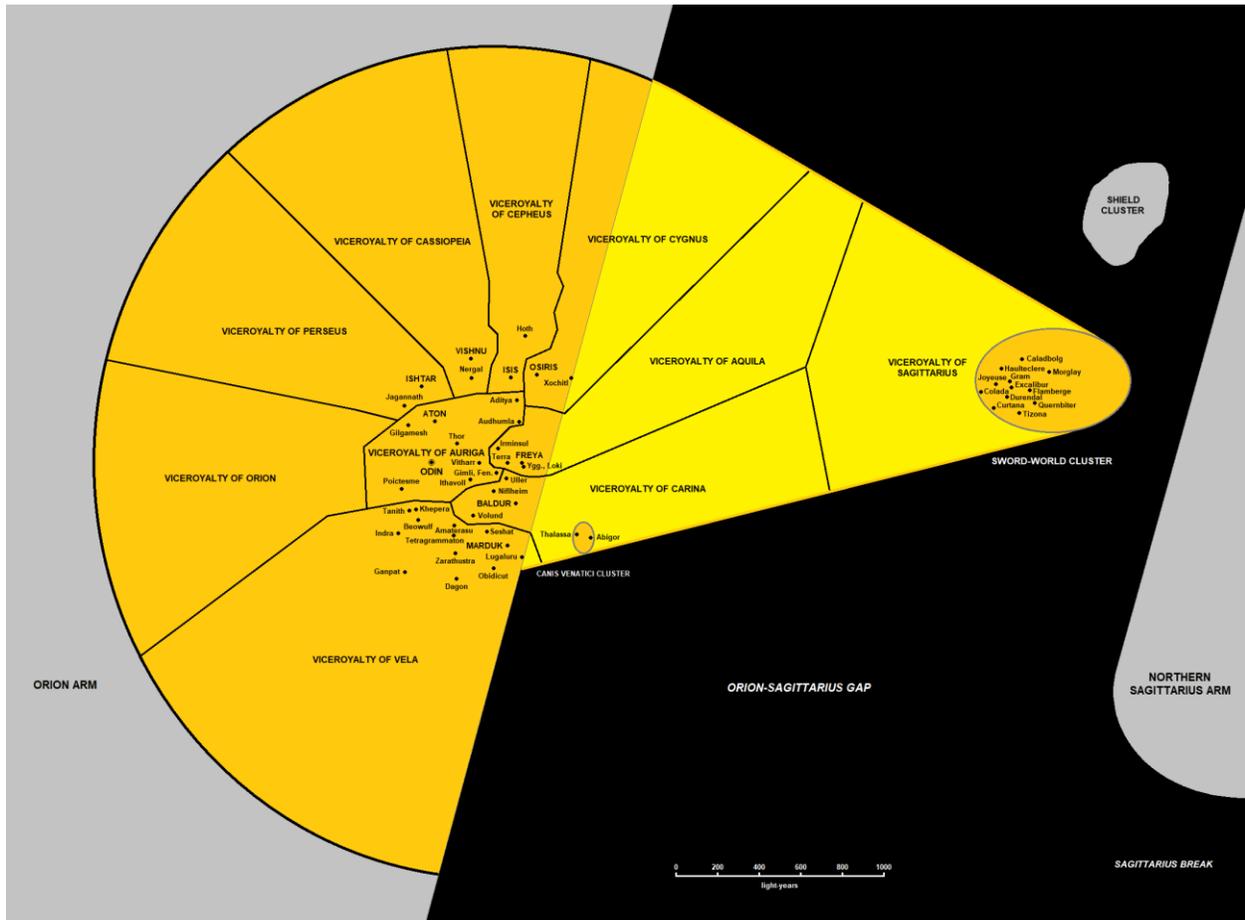


Figure 25. Possible configuration of the ten Viceroyalties of the First Galactic Empire.

In clockwise order from the top, the ten Viceroyalties of the Galactic Empire would then be Cepheus, Cygnus, Aquila, Sagittarius (appropriately close to the Sagittarius Arm), Carina (rather than Norma, a female personal name; or Centaurus, the name of the arm inside Sagittarius in my main source map), Vela, Orion, Perseus, Cassiopeia and Auriga. Auriga was used for the central Viceroyalty, rather than the one to the northwest, which the schematic would suggest. So I decided to name that one Perseus. Perseus is the constellation between Auriga and Cassiopeia along the Ecliptic, as well as the name of the galactic arm northwest of the Orion Arm. As neighbors to the west of the Aurigan Viceroyalty, the Viceroyalties of Orion and Perseus would then reflect the directions of expansion out toward the western edge of the Orion Arm, and the Perseus Arm beyond.

Given the elongated shape of most of the Viceroyalties, their capital cities are probably not located on the major civilized worlds they contain. Because Marduk, Baldur, Freya, Osiris, Isis, Vishnu and Ishtar are all close to the inner borders of their respective Viceroyalties. In order to more effectively govern them, the Imperial authorities likely establish their capitals on planets in roughly central locations, even as Odin is centrally located in the Empire. This means the viceregal seats could be on worlds along the old frontier of the Terran Federation (an obsolete line now removed from the map), or even on the newer planets beyond it, which were founded by the spheres of influence and the Galactic Empire.

In the eastern Viceroyalties of Aquila and Carina, their capitals would lie within the Orion-Sagittarius Gap, assuming suitably habitable planets are found. The capital of Cygnus could lie on a planet along the eastern edge of the Orion Arm, which that Viceroyalty straddles. And the capital of Sagittarius could

be one of the Sword-Worlds. Colada and Joyeuse, near the western end of the Sword-World cluster, are not too far from the center of the Viceroyalty. Either one of them would therefore be a good candidate for the viceregal seat. Unless, that is, the Empire prefers a brand-new planet, located some distance away from those 'decadent' and 'barbarous' Sword-Worlds.

In order to make the Viceroyalties of fairly comparable size, several adjustments were made to the estimated boundaries of the old spheres of influence. For example, the spheres of Osiris, Freya and Baldur were fairly small, because they were all along the eastern edge of the Orion Arm. All these viceroyalties were therefore given extensive territories in the Orion-Sagittarius Gap. The Atonian sphere was similarly small, and moreover was completely surrounded by the other spheres. So I combined it with the eastern part of the old Odinic sphere, which together became the Viceroyalty of Auriga. The Mardukan sphere, on the other hand, was too large, so its possessions in the central Old Federation were likewise transferred to Auriga.²³¹

As an aside, the constellation of Auriga is defined as "the Charioteer", but its first syllable *aur-* is suggestive of the Latin word for gold, *aurum*. This could tie in with the center of the First Galactic Empire with its official emblem, a "gold sun and superimposed black cogwheel".²³² Symbolically making Auriga the 'golden center' of the Empire, where the reins of power direct the galactic chariot of Terro-Humanity.

Odin itself is "the Imperial planet", ruled by the Galactic Emperor as "Planetary King of Odin."²³³ So while it may lie within the Viceroyalty of Auriga, it could be a special case. I therefore surrounded it with a small circle, replacing the one formerly around Gilgamesh. Gilgamesh was also transferred into the Aurigan Viceroyalty. Along with the planet and its people, this brings 'Yah' into the central region of the Empire. An appropriate move, since as stated earlier, Yah/Merlin the Almighty robot-god appears to be keeping the Empire stable, and running smoothly, from behind the scenes.

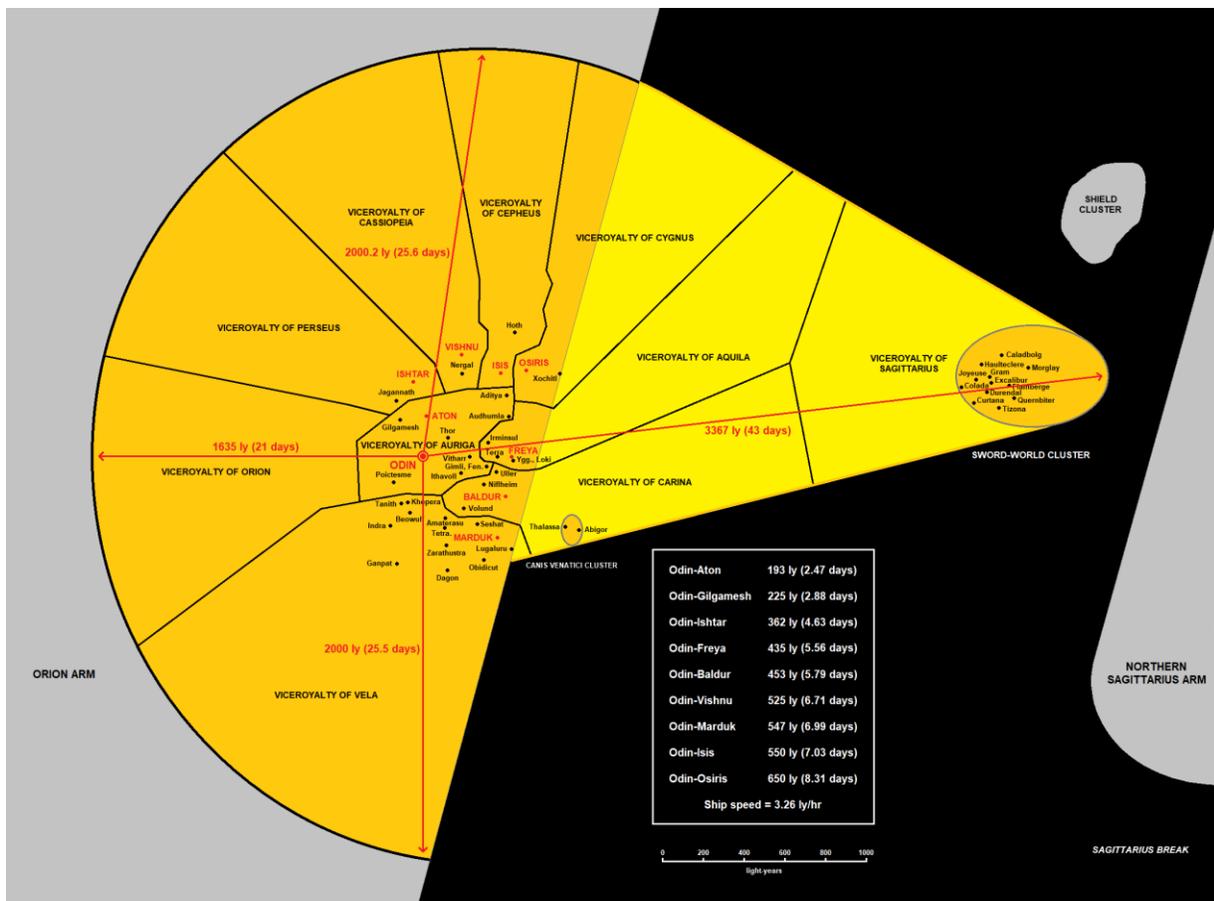


Figure 26. Distances and trip-times from Odin to the frontiers and major worlds of the Empire.

c) “The Stuff Was All At Least Twenty Days Behind Date”

In “Ministry of Disturbance”, the Imperial subdivisions are mentioned in relation to how long it takes information to travel from them to the capital on Odin. “[A] graph chart, with jiggling red and blue and green lines, appeared...It was the interstellar trade situation chart from Economics. Red line for production, green line for exports, blue for imports, sectioned vertically for the ten Viceroyalties and subsectioned for the Prefectures, and with the magnification and focus controls he could even get data for individual planets...The stuff was all at least twenty days behind date, and not uniformly so, which accounted for much of the jiggling. It had been transmitted from Planetary Proconsulate to Prefecture, and from Prefecture to Viceroyalty, and from there to Odin, all by ship.”²³⁴

This means that it takes more than 20 days for ships to bring the information from Proconsulates along the outer frontiers to the Imperial capital on Odin, but that Odin is not at the exact center of the Empire, or else all the information would be coming in at the same time. This is borne out by the map in Figure 26. As mentioned earlier, the estimated location of Odin is about 1635 ly from the western frontier of the Empire, 2000 ly from the southern, and a fraction more than 2000 from the northern. To the east, it is about 3367 ly from the eastern end of the Sword-World cluster.

Using our estimated speed for ships during the Galactic Empire, 3.26 ly/hr, it would then take a little less than 21 days to reach Odin from a planet on the western (nearest) frontier, and about 25 ½ days to reach it from planets at the southern and northern borders. A ship traveling from the eastern (farthest) frontier would need a trifle more than 43 days to arrive on Odin.

So the Viceroyalties of Vela, Orion, Perseus, Cassiopeia, Cepheus and Carina should all be able to send their socio-economic data to the Imperial capital in anywhere from 21 to 26 days. The data from the Viceroyalties of Cygnus and Aquila should take a little longer, say 30 days, since their outer reaches in the Orion-Sagittarius Gap are more than 2000 ly from Odin. And the data from the Viceroyalty of Sagittarius would take the longest to reach the Emperor in Asgard; upwards of 43 days.²³⁵

As relatively long as that may sound, 43 days is actually a far cry from the era of the Federation, when it took at least 182 days (6 months) to travel from outer planets like Poictesme to Terra; and even the Interregnum, when it took about 100 days (more than 2000 hours) for Space Viking ships to merely cross the Orion-Sagittarius Gap. Given the speed of its ships, the Galactic Empire should theoretically be able to expand to a much greater distance. And that is precisely what the Emperor intends.

d) Late Imperial Expansion

In Beam’s story, Emperor Paul XXII and Prince Yorn Travann scheme to “to move the Empire out of its complacent rut”.²³⁶ Their plans include a new period of Imperial expansion, after “eight centuries...of historyless tranquility.” Since the Empire has been quiet and peaceful for so long, the public at large are likely to be afraid of major changes. And Paul realizes that since “Any change frightens most people”, “It would have to be done stealthily, while nobody was looking, but some...[Space Navy] ships would go far beyond the boundaries of the Empire, and new things would happen. New worlds, new problems.”²³⁷

The goal of this expansion is to rectify the current paralysis of the Galactic Empire, and get it to “start growing again”. And it will be done through the forced emigration of the Empire’s numerous class of “nonworkers”, thereby giving them productive work to do, rather than living off the dole and selling their votes. This in turn will solve the problem of politics on Odin (and presumably many other worlds), which have “become unbearably corrupt” due to vote-selling.²³⁸

Given the configuration of the Empire, most of these involuntary settlers will be transferred into more distant reaches of the Orion Arm; north, northwest, west, southwest and south-southwest of the Imperial frontier. Although it’s not certain, perhaps a few of them will even reach the Arm’s western edge, on the eastern ‘shore’ of the Orion-Perseus Gap. Over at the eastern end of the Empire, other nonworkers could become the first Terro-Humans to settle in the Sagittarius Arm, enabling the Viceroyalty of Sagittarius to finally live up to its name. (Figure 27, below.)

This eastern sector of expansion also includes the colonization of another real-life star-cloud, to the north-northeast of the Sword-World cluster. I don’t know if it has a name, but its shape is suggestive of an irregular shield, so I have dubbed it the ‘Shield Cluster’. A seemingly fitting name, given its proximity to the ‘Sword’-Worlds and their ‘Helm’ shape. And since all this expansion is at the behest of the Emperor, these new worlds could be given names reflecting that fact. In 2016, I proposed several possible Imperial categories, including Scepter-Worlds, Crown-Worlds, Palace-Worlds, Jewel-Worlds,

Lord-Worlds and Lady-Worlds. (As a new name, the Shield Cluster could become the home of the Shield-Worlds, one of which would be named Aegis.) These categories could also be used for planets which were settled earlier by the Empire, in its initial expansion phase.

From Figure 27, it appears that the Empire's final period of growth will not fundamentally change its shape. It will still resemble a pork chop, just a bit larger. The tail end of the chop will now reside in the

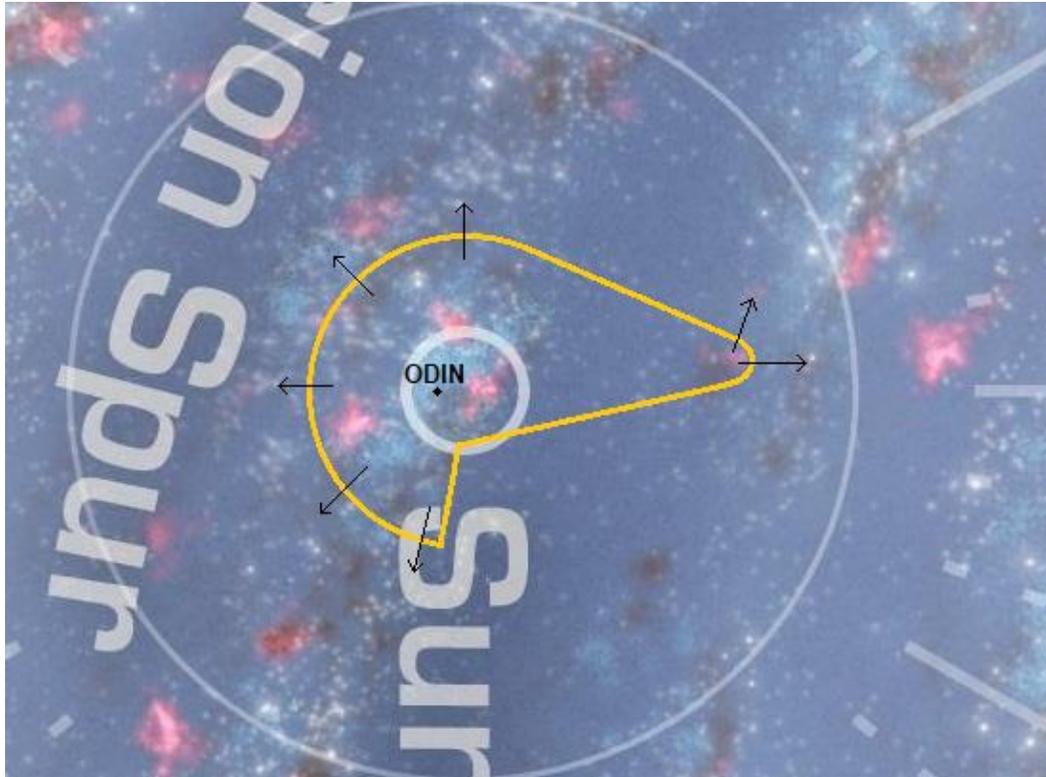


Figure 27. Estimated directions of late Imperial expansion, circa AE 3075.

Sagittarius Arm, and include the Shield Cluster along with the Sword-World cluster. And the meaty part of the chop will enclose a larger semicircle of the Orion Arm, possibly reaching its western edge.

It is probable that the worlds settled during this time are added to the existing Viceroyalties, moving their frontiers outward. With 1,365 inhabited planets currently in the Empire, the ten Viceroyalties should presently contain about 136 planets each. For reasons implicit in Piper, I believe the Empire only adds a bit more than a hundred new worlds, for a final total of about 1,500, or 150 per Viceroyalty. Thus, if each Viceroyalty gains about 14 new planets, it should mean one new Prefecture is added to each of them.

Why so little new growth? Because while at the end of “Ministry of Disturbance” the future looks bright for the Galactic Empire, Emperor Paul XXII is another one of Beam’s self-reliant men, who win the battle but will lose the war. As John Carr explains, “Paul’s plans to save the Empire—like those of Conn Maxwell in *The Cosmic Computer* and Lucas Trask in *Space Viking*—are destined to fail because of the deterministic forces of history.”²³⁹ Paul’s and Prince Travann’s efforts are therefore only successful in the short term. The Galactic Empire does begin growing again, the nonworker problem diminishes, the politics on Odin and other worlds becomes less corrupt, and a few scientific advances are made.

But it’s too little, too late. The Empire has been passive for too long to sustain this energetic impulse, which eventually diminishes and ceases. It then returns to its previous state of paralysis. And just as Prince Travann predicts, “when petrification is complete, the cracking and the crumbling starts, and there’s no way to stop it.” The Galactic Empire inevitably breaks apart. Indeed, in some Piper-style irony, the “Great and frightening changes” Paul and Yorn encourage—particularly the development of “Instantaneity” in interstellar communications—may contribute to the Empire’s ultimate demise.²⁴⁰

When the First Empire falls, perhaps only a century or two after Paul's time, it is followed by another period of Interstellar Wars. Given the larger size of the Galactic Empire as compared to the Terran Federation, these wars probably last about four centuries, or roughly twice as long as the two-century-period of Interstellar Wars after the fall of the Federation. The interregnal dark age following the First Empire's fall is likely of a similarly extended length. Until the next universal state finally emerges out of the ruins, to begin a great new age of growth and advancement for Terro-Human civilization.

This is the Second Galactic Empire.

18. The Second Galactic Empire

a) *Extent of the Second Empire*

So now let's look at the later Galactic Empires. There is very little to go on, as Beam never even mentions the Second Empire. The Third and Fourth receive only a passing reference in his story "The Keeper", and the Fifth Galactic Empire fares little better, being barely described. The following maps will therefore be much more speculative, and the sections generally shorter (save for the current one).

As we've seen, the First Galactic Empire has 2.73 times more planets than the old Terran Federation, and was therefore estimated to be 2.73 times larger. So our assumption will be a continuation of that level of expansion. The Second Galactic Empire could then contain about 4,095 inhabited planets (1,500 x 2.73). In addition, given the estimated radii of the Federation and First Empire (800 and 2184 ly), the radius of the Second Empire should be about 5962 light-years, or roughly 6000.

Plotted on our base map, this means the Second Galactic Empire would roughly take in the central third of the Orion Arm. It would also be the first universal state to incorporate a substantial part of the Sagittarius Arm to the east, although this stretch contains a major break between what can be called the 'northern' and 'southern' parts of the arm (marked as "*Sagittarius Break*" below the Northern Sagittarius Arm in Figures 25 and 26.). To the west, the expansion of the Second Galactic Empire could reach the inner edge of the Perseus Arm. (Figure 28.)

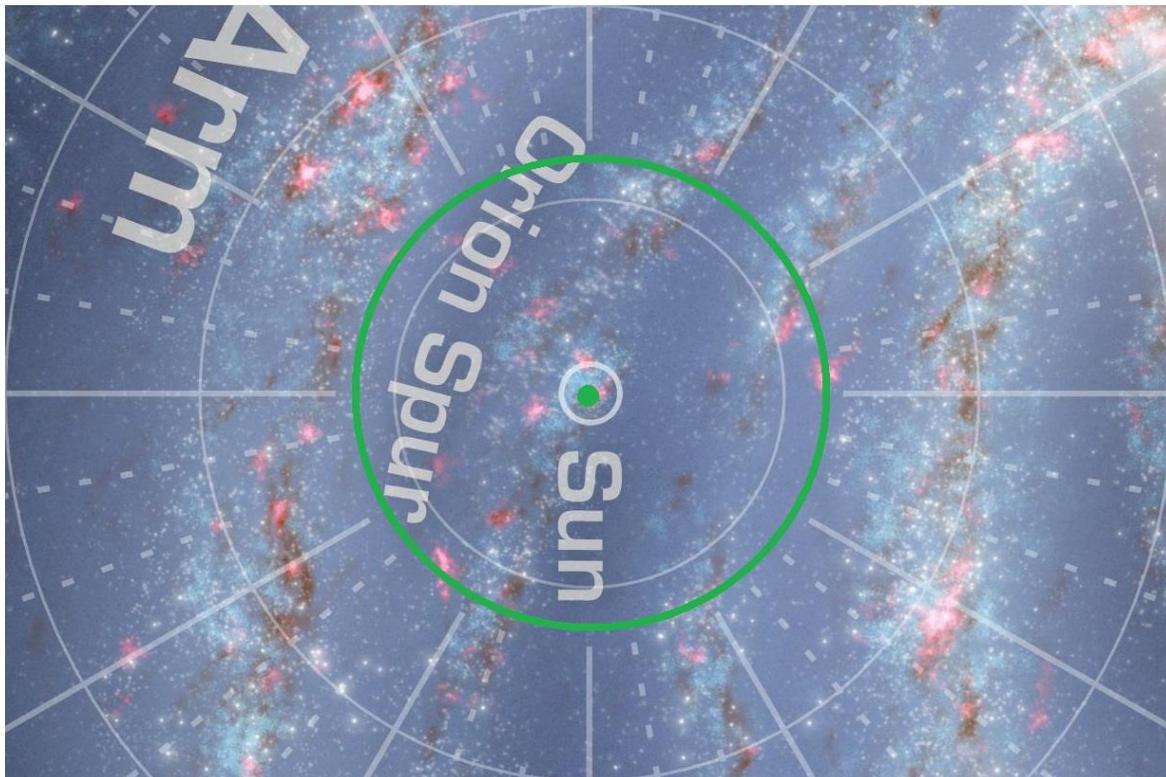


Figure 28. Estimated extent of the Second Galactic Empire, and its possible capital planet, circa AE 5650.

Such a major increase in area compared with the First Empire would therefore entail the first great hypership voyages across the largely empty interarm gaps. Particularly the western one, the Orion-Perseus Gap. For while the First Galactic Empire incorporated the Sword-World cluster, and probably settled parts of the nearer 'shore' of the Sagittarius Arm, it may not have made it to the western edge of the Orion Arm, and almost certainly didn't explore the gap beyond. Moreover, Perseus is a major arm; much more substantial than the relatively thin and broken Sagittarius Arm, and even wider than the Orion Arm. Potentially containing a correspondingly greater amount of habitable planets and other resources, the Perseus Arm should be a much more attractive goal for explorers than the Sagittarius Arm.

Thus, these interarm voyages, which are probably initiated by the successor states of the First Empire, will herald a new Age of Exploration. A parallel of the European ships of the Age of Discovery, which explored and crossed the Atlantic and Pacific Oceans, beginning in the late 1400s AD. Indeed, going back once again to the Orion Arm's parallel with the Western Hemisphere, the break in the Sagittarius Arm, separating it into a northern and southern part, makes a pretty good parallel of the Straits of Gibraltar, separating the continents of Europe and Africa.

If we assume the same ship speed as during the First Galactic Empire, then the first explorers sent out from the western Orion Arm would take about 38 days to cross the Orion-Perseus Gap (3000 ly divided by 3.26 ly/hr). This seems about right, given that after leaving the Canary Islands on his first voyage, Christopher Columbus took 36 days to cross the uncharted Atlantic Ocean.²⁴¹ There's more support if we take into account Piper's habit of consistently making distant planets in his Federation stories six months from the center. Because in six months, a ship traveling 3.26 ly/hr would travel a distance of 14,279 ly. As the radius of the Second Empire is estimated to be only 6000 ly, there would seem no pressing need for faster ships.

b) Capital of the Second Empire

While we know that Odin was the capital of the First Empire, and its major worlds included the civilized planets which survived the fall of the Old Federation, the complete lack of information about the Second Empire would seem to preclude knowing anything about its capital and major worlds. However, there are several interesting facts in Piper's stories, and about the man himself, which may give us some clues.

First, Beam seems to have been a fan of the Norse myths, often swearing by Odin and Thor.²⁴² Second, as noted earlier, he used the Norse myths as the starting point of interstellar expansion. ("The first extrasolar planets, as they had been discovered, had been named from Norse mythology—Odin and Baldur and Thor, Uller and Freya, Bifrost and Asgard and Niflheim.") Third, several of his tales are set on these Norse-named worlds. Including Freya ("When in the Course—"), Fenris (*Four-Day Planet*) and Odin ("Ministry of Disturbance"). And finally, as the very first extrasolar planet to be mentioned, it seems no coincidence that Odin eventually becomes the very 'first' among planets; the center and capital planet of the First Galactic Empire, with "Asgard [as] the capital city".²⁴³

Asgard of course is named for the 'heaven' of Norse mythology, the celestial home of the gods; and Odin for the king of the Norse gods. So when the First Galactic Empire inevitably collapses, sometime after "Ministry of Disturbance", the result will include the 'fall of Asgard'; an interstellar Ragnarok of sorts. A new period of Interstellar Wars will occur, a cosmic *gotterdamerung* on a scale almost three times greater than that which followed the fall of the Terran Federation. Otto Harkaman says that "There aren't a dozen and a half planets in the Old Federation that still have hyperdrive, and they're all civilized. That's if 'civilized' is what Gilgamesh is".²⁴⁴ So roughly 16 out of 500 planets survived the Federation's fall intact. Using that ratio as a guide, the fall of the First Empire should result in about 1,321 planets suffering destruction and/or decivilization, with only 44 or so remaining completely civilized.

Many of the planets named from Norse mythology will probably be destroyed in this 'Twilight of the God-Worlds'. And since the capital planet of the Federation, Terra, was "*bombed back to the Stone Age*" in the Interstellar Wars, one would expect that the Imperial planet, Odin, suffers a similar fate when the First Empire collapses. The destruction of Odin would naturally include its capital city, Asgard, and thus the deaths of the Household Guard of the Emperor, which is composed of Thorans. The planet of Thor may also suffer destruction, to prevent any of the escaping Imperial Family's members or branches from recruiting more Thoran guards, and thereby laying claim to the throne, or attempting to resurrect it.

This parallels Ragnarok, in which Asgard is destroyed, and Odin and Thor are both killed. In fact, Odin's mythical demise is caused by the Fenris-wolf, which suggests that the lowly planet of Fenris could

actually play a role in the destruction of the Imperial planet, Odin.

Moreover, if the Norse model holds true, then the collapse of the First Empire should be preceded by a disaster of huge proportion on the planet Baldur. For the mythical death of Baldur was the major event which heralded the approach of Ragnarok.²⁴⁵ The gods mourned the passing of their bright god of light, and sent Hermod to try and bring him back from the underworld of Niflheim. But Hela's demanded price, that all things weep for Baldur, was denied by only one creature, the giantess Thok. So Baldur was not allowed to return to Asgard, remaining in Niflheim with the other souls of the dead.²⁴⁶

If this myth is applicable, it indicates that the whole Empire is horrified and bereaved at the planet-wide destruction on Baldur. Plans are made to rebuild, but at the critical point, these are blocked by a single person, or possibly a small group. It may therefore be at this crucial moment, many years after the dynamic reigns of Paul XXII and his son Rodrik XXII,²⁴⁷ that the Imperial leadership finally loses its renewed political and moral will to take positive action. Afterward, the Galactic Empire reverts to its previous paralytic state, back on the slow and inevitable slide to dissolution and devastation.

After Ragnarok, however, the Norse myths tell us that a new heaven and earth will be created. And after the First Empire falls, we know that a Second Empire will arise. So the First Galactic Empire, or the 'First Empire of the Heavens' (Odin, Asgard, Thorans), parallels the 'First Norse Heaven' (Asgard, Odin, Thor); while the model for the 'Second Empire of the Heavens', or Second Galactic Empire, should be the 'Second Norse Heaven'. This new Norse heaven is called Gimlé, or Gimli; and interestingly enough, Beam just happened to include a habitable planet with that name. Thus, the Second Empire which eventually arises may be founded by none other than the surprisingly unlikely planet of Gimli, or at least Gimli becomes its capital.

This line of reasoning can explain why Beam scattered so many references to Gimli among his stories, a fact which many fans have remarked upon. In *Four-Day Planet*, Gimli is "the next planet out" from Fenris, and is the site of a Federation Navy base. A TFN destroyer is sent to transport Steve Ravick from Fenris to Terra for trial, because of his "enslavement of from twenty to thirty thousand Lokian natives, gentle, harmless, friendly people, most of whom were worked to death in the mines."²⁴⁸ In *Fuzzy Sapiens*, we learn that Gimli has its own native sapient race, and is "the nearest planet" to Zarathustra, where another, highly unusual native sapient race (the Fuzzies) has just been discovered.²⁴⁹

In *Space Viking*, Gimli is merely one of Marduk's 14 trade planets, yet it is where Princess Bentrik and her son Count Steven escape to, before proceeding to Tanith, after Zaspas Makann 'wins' the Mardukan election. Gimli then becomes the 'rally planet' where the allied fleet assembles (possibly at the old Federation Navy base) prior to liberating Marduk from Zaspas Makann and Andray Dunnan.²⁵⁰ And the liberation of Marduk is a critical event in the Future History, since the reinvigorated Mardukan monarchy later goes on to establish the First Galactic Empire.²⁵¹

Finally, ten years before "Ministry of Disturbance", the popular professor Van Evaratt is exiled to Gimli from Odin, and it is where he taught Klenn Faress. In turn, Faress went from Gimli to Odin, became an even more popular professor and made the first new major scientific discovery in 800 years. This paves the way for Vann Evaratt's triumphant return from Gimli to Odin, where he is appointed Chancellor of the Imperial University in Asgard, while Faress becomes the head of a new "Imperial Office of Scientific Research".²⁵²

Thus, throughout the eras of the Terran Federation, First Interregnum and First Galactic Empire, the apparently minor planet of Gimli seems to be constantly hovering behind the scenes, providing military, moral, historical and technical support toward the maintenance and advancement of Terro-Human civilization. Taken as a whole, I contend that these indicate Piper meant for Gimli to eventually play a much greater role, finally coming into the foreground as a major world in its own right.

c) Major Worlds of the Second Empire

Only a few of the Norse gods survive Ragnarok, which suggests that only a few of the Norse-named planets survive the fall of the First Empire. The myths tell us that the new heaven of Gimlé is inhabited by once-lesser gods, like Vidar and Vali, Hoenir and Hodur, as well as the sons of Thor, Modi and Magni. They walk together on the plain of Idavold, where they are joined by the only major Norse god to survive. This is Baldur, who finally returns "out of the dark underworld where he had languished so long".²⁵³

The major civilized worlds of the Second Empire should then include Vitharr (Vidar), in *Space Viking* a mere trade-planet of Tanith; Hoth (Hodur), a *Space Viking* base planet; Ithavoll (Idavold), a former colony

of Marduk which seceded,²⁵⁴ and apparently will eventually surpass its once-great parent; and Baldur, which maintains a shadowy existence through the darkness of the Second Interregnum, eventually recovers from whatever destructive event preceded the fall of the First Empire, and once again becomes a great planet of light. The only major Norse world to do so.

Thus, the Second Galactic Empire, like the First, may contain a 'Norse Core'; the major worlds this time being Gimli, Vitharr, Hoth, Ithavoll and Baldur. But the 'ragnarok' of the First Empire could indeed represent the Twilight of the Norse God-Worlds. Because out of the Second Empire's 4,100 inhabited worlds or so, only a few of the major ones have Norse names. The vast majority will be non-Norse, or even non-deity names. And among them could be Isis, Ishtar, Zarathustra, Gilgamesh and (possibly) Poictesme.

Although they are not mentioned in Piper, I added the habitable planets of Modi and Magni, placing them in the northeastern section of the old Norse Core. I assume these hypothetical bodies are in the same stellar system, and possibly twin worlds. This enables the Second Empire to have seven major Norse-named planets, even as seven Norse gods survived Ragnarok. Notice also that the whole region of what was once the Terran Federation, divided into many Viceroyalties during the First Empire, should now constitute merely the single central province of the Second Galactic Empire. (Figure 29.)

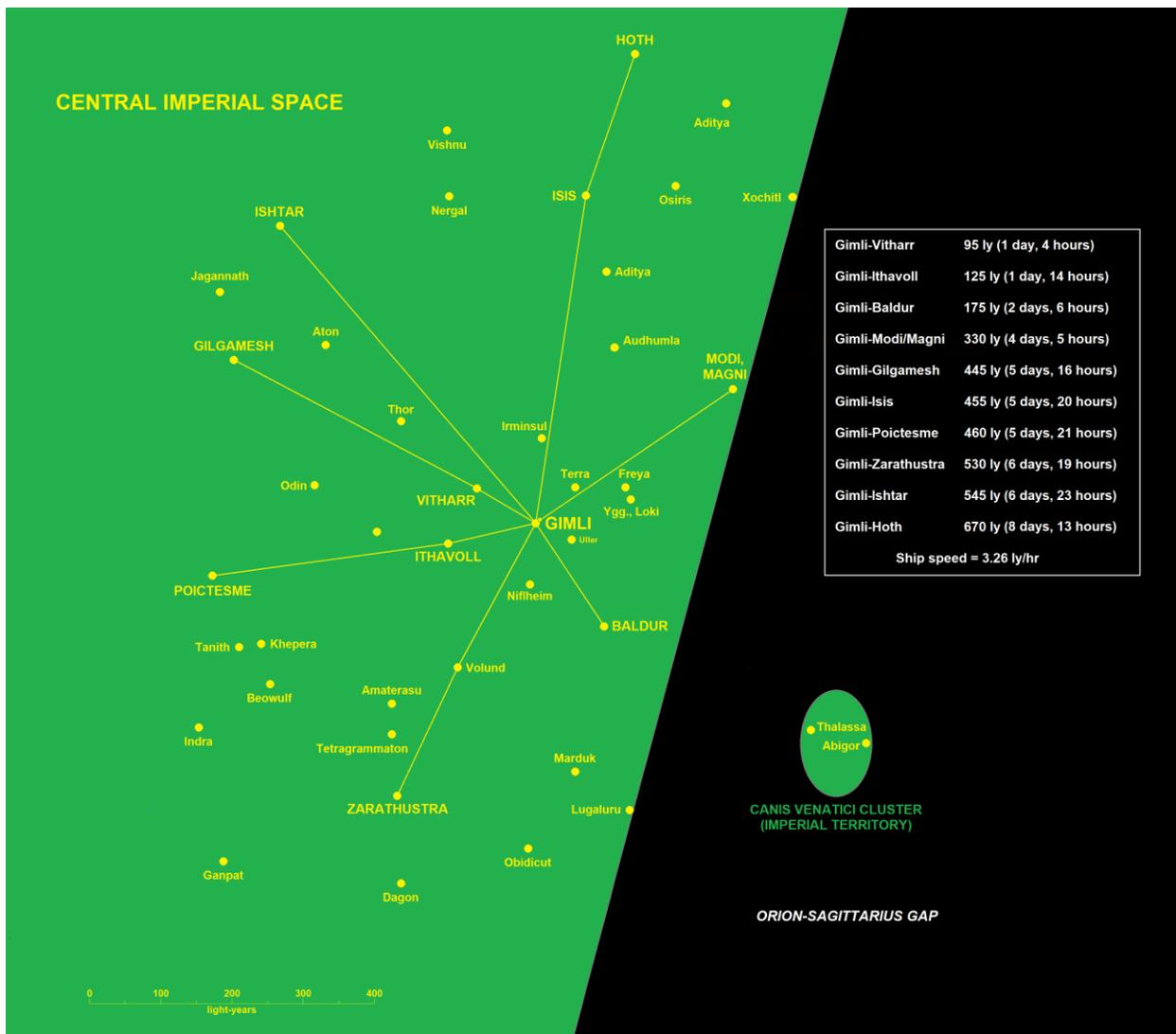


Figure 29. Estimated central region of the Second Galactic Empire, including its capital planet Gimli and a few of its major worlds.

And perhaps not even all of it. For given the estimated ship speed of 3.26 light-years (1 parsec) per hour, the box on the right side of Figure 29 shows the new times from Gimli to the various major worlds. These reveal that the farthest reaches of the Old Federation, which used to be more than 6 months from Terra, would now be not much more than a week from Gimli. And the 6000 ly distance to the outer frontier of the Second Empire would only take 1840.5 hours, or 76.7 days, to reach. A little more than two and a half months.

In Norse mythology, the new heaven of Gimlé represents a new and peaceful golden age, unlike the warrior's heaven of Asgard which preceded it; and the new earth which arises after Ragnarok will be "beautiful and green, in which self-sown crops grow."²⁵⁵ This suggests that the planet Gimli is a more beautiful world than the standard Terra-type. As John Carr and William Taylor describe it, "Piper often worked under the conception—at least in the first six centuries of the Federation—that the founders used those gods that best described the discovered planet. Therefore, we can safely assume that Gimli was a beautiful world, more lovely than even Terra."²⁵⁶

For this reason, I used green and gold as the colors of the Second Galactic Empire, and its possible capital planet Gimli, which establishes a verdant new golden age among Terro-Humanity. Indeed, the references to Gimlé in the Norse myths also suggest that the Second Empire will be a more egalitarian state. And this could include its relations with its constituent alien races; such as the Gimlian natives (making Gimli the first Imperial capital to possess a native sapient race), and the nearby Fuzzies of Zarathustra, who are once again recognized as intelligent beings.²⁵⁷

19. The Third Galactic Empire

As serene, equitable and wonderful as it may be, however, we know that the Second Empire will eventually fall in its turn, to be succeeded some time later by the Third Galactic Empire. But the Second Empire probably lasts longer than the First. Of human government, Prince Simon Bentricks says that "we'll just have to make it work the best way we can, and when it breaks down, hope the next try will work a little better, for a little longer."²⁵⁸ So continuing the trend, the Second Galactic Empire is followed by the Third Interregnum and Third Galactic Empire, both of which last longer than the Second Interregnum and Second Empire. The Third Empire is probably larger than the Second as well. If we apply our working figure of 2.73 once more, then the Third Galactic Empire could include more than 11,000 inhabited planets, and extend more than 16,000 light-years from the original center of human space.

This expanse would encompass practically the entire Orion Arm, the central sections of the Perseus and Sagittarius Arms, plus most of that section of the Centaurus Arm closest to the galactic core. Indeed, it would even include a little of the Norma Arm, almost but not quite reaching the outer edge of the galactic core. This is mirrored in the west, where the Third Empire almost but not quite reaches the inner edge of the Outer Arm. (Figure 30, below.) In this era, Terro-Humanity is therefore closing in on both the Core and the western edge of the Galaxy itself.

A radius of 16,000 ly puts us just beyond the 6 month range of ships traveling at 3.26 ly/hr. The frontier of the Third Galactic Empire would be more like 7 months from the astrographic center. So it is possible ship speeds remain the same, but I would guess that sometime during the Third Empire, they improve once again. To keep things simple, let's estimate that hyperships can now travel twice as fast; 2 parsecs, or 6.52 ly/hr. At that speed, the outer frontier of the Third Empire would be about three and a half months from the center.

The Perseus Arm and Centaurus Arm are both more substantial than the Orion Arm. Eventually, therefore, these should become the homes of greater realms which eventually challenge the supremacy of the old center in the Orion Arm. But in the days of the Third Empire, they are still virgin arms in the initial stages of settlement, so I assume the capital of Terro-Humanity remains in Orion.

Piper provided only one detail of the Third Empire, beside the name. In "The Keeper", the Lord Dranigrastan states that "the glaciation [on Terra] hadn't started in the time of the Third Empire."²⁵⁹ That's it. So there are many possibilities as to the Imperial capital. It could be an Old Federation world, or one of the newer worlds of the First or Second Imperial periods. However, in *The Cosmic Computer*, the planet Poictesme is poised to create a new universal state.²⁶⁰ For some unknown reason or reasons, it fails and falls, and is later replaced by Marduk, which eventually creates the new state; a Galactic Empire instead of a new Federation. But Poictesme's potential status may have been another one of

Beam's foreshadowings, meaning that the planet might indeed create a new universal state, sometime later in the Future History. If so, I would guess that it is the capital of the Third Galactic Empire. That Poictesme belongs to a 'Trisystem' might have been another one of Piper's subtle hints in this regard.

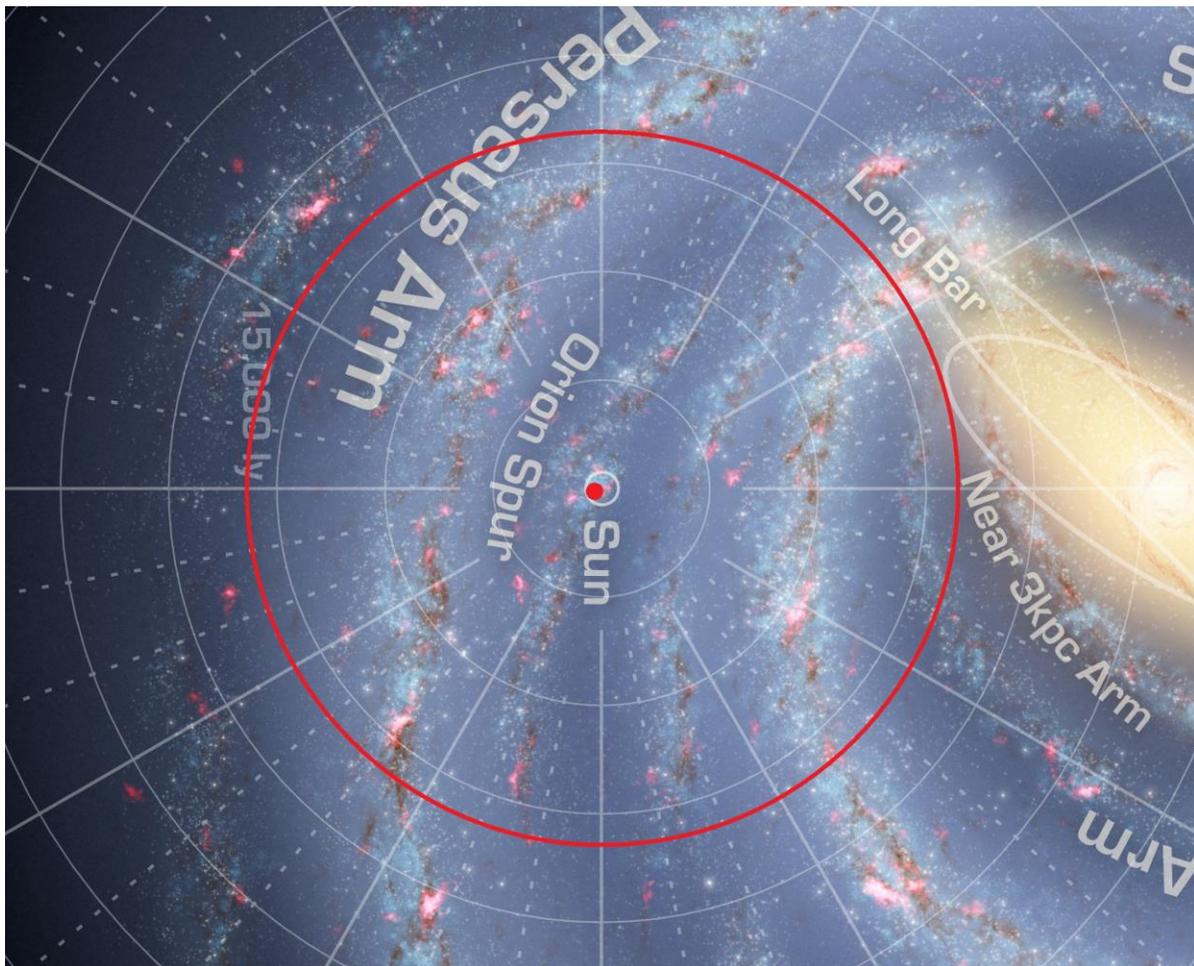


Figure 30. Estimated extent of the Third Galactic Empire, with its possible capital planet Poictesme, circa AE 11,000.

Thus, Poictesme, the boom-and-bust planet which just couldn't seem to make good during the later Federation era and immediately after, may finally become the gleaming center of Terro-Human space. A 'planet of light', a galactic capital; paralleling the City of Light, Paris, one of the great cities of Terra and capital of one of the greatest nations. Red and white are "the planetary colors" of Poictesme,²⁶¹ so I used red to delineate the estimated border and possible capital of the Third Galactic Empire.

Another interesting possibility for the capital of the Third Empire would be Excalibur, or another one of the old Sword-Worlds. That's because Sword-World civilization initially expanded much like the Terran Federation. With Excalibur paralleling Terra, and the other Sword-Worlds paralleling the initial extrasolar colonies of the Federation; such as Odin, Baldur, Yggdrasil and Freya. Given a normal course of development, Sword-World civilization should have expanded to a much greater size, and eventually could have created its own universal state. But as we've seen, its natural growth was interrupted by the diversion to plundering and conquering planets in the Old Federation.

During the First Empire, the Sword-Worlds are an Imperial backwater. Yet it is possible that, during the Second Galactic Empire, the Sword-Worlds once again achieve a high level of civilization, and become a major player in Galactic affairs. Not to raid and destroy this time, but to build, progress and preserve. This would parallel their historical model, the Vikings. For after the fury of the Norsemen was

spent, they settled down, renounced their pagan ways, and became highly advanced and respectable Christian nations. A couple, like Denmark and Sweden, even achieved an imperial level of power.

This could mean that, after the Sword-Worlds are properly 'civilized' by the First Empire, one or more of them proceed to become empires themselves. Going way back to our comparison maps in Figure 13, Denmark and Norway would be paralleled by the Sword-Worlds themselves, and Sweden by the undiscovered worlds of the eastern Sword-World cluster, which I assume are settled during the First Empire. So that during the Third Interregnum after the Second Empire collapses, there could arise a 'Western Sword-World Empire', paralleling the Danish Empire, followed by an 'Eastern Sword-World Empire', paralleling the Swedish Empire. Powerful interstellar states, if not universal ones.

20. The Fourth Galactic Empire

After the Third Galactic Empire comes the Fourth Interregnum and then the Fourth Galactic Empire. Nothing is known of the Fourth Empire, save that there are no records of Terra during that time.²⁶² Shades of Aditya; now Terra itself has become so obscure as to be a 'lost' planet! But assuming that the Fourth Galactic Empire is a similar 2.73 times larger than the Third, it will contain about 30,500 inhabited planets, and extend out to roughly 45,000 light-years. Thus, the Fourth would be the first to expand to the galactic core, and beyond it into the far side of the galaxy. It would also be the first to control the majority of the Milky Way. As seen in Figure 31, it should encompass almost the entire Perseus Arm, save for its

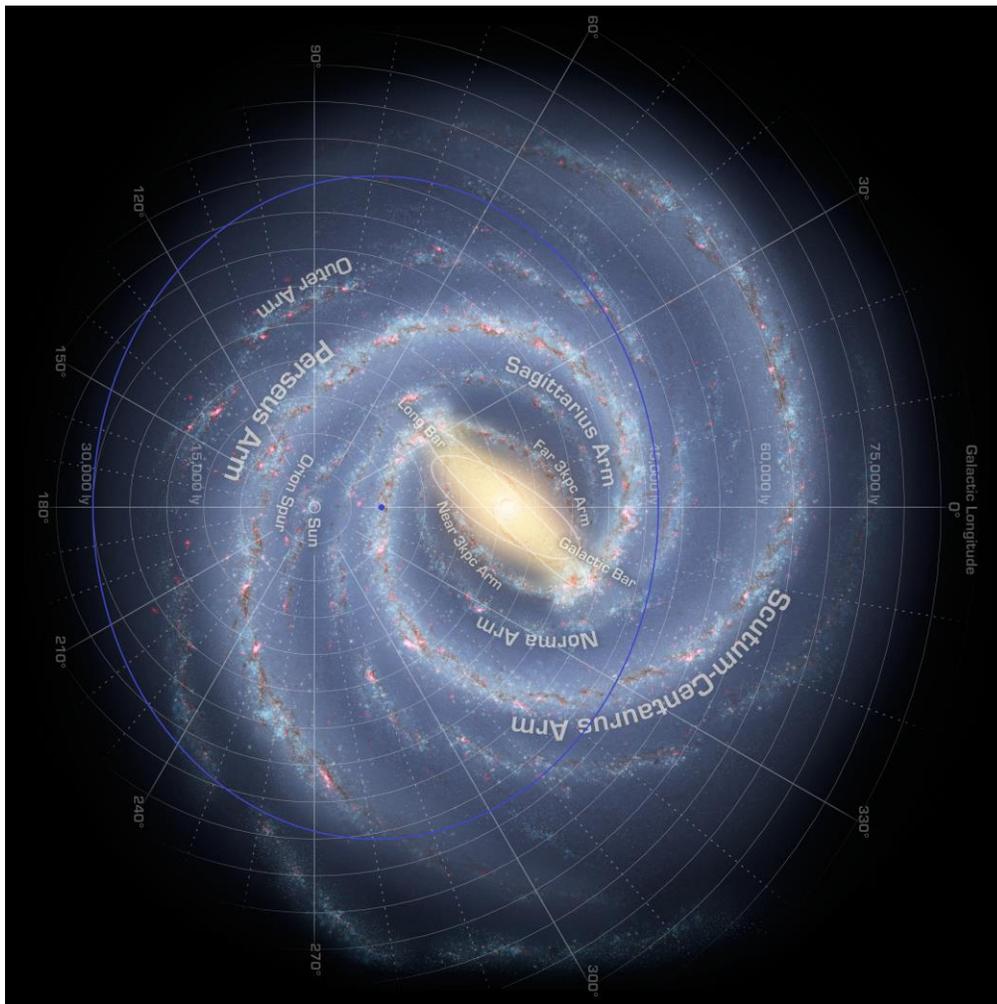


Figure 31. Estimated extent of the Fourth Galactic Empire, with its deduced capital in the Centaurus Arm, circa AE 20,000.

tail; about half of the Sagittarius Arm, and most of the Outer Arm. The largest expanse of territory it would not control would be the majority of the Centaurus Arm, followed by the eastern half of the Sagittarius Arm, and then the southern trailing reaches of the Outer Arm.

It must be noted, however, that 45,000 ly of expansion toward the west takes us well into intergalactic space. Expansion in this direction will therefore cease at about 25 or 30,000 ly, just beyond the Outer Arm. That would give the Fourth Empire more of an oval shape, rather than circular. And with an east-west diameter of 70 to 75,000 ly, that means the astrographic center of the Fourth Galactic Empire will be at the 35,000 to 37,500 ly mark, which is in the Centaurus Arm, not Orion.

Thus, the capital of Terro-Human space may finally make a major move toward the center of the galaxy, as well as transferring from a minor arm to a major one. And a capital in Centaurus would be on a planet founded during the Third Empire, when I assume that arm was first colonized.

I also assume another increase in ship speed. Because if the speed is the same as the estimate for the Third Empire, 6.52 ly/hr, it would take a hypership 287 days, or almost nine and a half months, to travel from the capital of the Fourth Empire to its northern and southern frontiers. So let's increase the speed to 3 parsecs per hour, which would be 9.78 ly/hr, or say 10 for convenience. At 10 ly/hr, the farthest reaches of the Empire would be 187.5 days, or a little more than 6 months, away.

The only major colors I haven't used for a universal state yet are orange, indigo and violet. I chose indigo for the Fourth Empire, because it controls most, but not all, of the galaxy. That leaves Beam's penultimate state, the Fifth Galactic Empire, to receive the 'Imperial purple'.

21. The Fifth Galactic Empire

This universal state makes just one appearance, in the last story of the Future History, "The Keeper". The tale appropriately takes place on Terra, whence humanity's expansion into the galaxy began "about 30,000 years" earlier.²⁶³ Assuming the Fifth Galactic Empire is 2.73 times bigger than the Fourth, it will contain more than 83,000 inhabited planets, and extend to more than 120,000 light-years. This of course encompasses the entire Milky Way, which is usually estimated to be about 100,000 ly in diameter.²⁶⁴

A unified galaxy is suggested by Raud the Keeper. When he learns that his visitors "from the Far Stars" are actually from the capital planet Dremna, he is surprised and impressed. "Why, Dremna was the Great World, at the middle of everything! Dremna was the Empire."²⁶⁵ I have always taken "the middle of everything" to mean 'the center of the galaxy', which has finally been completely settled and united by Terro-Humanity.

In the far distant age of the Fifth Empire, one would think that the most important planets congregate in, or close to, the galactic center. That would mean the inner Centaurus and Perseus Arms. Following these in importance would be the inner Sagittarius Arm, then the outer Centaurus, outer Perseus and outer Sagittarius Arms, and then the Outer Arm. Finally followed by the Orion Arm, the smallest in the Galaxy and likely to be the least important by this time.

Not only because of its small size. The number of interplanetary and interstellar nuclear wars fought from the First Interregnum (after the fall of the Terran Federation) to the Fourth Interregnum (after the fall of the Third Galactic Empire) is undoubtedly very large, and during the whole of this time, the Orion Arm is the center of Terro-Human civilization. In all probability, these wars leave the majority of the Orion Arm devastated and depopulated; particularly because the destructive weapons used likely become more and more powerful. After the fall of the Third Empire, the relatively devastated state of the Orion Arm is likely another reason why the Fourth Empire's capital is located in a major arm like Centaurus.

The backwardness of Orion in this age seems to be supported by Lord Dranigrastan, who informs us that "The [Fifth Galactic] Empire has a Space Navy base, and observatories and relay stations" on Terra.²⁶⁶ The Navy base's purpose is certainly to exert control over this part of the galaxy, but also to protect the relay stations. These are likely used to maintain communications between the major worlds of the Core and the inner galactic arms to the east, and the important worlds beyond Terra to the west, in the Perseus and Outer Arms.

Incidentally, the existence of relay stations suggest that the faster-than-light or "instantaneous" method of interstellar communications, invented near the end of the First Galactic Empire, are still limited in range. The early version enabled immediate contact between planets hundreds of light-years apart, such as from Odin to "Baldur or Vishnu or Aton or Thor".²⁶⁷ During the Fifth Galactic Empire, the range has probably improved to planets thousands of light-years apart, such as in the same arm or in neighboring

arms. But the galaxy is about 100,000 light-years across. So for communications between planets, say, 10,000 ly apart or more, relay stations are necessary. This parallels Beam's story "Omnilingual", where radio communications between Mars and Terra travel "via Lunar", which implies a Lunar relay station.²⁶⁸

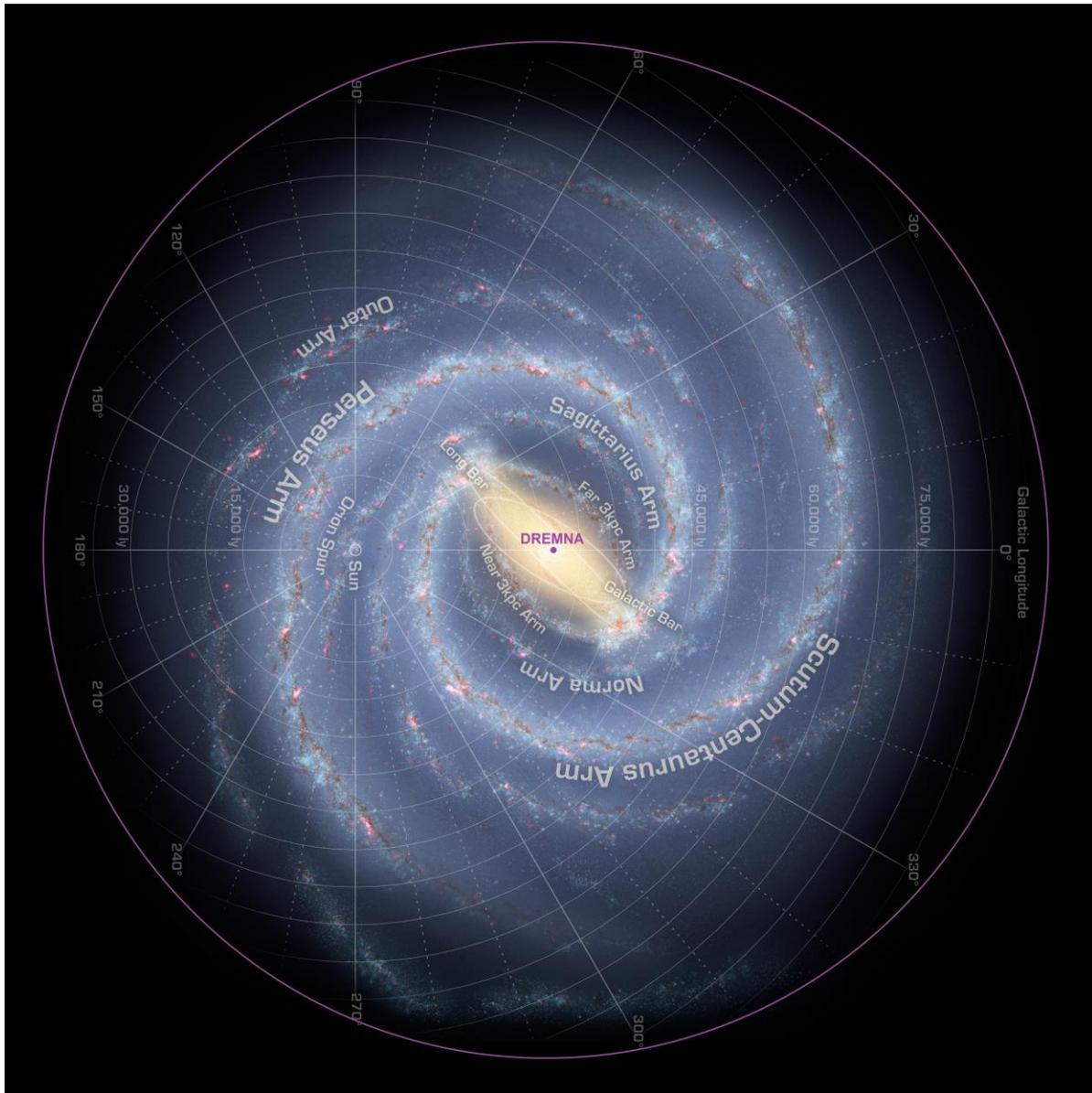


Figure 32. Presumed extent of the Fifth Galactic Empire, with its capital Dremna "at the middle of everything", circa AE 30,000.²⁶⁹

The estimated radius of the Fifth Galactic Empire, 50,000 ly, is only 5000 ly more than that of the Fourth. So I assume that the estimated ship speed during the Fourth Empire, 10 ly/hr, is the same in the Fifth Empire, at least during its early centuries. In Beam's time, Terra was estimated to be about 30,000 ly from the center of the galaxy.²⁷⁰ At 10 ly/hr, Prince Salsavadran and Lord Dranigrastan would then have taken about 3000 hours, or a little more than 4 months, to travel from Dremna to Terra. To me that sounds about right, since the reference to "the Far Stars" always suggested it takes a long time to reach them. They're far away in time as well as space. At the 10 ly/hr rate, the farthest reaches of the Fifth Empire, the outer edge of the Milky Way, would be about 5000 hours, or almost 7 months, from Dremna.

22. A General Timeline of Galactic Expansion

This brings us to the apparent end of the Terro-Human Future History, with mankind as masters of the entire Milky Way. It seems fitting that the THFH begins and ends on “the Mother-World, Terra, the world that sent Man to the Stars”.²⁷¹ From humanity’s initial baby-steps to the Moon in “The Edge of the Knife”, to the arrival on Terra of Imperial overlords from the Far Stars of the Galactic Core in “The Keeper”.

Can a timeline of the entire Future History be created? Some of its most important dates are known, or can be approximated. In “The Edge of the Knife”, we learn that the Terran Federation is established in 1974, or AE 31,²⁷² and in “The Future History”, Beam tells us that the “Terran Federation completely vanished by 1100 A.E.” The First Interregnum runs from that point to roughly AE 1850, or about 750 years.²⁷³ The First Galactic Empire’s range is from circa 1850 to at least 3050, which is the approximate date of “Ministry of Disturbance”.²⁷⁴ If we assume that it lasts another 150 years, then the Galactic Empire disappears around AE 3200.

After that we have nothing until “The Keeper”, which takes place “about 30,000 years” from now. At the time of the story, “the beginning of the Fifth Empire, [was] less than a thousand years ago,”²⁷⁵ meaning that the Fifth Galactic Empire should begin around AE 29,500. But how to figure out the durations of the intermediate Galactic Empires, plus their interregnums, between the end of the First Galactic Empire and the rise of the Fifth, an expanse of about 26,300 years? Careful readers will have noticed that tentative dates were provided for the maps of the Second, Third and Fourth Galactic Empires. These were based on estimates made by multiplying the number of years in the First Interregnum and First Empire by 1.7. That is, each Galactic Empire lasts 1.7 times longer than the previous one, and the same for each interregnum. That resulted in the following numbers.

The Second Interregnum begins around AE 3200, with the end of the First Galactic Empire. It lasts about 1277 years, ending around AE 4477. The Second Galactic Empire runs from there to AE 6775, after lasting about 2298 years. The Third Interregnum covers about 2170 years, ending circa AE 8945; and then the Third Galactic Empire runs for another 3907 years, until it falls around AE 12,852. The Fourth Interregnum spans about 3690 years, ending around AE 16,542; followed by the Fourth Galactic Empire, which lasts approximately 6642 years, until its end circa AE 23,184. The Fifth Interregnum then covers the next 6272 years, until around AE 29,456, when the Fifth Galactic Empire begins.

The estimated date of 29,456 for the rise of the Fifth Empire is 544 years, or appropriately “less than a thousand”, before Beam’s vague date for “The Keeper”, AE 30,000. In graphic form, the timeline would look like this (Figure 33). Too long to display at full length, it’s in two parts, one above the other.

The timeline begins with a gray wedge, representing the ‘end’ of normal human history, onto which Beam tacked his Future History. The little sliver marked “AE 2-30” represents the period of the United Nations, which is far too narrow to label. The white line at AE 183 represents the break between the First and Second Terran Federations.²⁷⁶ And the black line at AE 3050 is the time of “Ministry of Disturbance”.

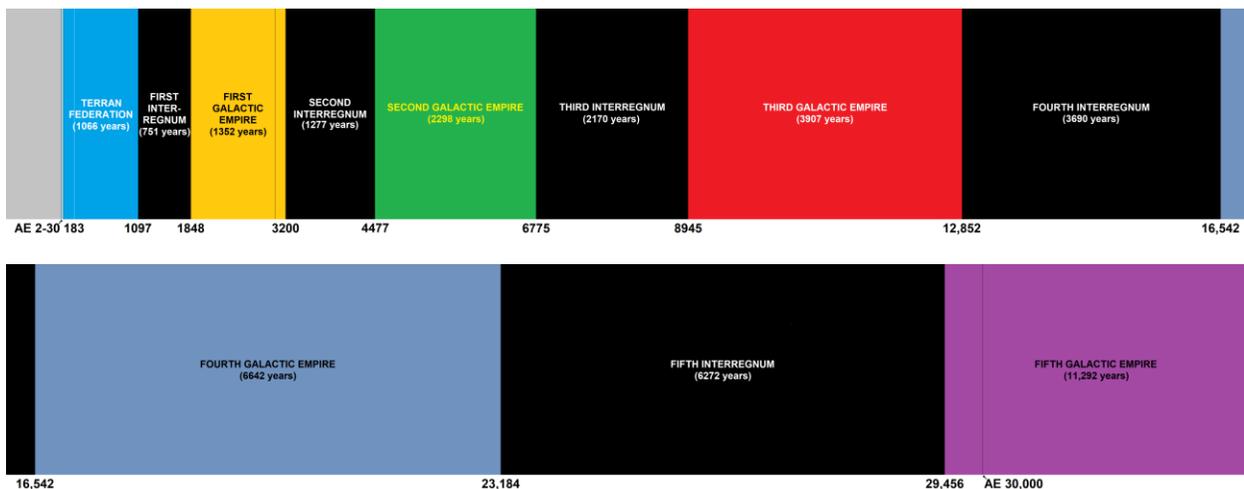


Figure 33. Estimated timeline of Piper’s Future History, from the Terran Federation to the Fifth Galactic Empire.

Moving down to the end of the timeline, a black line was added at AE 30,000, representing “The Keeper” and the end of Piper’s Future History. Beyond that, it is interesting to note that using this ratio, the galaxy-spanning Fifth Galactic Empire is calculated to last around 11,292 years. Because this is ‘less than a thousand years’ less than the duration of Isaac Asimov’s galaxy-spanning First Galactic Empire—12,000 years. Moreover, Beam’s number of 30,000 years also has significance with regard to Asimov’s First Empire.²⁷⁷

In any case, Piper seems to have intended for his Future History to record the expansion of Terro-Humanity from its original home world out across the whole galaxy; a parallel of the expansion of Western (or European) civilization from a single continent outward across the entire globe. Terrestrial expansion involved gradual improvements in the speed of ships and communications, which are paralleled by celestial improvements in Piper. As we’ve seen, his interstellar communications become instantaneous during the late First Empire, and are probably followed in later ages by gradual increases in their range. The improvement in ship speeds over the course of the Future History can be displayed by adding the estimated rates of later hyperships to those of the chart on page 14. Like so:

Estimated Ship Speeds of the Terro-Human Future History

Period	Rate	6 month distance
Early Federation (circa AE 192 to 600)	62.57 hr/ly	70 ly
Later Federation (circa AE 600 to 1100)	8 hr/ly	547 ly
First Interregnum (circa AE 1100 to 1900)	1 ly/hr	4,380 ly
First Galactic Empire (circa AE 1900 to 3200)	3.26 ly/hr (1 parsec/hour)	14,279 ly
Second Galactic Empire (circa AE 4477 to 6775)	3.26 ly/hr (1 pc/hr)	14,279 ly
Third Galactic Empire (circa AE 8945 to 12,852)	6.52 ly/hr (2 pc/hr)	28,558 ly
Fourth Galactic Empire (circa AE 16,542 to 23,184)	10 ly/hr (3+ pc/hr)	43,800 ly
Fifth Galactic Empire (circa AE 29,456 to 40,748)	10 ly/hr (3+ pc/hr)	43,800 ly

Ten light-years per hour. After “The Keeper”, when Prince Salsavadran and Lord Dranigrastan finish investigating “the long-ago times” on Terra,²⁷⁸ they could decide to continue their archaeological research on planets settled during the early Interstellar Era. And if they begin by following the route of the very first hypership to the Alpha Centauri system,²⁷⁹ at 10 ly/hr it would take them less than 30 minutes to get there. Like modern seamen aboard an aircraft carrier wondering at the triremes of ancient Greece, Dranigo and Salvadro might discuss those ancient star voyagers of 300 centuries ago, who had to take more than 270 hours, almost 11 ½ days, to travel that 4 light-year distance.

23. Piper’s Cosmogony...and Beyond?

And finally, Piper’s Terro-Human Future History contains almost all the elements of the common “Cosmogony of the Future”, which became tacitly accepted by science-fiction writers after Isaac Asimov’s groundbreaking Foundation series. As explained by Donald Wollheim, “What the Foundation series did was to create the point of departure for the full cosmogony of science-fiction future history. It is possible to analyze present-day stories and place them into that framework of millions of years to come. We can establish a pattern of premises accepted without acknowledgement. We can tell what is implied by the simple facts of a story’s background.”²⁸⁰

According to Wollheim, there are eight main elements to this cosmogony. And when we analyze Beam’s stories, we find that they fit into this framework very well. The first element is “the initial voyages to the moon and to the planets of our Solar System”. In Beam’s Future History, this era is described in

“The Edge of the Knife” and “Omnilingual”. The second element is “the first flights to the stars” and the rise of an interstellar civilization; these are covered in Piper’s various Federation tales. Third is “the Rise of the Galactic Empire” (featured in “A Slave is a Slave”), followed by “the Galactic Empire in full bloom” (“Ministry of Disturbance”). Fifth is “the Decline and Fall of the Galactic Empire”, which we know will happen sometime after “Ministry of Disturbance”; then “the Interregnum” which will follow the Empire’s collapse. The seventh element is “the Rise of a Permanent Galactic Civilization”; this seems to be fulfilled by Beam’s Fifth Galactic Empire, which has united the whole Milky Way by the time of “The Keeper”.²⁸¹

The main difference in Piper’s cosmogony is that he postulated a series of universal states and subsequent dark ages, beginning with the Terran Federation and First Interregnum. Each universal state is larger and longer-lasting than its predecessor, and each interregnum is likewise longer, until slowly, over tens of millennia, the entire galaxy is explored, colonized and finally united.

The last element in the Cosmogony of the Future is “the Challenge to God. Galactic harmony and an undreamed-of high level of knowledge leads to experiments in creation, to harmony between galactic clusters, and possible exploration of the other dimensions of existence.”²⁸² Piper wrote no stories set after “The Keeper”, but he did imply that Galactic harmony may be possible. Just not for a very long time. Because in *Space Viking*, Prince Trask says that “It may just be...that there is something fundamentally unworkable about government itself. As long as *Homo sapiens Terra* is a wild animal, which he has always been and always will be until he evolves into something different in a million or so years, maybe a workable system of government is a political-science impossibility”.²⁸³

In about a million years, Terro-Humanity will no longer be a wild animal, having evolved into a higher state of being. And Beam inserted clues that mankind is slowly evolving. In “Ministry of Disturbance”, there are references to “psi-mediums”, who “have real powers”, and whose predictions (sometimes) come true.²⁸⁴ While over in his Paratime series there are even greater indications. Set about 100,000 years after the advent of Martio-Humanity on Terra, the human beings of Home Time Line have enhanced mental abilities, including total recall of memories and “semitelepathic rapport” between individuals. Moreover, psychic research is not only an established science, on one Second Level timeline, they have perfected a technique which allows people to remember their most recent past lives.²⁸⁵

Assuming that Piper intended parallel developments in the Future History, we would expect Galacto-Humanity to gradually acquire advanced mental abilities in the tens of millennia after “The Keeper”. The Challenge to God might then eventually become possible. Although, given Beam’s agnosticism if not downright atheism,²⁸⁶ perhaps it would be better to call it the ‘Challenge to Infinity’ or (if the minds of Terro-Humans are in fact immortal as in Paratime) the ‘Challenge to Eternity’.

A vast span of time lies between the Fifth Galactic Empire of “The Keeper” (circa AE 30,000) and the postulated Challenge to Infinity and/or Eternity (beginning circa AE 1,000,000). What happens in the interim? Well, since Terro-Humanity is still a wild animal, the Fifth Galactic Empire probably falls in the end, just like the First through Fourth before it. Adding the estimated duration of the Fifth Empire to the estimated date of its beginning, this would occur around AE 40,748. And in a way, the subsequent eras would parallel the Terro-Human Future History, just on a much larger scale. The cycle would begin again.

First would be the start of an ‘Intergalactic Era’, involving the first flights to the nearest galaxies; paralleling the first flights to the planets and stars in the ancient Atomic and Interstellar Eras. This new Era would thus involve colonizing expeditions (obviously requiring a ship speed much greater than 10 ly/hr) to the Greater and Lesser Magellanic Clouds, the Andromeda galaxy and beyond. Next would be the rise of a series of ‘Intergalactic Empires’, true Universal States, paralleling the ancient universal states of the Milky Way galaxy. Each presumably containing a larger number of galaxies, and lasting longer, than its predecessor. In this way, hundreds, then thousands of new galaxies, trillions and quadrillions of new stars, planets and an untold number of alien races would be encountered. Onward and outward, rising, falling, and rising again, for hundreds of thousands of years. Until the time comes when *Homo sapiens galactica* evolves into something like ‘*Hyper sapiens universalis*’.

Mankind may then finally be on the verge of “Galactic harmony and an undreamed-of high level of knowledge [leading] to experiments in creation, to harmony between galactic clusters, and possible exploration of the other dimensions of existence.” Had H. Beam Piper lived his full span, who knows but that he could have sat down at his typewriter to craft such a tale. And if he did, it almost certainly would have been not only well-written and thought-provoking, but very entertaining.

Appendix 1. Vertical Views

So far, all the maps in this atlas have covered the expansion of Terro-Humanity in the x and y axes, the horizontal plane. What about the vertical plane, the z-axis? It is well known that the spiral arms of the galaxy are relatively very thin; only about 1000 light-years on average.²⁸⁷ In our part of the Orion Arm, however, it's a bit thicker. The estimate in Beam's time was "about 400 parsecs in the neighborhood of the Sun".²⁸⁸ Four hundred parsecs is a little more than 1300 light-years.

This means that while the Terran Federation expands outward from Sol about 800 light-years in the x and y axes, it only expands about 650 light-years in the z axis, above and below "the plane of symmetry". This plane is the level at the center of the galactic arms which separates the upper from the lower Milky Way.²⁸⁹ In the 1950s, Sol's vertical position in the Orion Arm was estimated as "about 20 parsecs" above the plane of symmetry.²⁹⁰ So when the Federation is at its greatest extent, Terra is not only off-center horizontally, it is off-center vertically, being slightly more than 65 ly above the center of the Orion Arm.

The resulting shape of the Federation in the vertical axis would then be a circle missing its top and bottom. Thus, it roughly matches the Federation's shape in the horizontal axes, which was a truncated circle as well. Here's a simple chart of it, as seen from a point in the Orion-Sagittarius Gap, looking west.

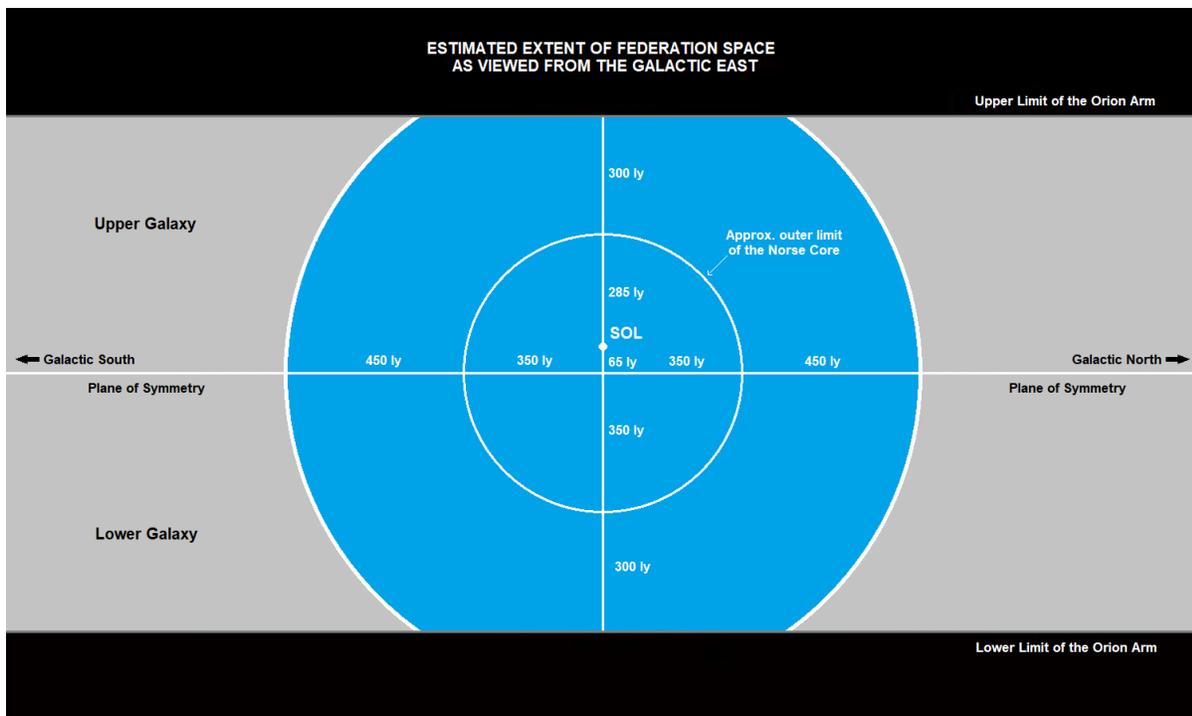


Figure 34. Side view of the Terran Federation, including the Norse Core.

Now for the System States Alliance. When it secedes from the Terran Federation,²⁹¹ a vertical map of the result would look about like this (Figure 35, below). The Alliance GHQ is depicted at the proper 30 parsec (98 light-year) distance from the Federation border, but its vertical position is of course unknown. For convenience, I placed it on the Plane of Symmetry.

From the scanty evidence in Piper, it is difficult to know how much he considered the z-axis in his placement of various planets. Apart from Uller and Niflheim, whose primaries were known stars, one might think he did not take it much into account. Because given the thickness of the Orion Arm, the Federation-Alliance border in the vertical direction should be about 1300 light-years. And that's assuming a straight-line border. As was the case in the horizontal-view maps, it is likely that the frontier varies somewhat, which would make the total more like 1350 or 1400 ly, if not more. This is a much larger figure than the "perimeter of close to a thousand light-years" mentioned by Conn Maxwell, which as we saw in

Figure 5 does work in the x and y axes.

However, Beam may have simply used the standard approximation of 1000 ly for the depth of the galactic arms. In that case, Conn's perimeter would work in the z axis as well.

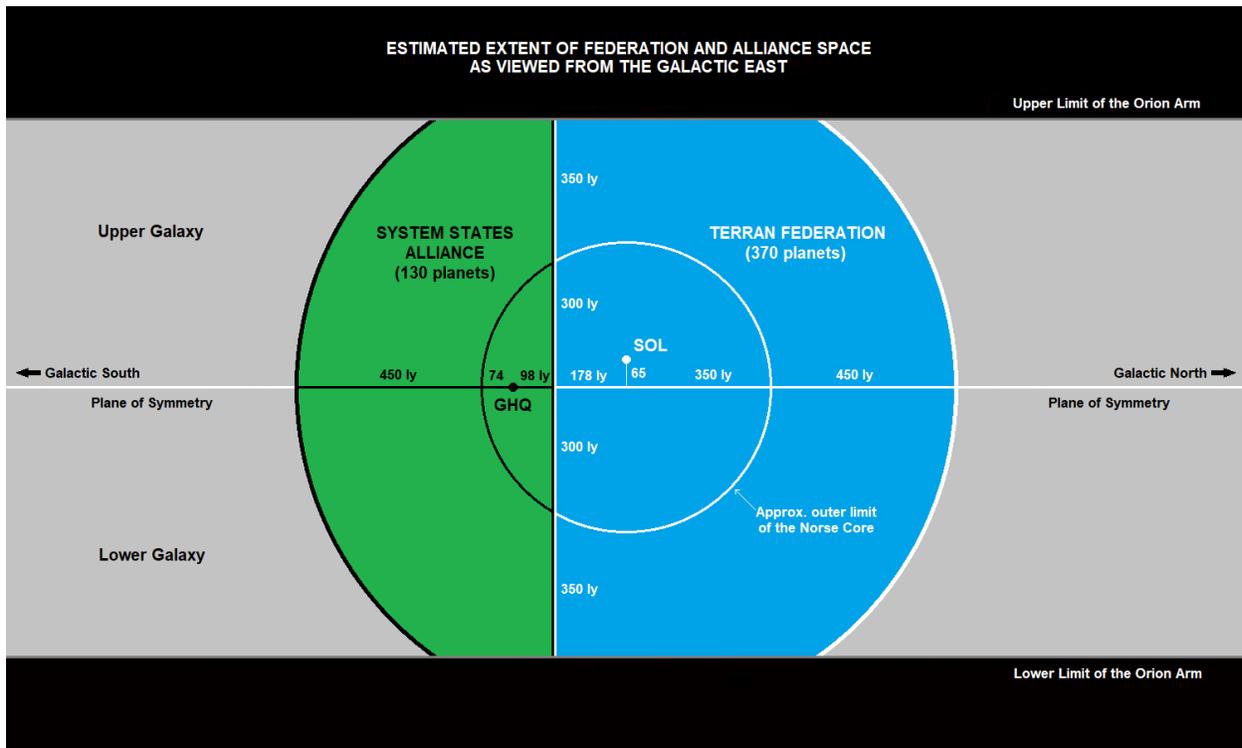


Figure 35. Side view of the System States Alliance and Terran Federation, including the divided Norse Core.

Now let's look at a side view of the First Galactic Empire, which was estimated to extend out to 2000 light-years from Sol.

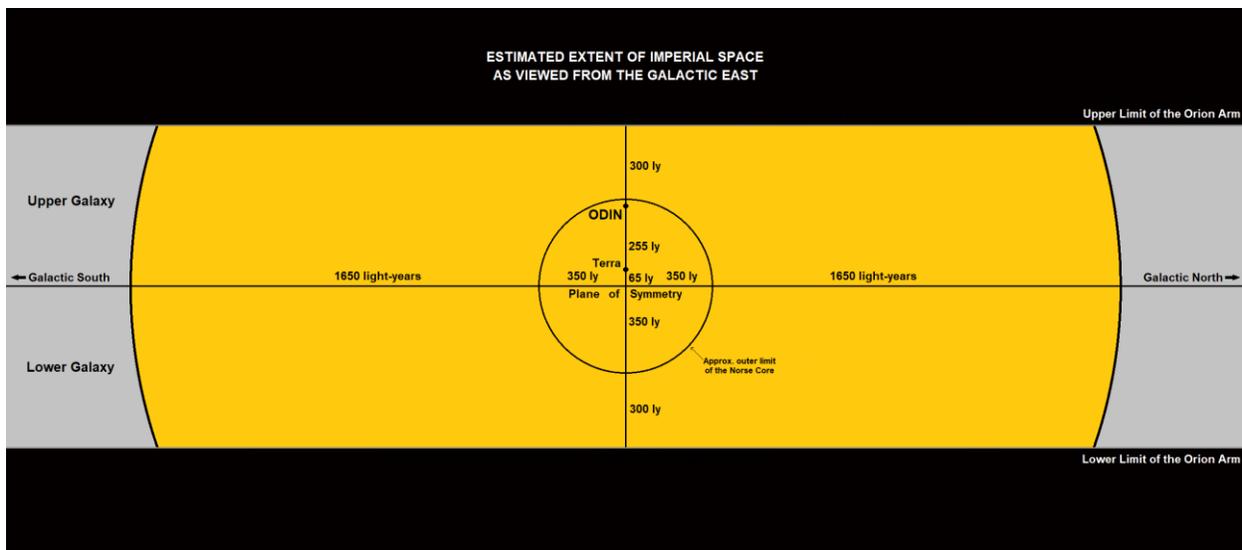


Figure 36. Side view of the First Galactic Empire.

Unlike the Terran Federation’s almost-spherical shape, the Galactic Empire as seen from the side is more like a rectangular wedge with curved ends. Way back in Figure 7, Odin was placed directly west of Terra. That locates it on the same latitude as Sol; the Galactic Equator. Its position in the z-axis is unknown, but Odin’s namesake, the King of the Norse Gods, is by definition a ‘highly elevated’ person. Moreover, Odin rules the Nine Worlds from his throne on Hlidskialf, the “High Seat”.²⁹² So I placed the planet Odin 255 ly ‘higher’ than Sol; making it about 320 light-years above the Plane of Symmetry, and therefore almost halfway to the upper limit of the Orion Arm. As a result, Odin would be much more offset than Terra in the vertical direction, even though it is centrally located in the horizontal direction. But Odin, and its capital city of Asgard, would appropriately rule the ‘Thousand Worlds’ of the Empire from near the top of the Norse Core.

And finally, here’s a side view of the Second Galactic Empire (Figure 37). As you can see, the Second Empire covers an even more elongated rectangle of the Orion Arm. And the Norse Core, containing the capital planet Gimli and such major worlds as Vitharr, Ithavoll and Baldur, is now only a small fraction of Terro-Human space.

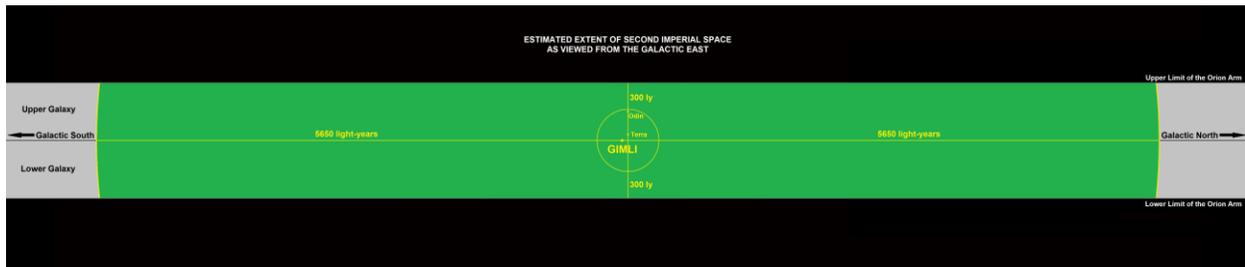


Figure 37. Estimated extent of the Second Galactic Empire, side view (Orion Arm only).

When Piper wrote that Fenris was “six hundred and fifty light-years to the Galactic southwest of the Sol System”, I always took that to mean Fenris was ‘below’ Terra in the z-axis. However, we have already determined that Fenris is not 650 ly from Sol, but only 65; and since Sol was estimated in Beam’s time to be about 65 ly above the Plane of Symmetry, that should place Fenris very close to the Plane; probably slightly above it. Gimli, only about 2.4 ly from Fenris, would therefore be very close to the Plane as well, and possibly right on it. For convenience, that’s where I located Gimli. This position is below Terra, and far below Odin, in the z-axis. A reflection of the ‘lowly’ status Piper gave the planet during the Federation and First Imperial periods. Yet ironically, its estimated location on or near the Place of Symmetry would actually make Gimli more centrally located than either Terra or Odin.²⁹³

The Second Galactic Empire is the last universal state whose space-area lies mainly in the Orion Arm. The majority of the Third Empire’s space-area is in the Perseus, Sagittarius and Centaurus Arms. And the disparity only increases afterward, as the Orion Arm steadily decreases in significance during the Fourth and Fifth Empires. Moreover, as seen in Figure 37, the side view perspective is rapidly becoming too elongated to be easily displayed. It therefore seems unnecessary, and infeasible, to attempt making side views of the Third through Fifth Galactic Empires.

Appendix 2. Star Maps of the Terran Federation and Galactic Empires

What about Beam’s “star map of Federation and Empire”, mentioned by Jerry Pournelle in his Preface to *Federation*? Over the course of this paper, it has become possible to create a simple approximation. This involves bringing together all the planets whose locations have been estimated in the previous maps.

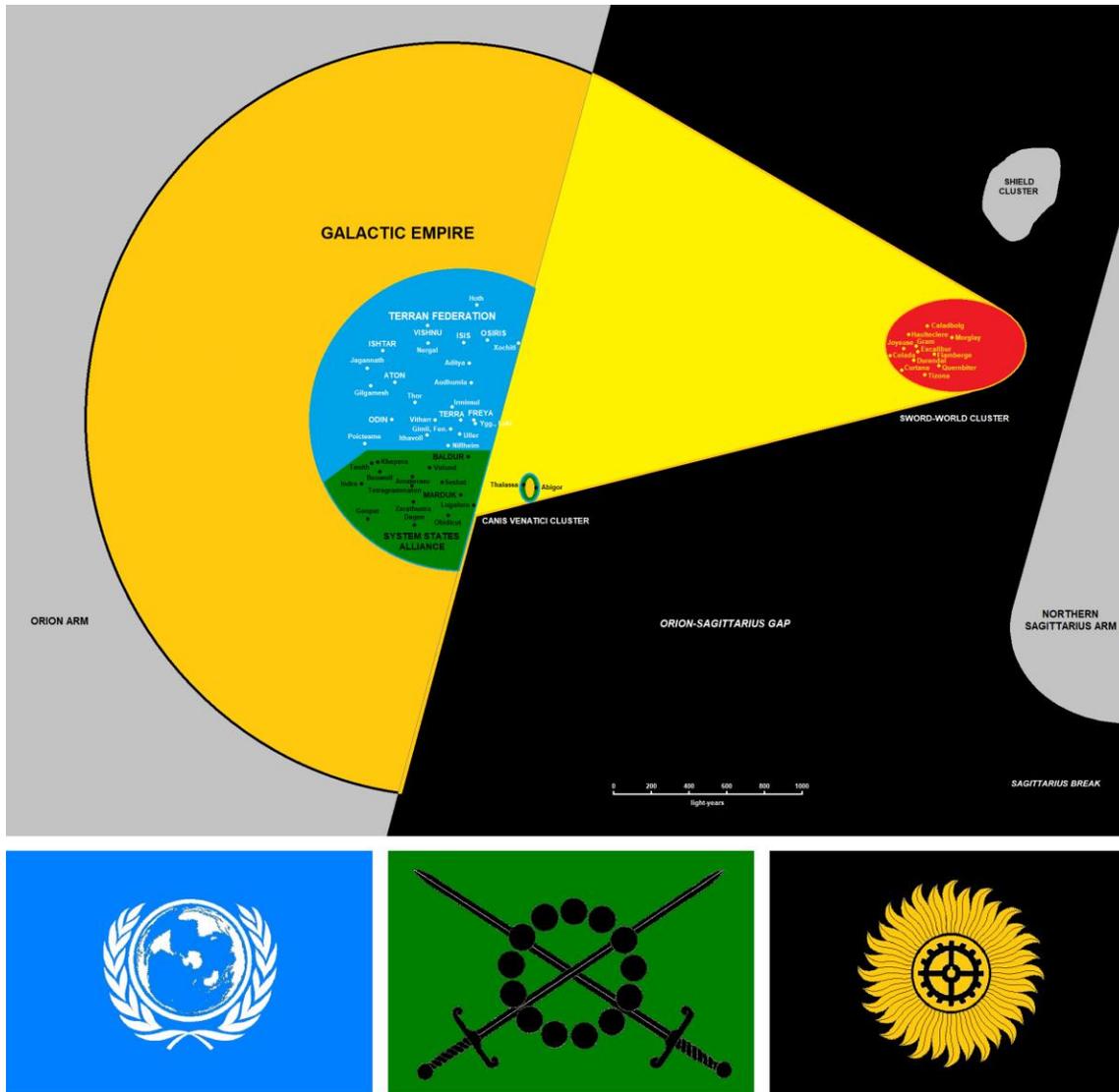


Figure 38. Estimated star map and flags of the Second Terran Federation, System States Alliance and First Galactic Empire.

For good measure, I attached my designs for the flags of the Second Terran Federation, the System States Alliance, and the First Galactic Empire.²⁹⁴ These are based on Beam’s descriptions. The Terran Federation flies a “wreathed globe” on a “light blue field”. I have always felt that this meant the continued use of the old United Nations flag, which the First Federation replaces.²⁹⁵ But after WWIV, the First Federation becomes a “Completely unified world” based in the Southern Hemisphere; and this continues when it is replaced by the Second Terran Federation.²⁹⁶ To symbolically reflect the new political reality, I flipped the globe in the flag to a South Polar projection, and removed the lines of latitude and longitude which gave it a ‘disunited’ look. The First Galactic Empire’s emblem, as mentioned on page 46, is the “gold sun and superimposed black cogwheel”. I chose a cogwheel whose shape suggested a gun sight,

a touch that I think the firearms-loving Piper would have liked.²⁹⁷ As for the System States Alliance, its emblem is unknown. The flag is merely described as “the Banner Black and Green”, which appears to mean a black emblem on a green field.²⁹⁸ Since the Alliance is modeled on the Confederate States of America, I felt their banner should echo those of the Confederacy. So I created a design called the ‘Swords and Worlds’, paralleling the Stars and Bars. A circle of 13 planets represents the 130 planets of the decentralized Alliance, but they also parallel the 13 stars in the Confederate flag. And while the crossed swords symbolize the Alliance’s determination to defend their rights, they also evoke the diagonal stripes in the iconic Southern Cross, the Battle Flag of the Confederacy.²⁹⁹

I did not include a flag for the Sword-Worlds, because they are a cluster of independent planets, not a single state or even a loose association like the Alliance. Once they are conquered by the Galactic Empire, they do become united, but this is “under the Sun and Cogwheel” banner.³⁰⁰ It is only after the fall of the Empire that the Sword-Worlds could possibly emerge as a single, independent state; the ‘Western Sword-World Empire’ proposed on pages 54-55. Such a state would enable the Sword-Worlds to have their own flag at last. (I have an idea for a design, but have not yet put it to paper.)

Getting back to our subject, and using the NASA base map, we can extend the theme by creating ‘a star map of the Empires’; collectively depicting Beam’s First through Fifth imperial galactic states.

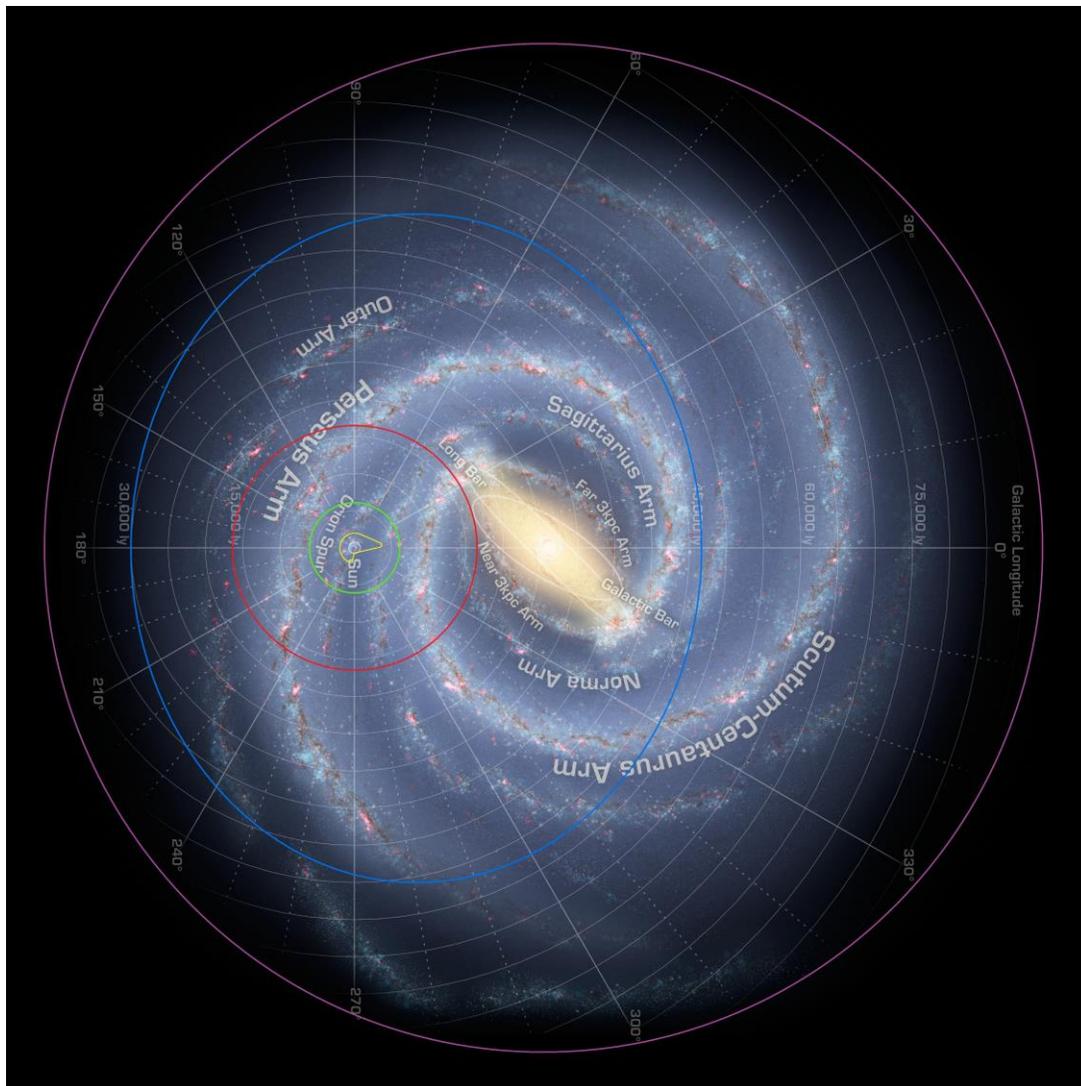


Figure 39. Estimated star map of Piper’s First through Fifth Galactic Empires.³⁰¹

Appendix 3. The Voyage of the Gilgameshers

In the section **Internal Configuration of the Terran Federation** (page 12), we described part of the journey of the first Gilgamesh ship that lands on Tanith, after Lucas Trask takes over that planet. But now that we have the estimated locations of many more worlds on our map, let's try to fill in the rest.

Piper says that "They had a mixed cargo picked up here and there on subcivilized planets, in which nobody on Tanith was interested. They also had some good stuff; vegetable-amber and flame-bird plumes from Irminsul; ivory or something very like it from somewhere else; diamonds and Uller organic opals and Zarathustra sunstones. They also had some platinum."³⁰²

This suggests that the Gilgamesh trade ship does not make stops on the major civilized worlds; probably because there are already large Gilgamesher colonies on them who do the trading. Instead, these itinerate merchants visit the lesser worlds of the Old Federation. Assuming they start their journey from Gilgamesh, their route could look something like this.



Figure 40. Possible route of the Gilgamesh trade ship in *Space Viking*.

The subcivilized planets they land on might therefore include Thor, southeast of Gilgamesh and possibly their first port of call; as well as Seshat, northeast of Zarathustra. As a naturally-occurring substance, the diamonds could come from anywhere; but I assume they are picked up on Terra, which is also where I assume the Gilgameshers acquire the ivory. Both can be found in sub-Saharan Africa.

In *Lord Kalvan of Otherwhen*, Calvin Morrison is accidentally shifted through time, after which he

believes that he has traveled into “the future. A far future, long after the world had been devastated by atomic war, and man, self-blasted back to the Stone Age, had bootstrap-lifted himself back this far.” There is plenty of wildlife in his present time, leading Calvin to comment that “The game must have come back nicely after the atomic wars.”³⁰³

Though these quotes are from Beam’s Paratime series, they seem appropriate to Terra in *Space Viking*. Because as Piper revealed to Jerry Pournelle, “*Terra was bombed back to the Stone Age in one of the many wars that followed the Federation breakup.*”³⁰⁴ And *Space Viking* takes place five centuries after the end of the Interstellar Wars, or ‘long after Terra had been devastated by atomic war’, and the survivors have been ‘blasted back to the Stone Age’. So by the time the Gilgameshers arrive on Terra to trade, the game animals all over the planet are likely to ‘have come back nicely’ and are plentiful again. This would include the elephant herds in Africa, traditionally the greatest source of ivory. Local hunters, reduced to primitive weapons, track and kill them, trading or selling the ivory to other locals or off-worlders. Or—though this doesn’t seem very likely—the Gilgameshers might do their own ivory hunting, with advanced weapons and aerial vehicles. As for the diamonds, the massive workings in the former South Africa might still be in operation. Even if they’re not, diamonds can be found in many places on Terra. In that case, the Gilgameshers may visit more than one continent while on the planet.

Like the diamonds, the platinum the Gilgameshers carry could come from just about any world. But from *Fuzzy Sapiens*, we know that platinum is found on Thor; and in *Space Viking*, there is mention of its industrial use on Amaterasu.³⁰⁵ That might mean the Gilgameshers pick up platinum on Thor, and then later stop on Amaterasu, after leaving Zarathustra (where they pick up the sunstones), to trade the platinum, before continuing on to Tanith. They could also trade the platinum on Beowulf, which is an even more heavily industrialized planet, and on our map lies in just about a straight line between Zarathustra and Tanith.³⁰⁶ However, their visit to Tanith is some time after the *Nemesis* and *Space-Scourge* raid both Amaterasu and Beowulf, and during their discussions and haggling with Prince Trask, the Gilgameshers do not mention either planet. So I assume they stop somewhere else.

Given their estimated trajectory up to this point, a good possibility would be Indra. Indra is a sub-civilized world, and at this point in the story doesn’t seem to have become one of Tanith’s trade planets yet. Indra could then be another one of the subcivilized worlds where the Gilgameshers acquire some of their “mixed cargo”. And of course, some of the mixed cargo may have come from the subcivilized planets where they got the “good stuff”; Thor, Irminsul, Terra, Uller and Zarathustra.

On Tanith, the Gilgameshers “wanted machinery, especially contragravity engines and robots.”³⁰⁷ They presumably pay for it with platinum (which Tanith would need for its new and growing industries), sunstones, organic opals, diamonds and vegetable amber. After departing from Rivington spaceport, the Gilgameshers could make a stop at Poictesme, another subcivilized planet, which is located between Tanith and Gilgamesh. When they arrive back on their home planet, they probably turn in the majority of the profits acquired on their voyage to the theo-socialist government. Because this would parallel the various settlements of Gilgameshers all over the Old Federation, who send “most of” the money they make back home. And as mentioned on page 38, these funds are mainly used to maintain the formidable planetary defenses of Gilgamesh, in order to protect their ‘god’, Yah/Merlin.

If the map in Figure 40 is generally correct, their journey seems to make a rough, clockwise circuit of the central and southern parts of the Old Federation. But it must be admitted that the Gilgamesh trade ship may visit quite a few more planets than I have depicted. Indeed, Aton, Freya, Baldur, Marduk and Odin are not too far from their estimated route. And as part of the ‘Gilgamesh Interstellar Conspiracy’, the Gilgameshers could indeed make short stops on these major civilized worlds, their purpose being to trade information with their co-religionists dwelling there. Thereby fostering the general belief among the other worlds of the Old Federation that “anything one Gilgamesher knows, they all find out”. But their real reason being to hasten the flow of data back to “Yah” on Gilgamesh.

Appendix 4. Evidence for a Large Federation and Empire

When I first read “Ministry of Disturbance” back in 1981, I got the impression that the First Galactic Empire was fairly large. Certainly large enough to be easily seen on a map of the Milky Way. But in Figure 39, the First Empire is pretty tiny compared to the whole galaxy. It doesn't seem justified in calling itself a 'galactic' empire; it's more like a 'small interstellar' one. Granted, the First Empire should appear much larger on the huge star-map in Emperor Paul XXII's study. But this begs the question; are my estimates off?

Early in the main paper, we showed that Piper's distances to planets like Uller, Freya and Fenris were deliberately incorrect, being ten times larger than the true figure. However, these distances could actually be 'true' in another sense. Because in his extremely careful and expert way of confusing the issue, Beam included several references which point to a 'large' Federation and Empire. And at first glance, they seem to be consistent with one another. So let's take a look at them.

The first of these references is Otto Harkaman's statement that “The Old Federation...occupies a space-volume of two hundred billion cubic light-years.” That means the Federation would have a radius of about 6500 ly, and this was shown at an oblique angle in Figure 4.

By tilting Figure 4 so that our viewpoint is directly above the galaxy, here's how that would look. (Figure 41.) Notice that this 'large' Terran Federation would have a slightly greater radius than that of the entire Second Galactic Empire, which was depicted in Figure 28. Like the Second Empire, the 'large' Federation would include the central Orion Arm, and parts of the Sagittarius and Perseus Arms.

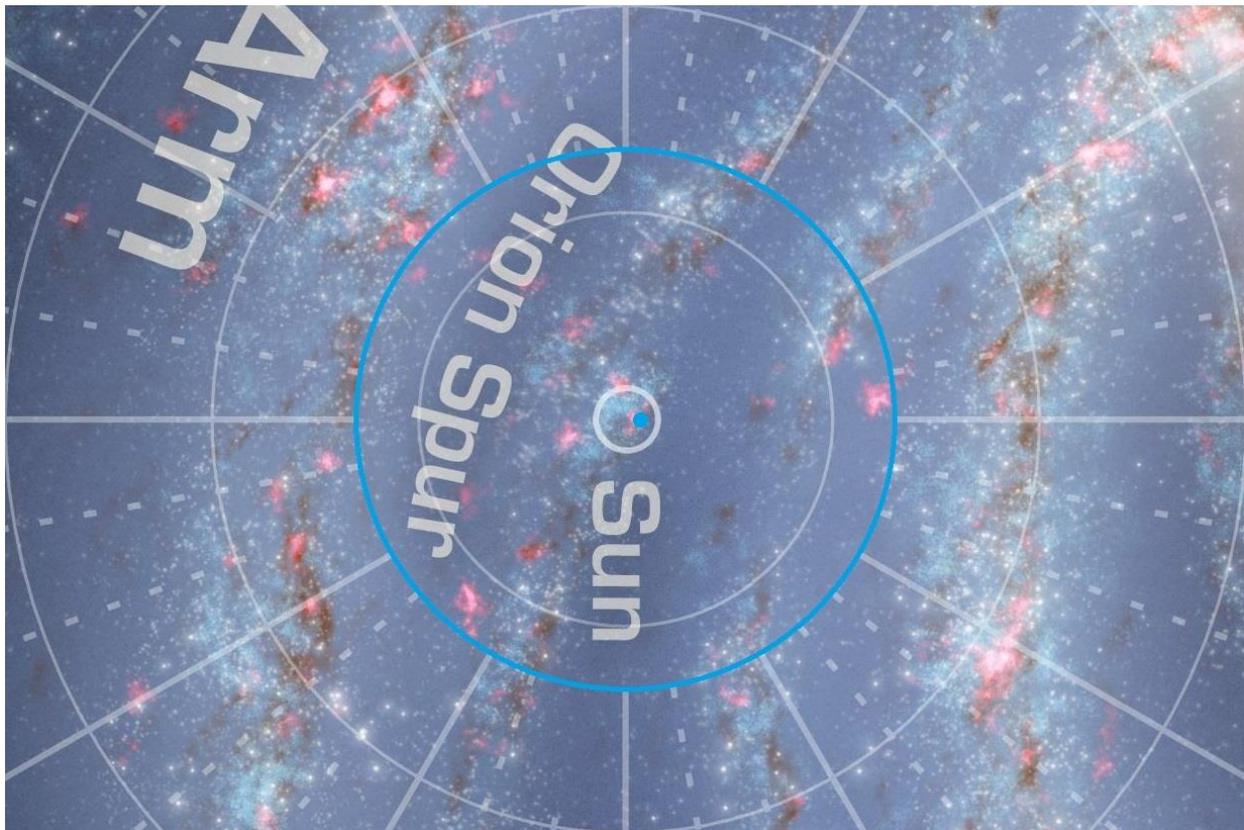


Figure 41. Estimated extent of the 'large' Terran Federation, with its capital Terra near the inner edge of the Orion Arm.

In this scenario, Fenris could indeed lie 650 light-years southwest of Terra, with Gimli at about 674; while Freya could be at the story-specified distance of 700 ly from Sol. Since Odin and several of the T-O planets must be much farther out than Fenris and Gimli, the Norse Core's radius would have to be much

greater than 674 ly; perhaps 1500 or so.

In turn, this would mean that the distances to all the other Federation planets would be much greater than my estimates in the main paper, and would have to be recalculated relative to a far faster ship speed. This would probably entail using the ten times faster speed of 6.257 hr/ly.

Now let's look at Beam's other references. The first comes from "A Slave is a Slave", in which it is said that "Marduk, [was] where the [Galactic] Empire had begun", but also that "the Empire had risen on a few planets five thousand light-years away" from Aditya.³⁰⁸ These "few planets" likely refer to the four which signed a treaty at the end of *Space Viking*; one fully-civilized world (Marduk) and three recivilized ones (Tanith, Beowulf and Amaterasu). This is the origin of the League of Civilized Worlds, which we know grows into the First Galactic Empire. Marduk, "where the Empire had begun", was estimated in the main paper to be 400 ly south of Terra; while Aditya's location was estimated at 500 ly northeast of Odin. Odin was situated 365 ly west of Terra, so solving for the third leg of the triangle would place Aditya a little more than 300 ly north-northeast of Terra. This means Aditya should be about 700 ly from Marduk, not 5000. And that goes for the other three planets where "the Empire had risen"; Tanith, Beowulf and Amaterasu, which are all roughly the same distance from Aditya as Marduk.

If Piper's figure of "five thousand light-years" is correct, however, then Marduk would be almost 3000 ly south of Terra, and Aditya a little more than 2000 ly north-northeast of it. Assuming the 'large' Norse Core extends to about 1500 ly from Sol, both of these planets would appropriately lie outside it, with Marduk being farther out than Aditya. Tanith, Beowulf and Amaterasu would have similar distances from Terra as Marduk, also placing these non-Norse planets outside the 'large' Norse Core.

The third reference comes from when Lucas Trask first lands on Tanith. He says to Otto Harkaman, "That's the kind of news of Dunnan we're going to get. By the time we'd get to where he's been reported, he'd be a couple of thousand light-years away".³⁰⁹ If the Old Federation is only 1600 ly in diameter, as in the main paper, this number can't be right. Andray Dunnan should only be from a few hundred to over a thousand light-years away. Unless he takes the *Enterprise* back to the Sword-Worlds, which at their closest are 2000 ly from the Old Federation. But that doesn't seem to be the case, as Dunnan never goes back to them. He stays in Federation space to raid, trade, and make war on Marduk.

If the reference to "a couple of thousand light-years" is correct, however, such a distance would make perfect sense in a 'large' Federation whose radius is 6500 ly.

Aside from staying true to some of Beam's stated figures, the 'large' configuration has several other advantages. First, there would be plenty of room outside the Norse Core to accommodate all the worlds named from the various other mythologies used during the Federation era. Including "Celtic and Egyptian and Hindu and Assyrian"; as well as Japanese (Amaterasu), Aztec (Xochitl, Xipototec), Slavic (Svantovit), Persian (Pushan, Zarathustra), Hebrew (Behemoth, Gehenna) and probably several others unmentioned by Piper (such as African, Chinese, Polynesian and Incan). And then there's the "naming planets for almost anything" category of the later Federation period, which yielded literary names like Beowulf, Gilgamesh and those in the Gartner Trisystem (Poictesme, Britomart, Pantagruel), as well as demons (Abigor, Ashmodai, Baphomet) and others not easily defined (Agramma, Tetragrammaton). In the 'small' Federation of the main paper, the Norse Core takes up a much greater proportion of Federation space, meaning that all the other mythological regions would have to be somewhat small and cramped.

Another advantage is that, with such a huge Federation, the First Empire may be about the same size. Because that's another impression I got from reading Piper's stories. His references seemed to suggest that the Empire simply reunites the region of the Old Federation. Its only acquisitions beyond that are the distant Sword-Worlds, plus the space between, thereby creating the pork chop shape. That's when the Empire stops expanding, in order to 'consolidate' these vast gains before embarking on further growth. For reasons unknown, it remains passive for many centuries, until Paul XXII tries to correct this lapse.

Thus, there would be no need for the Empire to expand into ultra-Federation space (save toward the Sword-Worlds), nor for the spheres of influence which precede it, as I assumed in **The Spheres of Influence** and **First Galactic Empire** sections (pages 33 and 41 in particular). The Galactic Empire's 'consolidation' phase would merely involve discovering and settling 865 new worlds within the vast expanse of the combined Federation and Sword-World space-area now under its control. And there would be plenty of room in which to find these new worlds. For if the Terran Federation only had 500 inhabited planets in a space-volume of 200 billion cubic light-years, this means there should be one inhabited planet for every 400 million cubic light-years! That's pretty spread out—to put it mildly.

Such an immense area can explain why planets like Aditya are lost for five centuries. In the 'small' Federation, with the expanding spheres of influence in close proximity to each other, and consequently in greater competition, you would think that Aditya would have been rather rapidly absorbed by one of them.

And finally, the pork chop shape of the 'large' Galactic Empire could also mean that the Sword-Worlds do indeed lie far to the galactic south of Sol, consistent with their Confederado historical model. That would place the Sword-Worlds at or near the tail end of the Orion Arm. And interestingly enough, once again there is a large cluster of stars in just about the right location. (Figure 42.) But for the pork chop shape to look right, their distance from the Old Federation would have to be much greater than 2000 ly. It would be more like 5000 ly, which in turn would require the speed of Sword-World ships to be much faster than 1 ly/hr.³¹⁰

In any case, the 'large' First Galactic Empire should look something like this.

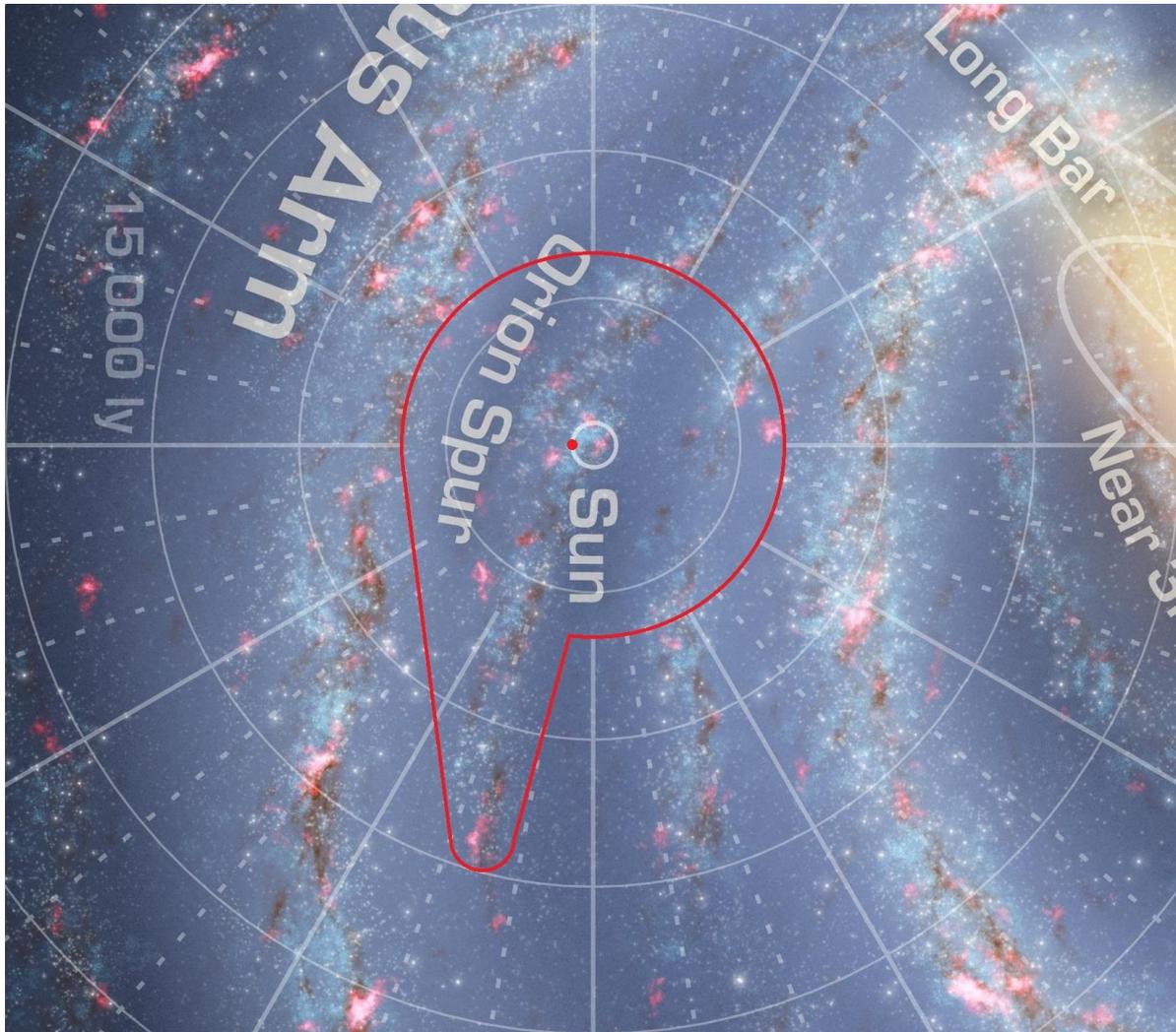


Figure 42. Estimated configuration of the 'large' First Galactic Empire, and its capital planet Odin.

Given a faster ship speed, the capital planet Odin moves farther west. Its new position is close to the middle of the Orion Arm, which would appropriately make the Imperial capital even more centrally located. For convenience, I placed it on the 1000 ly circle, which would make it about 1300 ly west of Terra.³¹¹ This is tentative, as I would have to take a much closer look at the internal configuration of the 'large' Federation and Empire to see if the distances between their worlds can be made consistent.³¹²

I gave the First Galactic Empire a red border this time, because on Emperor Paul XXII's overhead star-map, it is depicted as "a red patch".³¹³ Why Beam chose this color, rather than having it displayed in the Imperial colors of black and gold, seems to be related to the subtle connections between "A Slave is a Slave" and "Ministry of Disturbance".³¹⁴ But as seen in Figure 43 below, the extent of the 'large' Empire compared to the entire Milky Way seems more fitting for a state of alleged galactic size, and is closer to the original mental image I received from reading Piper's stories.

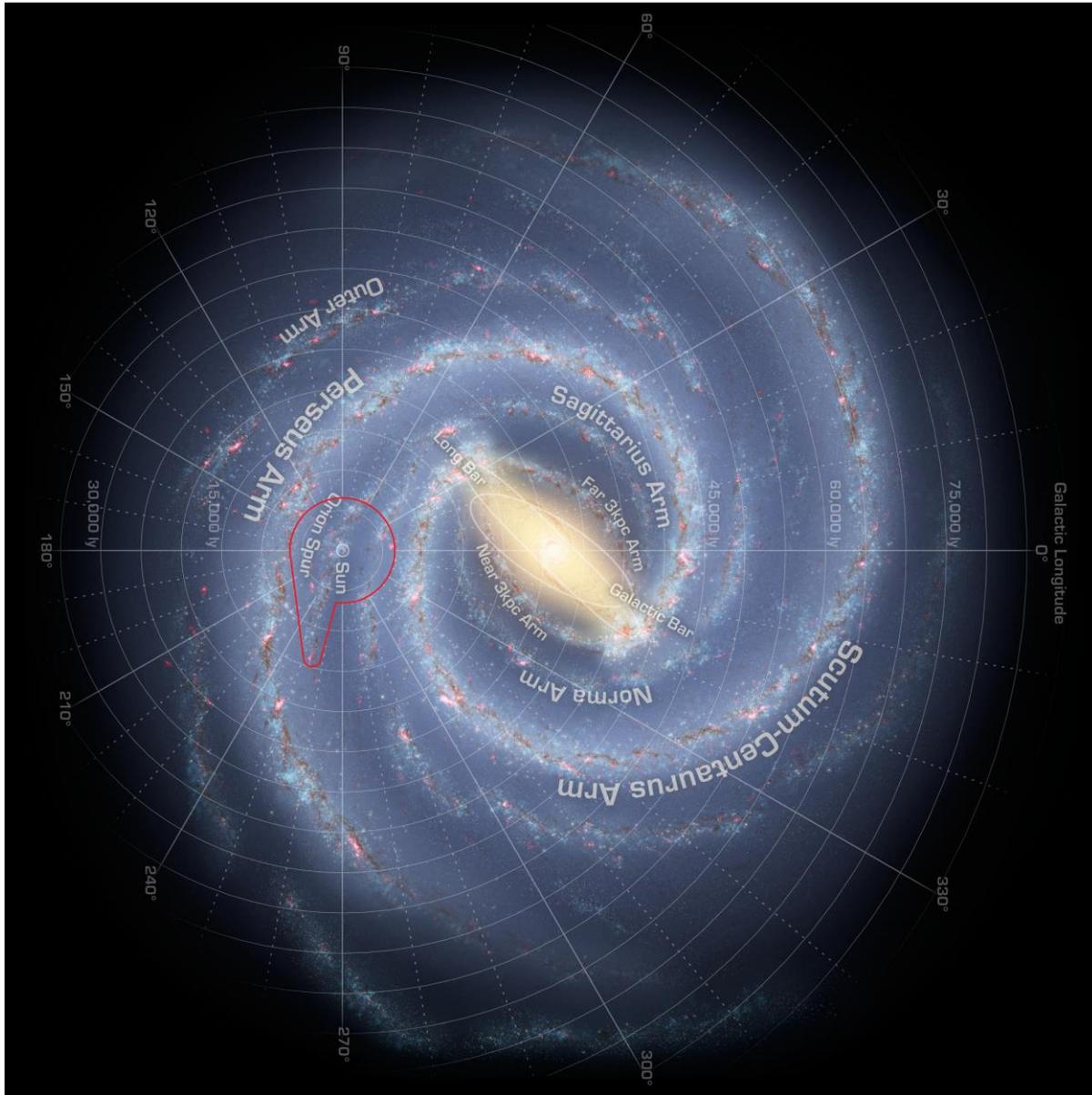


Figure 43. Estimated extent of the 'large' First Galactic Empire, "a red patch...on the western side" of the Milky Way.

With a 'large' First Empire, the later Galactic Empires would not each have a radius 2.73 times larger than their predecessor, which was the figure used in the main paper. They would have to be only about 1.7 times larger. Starting with the 6500 ly radius of the Terran Federation and First Empire, this would result in a radius of 11,050 ly for the Second Galactic Empire; 18,785 for the Third; 31,935 for the Fourth, and 54,289 for the Fifth. The last would entail a diameter of over 108,500 ly, which of course would take

in the entire galaxy. Simplifying the figures to 11,000 ly, 19,000 ly, 32,000 ly and 54,000 ly, here's what a combined map of all five Galactic Empires would look like. (Figure 44.) Since the First Empire is now red, I gave the Third Galactic Empire, formerly red, the original yellow color of the First.

Another change is that I provided the Second Galactic Empire with a 'vestigial tail', taking in the extreme southern end of the Orion Arm. However, this area may actually be colonized during the final expansion phase of the First Empire.

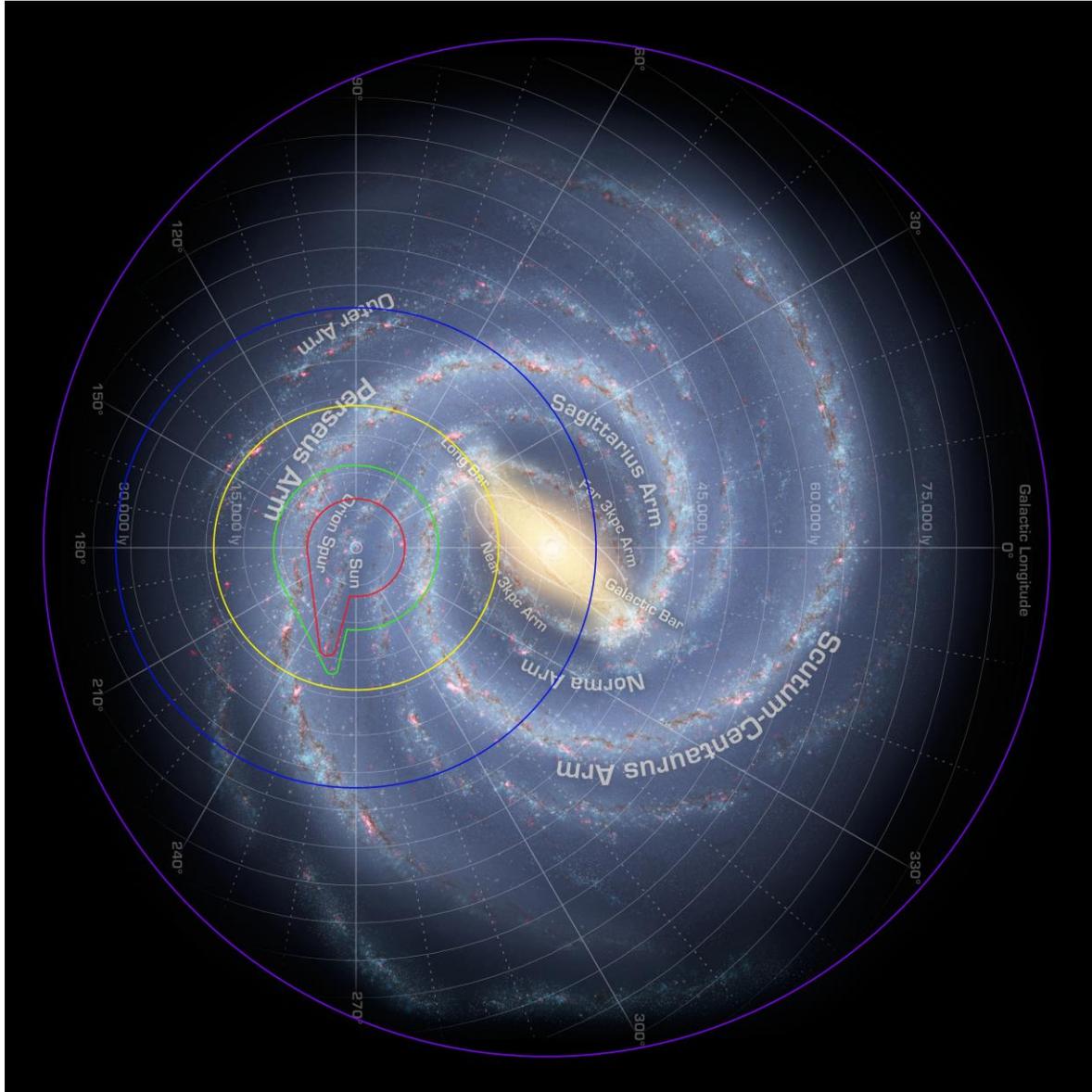


Figure 44. Estimated star map of Piper's First through Fifth Galactic Empires, using the 'large' Federation and Empire radius.

In Figure 44, there seems to be a significant difference between the sizes of the Fourth and Fifth Galactic Empires. This 'gap', however, is mostly an illusion. The NASA source map conforms to more recent estimates of the Milky Way's diameter; about 110,000 light-years across, rather than the traditional 100,000. Plus, in order to keep the border of the Fifth Empire circular, I had to make it even bigger than that. This was to ensure the inclusion of the stars in the southern part of the Outer Arm, which are farther from the galactic core than those in the northern end of the Centaurus Arm, at the top of the map.

Appendix 5. The Galactic Empires of Asimov and Piper

As mentioned in **The First Galactic Empire** section (page 43), Piper's five Galactic Empires were almost certainly inspired by the two Galactic Empires of Isaac Asimov. There is evidence to support this, even apart from the parallel names and numbers. First, we've seen that Piper's First Galactic Empire is divided into Viceroyalties, Prefectures and planetary Proconsulates. This closely parallels Asimov's First Galactic Empire, which was likewise divided into Viceroyalties and Prefectures, though his planetary level involved Procurators rather than Proconsuls.³¹⁵

Secondly, during his First Galactic Empire tale "A Slave is a Slave", Beam mentions that "Count Erskyll...was opposed to the use of force. Force, he believed, was the last resort of incompetence."³¹⁶ This is obviously modeled on Isaac's character Mayor Salvor Hardin of Terminus, whose most famous epigram is "Violence is the last refuge of the incompetent."³¹⁷ During Hardin's time, the First Galactic Empire is still very much in existence, although it has entered the initial stages of breaking up.

I believe examples such as these constitute Beam's subtle way of acknowledging his 'galactic' debt to Isaac, even while creating his own versions of them. But he was never a blind follower. Because in the classic Foundation series, Asimov's First Galactic Empire falls, and is followed by an Interregnum, during which the First and Second Foundations work to reunite the Milky Way in a Second Galactic Empire.

The flaw in this idea is that it is static. The First and Second Galactic Empires control exactly the same territory. There is no intergalactic Age of Discovery in Asimov; no mention of any attempts to colonize the nearby Magellanic Clouds, let alone an exploratory expedition to the Andromeda galaxy.³¹⁸ This rather stagnant approach to future history apparently did not sit well with Piper, who improved on Asimov's concept by envisioning a series of Galactic Empires. Each larger than the last, his empires start out small, and slowly expand Terro-Human civilization until it finally controls the whole galaxy.

Beam's Fifth Galactic Empire, which spans the entire Milky Way, therefore parallels Isaac's First Galactic Empire, which was likewise the first to control the whole galaxy. The Fifth Empire's capital, "Dremna...the Great World, at the middle of everything", parallels Asimov's imperial capital Trantor. Trantor was "*located...in the central regions of the Galaxy*", and was a 'great world' by virtue of being a single, planet-girdling city with a population "*well in excess of forty billions*"; "*the densest and richest clot of humanity the Race had ever seen.*"³¹⁹

By the time of *Foundation*, Asimov's First Galactic Empire contains "nearly twenty-five million inhabited planets",³²⁰ while as shown in the main paper, Piper's Fifth Galactic Empire may contain only about 83,000. But Isaac's First Empire has just passed the 12,000 year mark,³²¹ while at the time of "The Keeper", Beam's Fifth Empire is "less than a thousand years" old. So this would come under Emperor Paul XXII's comment that "A newly-won Empire must be consolidated within before it can safely be expanded." After the Fifth Empire 'wins' the whole galaxy, it will spend many subsequent centuries settling a great many new worlds within its roughly circular border.

That's exactly what happens with Asimov's First Empire. For in predicting its fall, Hari Seldon mentions that one of the signs of decay is "the declining rate of planetary explorations".³²² Wait a minute. The Galactic Empire has existed for 12,000 years, and it *still* hasn't discovered all the habitable planets in the Milky Way? This indicates that during the long millennia after the Empire was first established, a great many new worlds have been discovered and colonized. By projecting backwards, this also means that when it was founded, Isaac's Galactic Empire may have only contained less than a million inhabited worlds, similar to the deduced figure for Piper's Fifth Empire.

Furthermore, we've seen that the Fifth Galactic Empire lasts about as long as Asimov's First Galactic Empire. Because if the figures in the **General Timeline** are roughly correct, Piper's Fifth Empire should last about 11,292 years, compared to 12,000 years for Asimov's First Empire. So during the many thousands of years which follow "The Keeper", the Galactic population of Terro-Humanity will continue to grow, requiring "planetary explorations" to find more worlds suitable for settlement. And with roughly 100 billion stars in the Milky Way to explore,³²³ there should be plenty to choose from.

Now let's go back to the subject of galactic orientation. The fact that Piper placed Sol "on the western side" of the galaxy may also be due to Asimov, whose Foundation series seems to place Sol on the western side of the galaxy as well. It is known that Isaac modeled the First Galactic Empire on the Roman Empire.³²⁴ The capital planet-city of Trantor, in the central regions of the Milky Way, therefore parallels Rome, which was located near the center of its Mediterranean-based empire.

The planet Terminus, however, is “at the edge of the galaxy”, and its neighbors include the Kingdoms of Anacreon, Smyrno, Konom, Daribow and Loris.³²⁵ Which ‘edge’ of the galaxy is this? Presumably, the eastern edge, since four of these names come from Greece, which is east of Rome. Anacreon was a lyric poet of ancient Greece (c. 582-485 BC), while Smyrno is a slightly modified form of Smyrna, a prominent Greek city and port on the eastern shore of the Aegean Sea (now Izmir, Turkey).³²⁶ Konom is apparently a reference to the Agia Konom, an Orthodox church in Athens (at least, back in the early Nineteenth Century); and Loris is a Greek family name. The fifth name, Daribow, is not technically Greek, but refers to a region farther to the east, which was conquered by Alexander the Great.³²⁷

To me, these Greek references always suggested that Anacreon, Smyrno, Konom, Daribow, Loris and Terminus are located at the eastern end of the galaxy, just as the Greek regions were at the eastern end of the Roman Empire. Indeed, the whole eastern third of the Empire spoke Greek, because all these areas had previously been part of Alexander’s empire. (Figure 45.)



Figure 45. Map of the Roman Empire, with the eastern, Greek-speaking region in blue.³²⁸

When the First Galactic Empire begins falling apart, Mayor Salvor Hardin of Terminus notices that “Anacreon stands square across what was our last remaining trade route to Santanni and to Trantor and to Vega itself.”³²⁹ This implies that Vega is on the opposite side of the galaxy from Anacreon; or what can be called its ‘western’ side. And Vega is only 25 light-years from Sol, placing both systems in “the Sirius Sector”; which according to the Imperial Lord Dorwin also includes Alpha Centauri (4.37 ly from Sol), 61 Cygni (11.4 ly), and of course Sirius (8.6 ly).³³⁰ So a map of Asimov’s galaxy, which inspired Piper’s, should look something like this (Figure 46, below).

Of course, it is highly unlikely that Terminus and the other five planets are *exactly* east of Trantor and the Sirius Sector, as I have depicted them. But it seems fairly certain that they lie somewhere in the tail end of the Sagittarius Arm. And from a storytelling standpoint, such a distant location would make sense. What better way for Asimov to take his readers away from their Sol-centric mindset, than by setting his far future First Foundation on a planet at the opposite end of the galaxy?

Incidentally, this configuration can explain why Terminus, at the ‘Greek’ end of the First Galactic Empire, is where civilization is renewed, after the Empire itself collapses. It’s because when the Roman Empire fell apart, a remnant of the Greek regions in the east (the Eastern Roman or ‘Byzantine’ Empire) was able to survive, and maintained its civilization for another thousand years. Like Piper, Asimov was

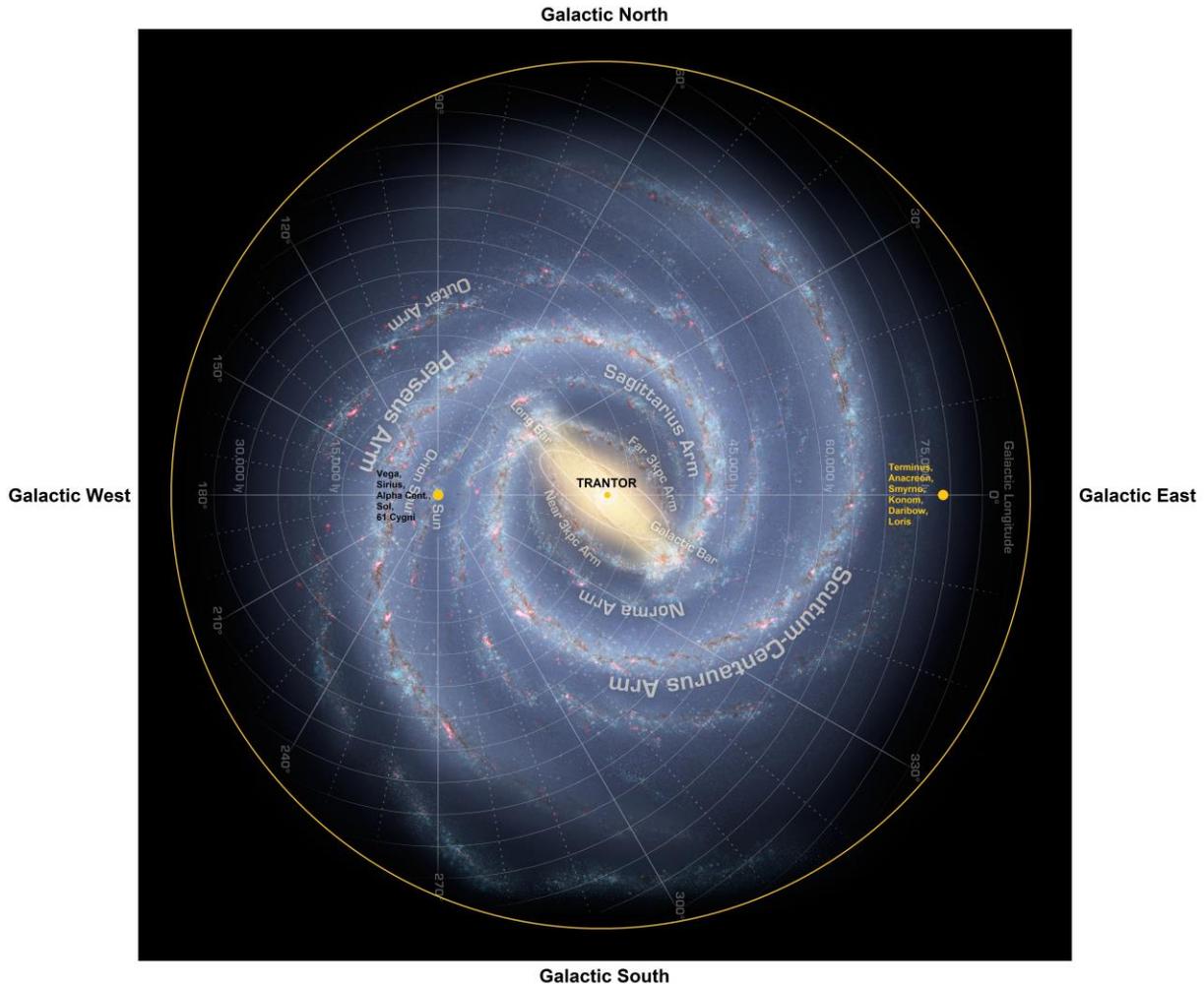


Figure 46. Estimated configuration of Asimov's First Galactic Empire, with the 'Greek' regions in the east, and Sol in the west.

using historical models. In fact (also like Beam), he was using a *combination* of models. Because he wasn't just modeling the Byzantines. The Mayors of Terminus, who overthrow and replace the incompetent Psychohistorians as rulers of the Foundation, seem to parallel the Mayors of the Palace, who replaced the lackluster Merovingian kings who originally ruled medieval France. So Asimov's First Foundation, which will physically establish the Second Galactic Empire, seems to combine the Eastern Roman Empire (Greece) with the Western or Holy Roman Empire (originally established by Charlemagne in France). A parallel of the many historical attempts to reunify or reestablish the Roman Empire by its various successor states. Among them, France (under Charlemagne, and later Napoleon), Germany (the later Holy Roman Empire, or First Reich; and afterward the Third Reich) and Russia (under its Czars, or 'Caesars'). Indeed, the current European Union could be seen as the latest attempt to reunify the Roman Empire, at least in Europe.

Appendix 6. The Potential Intergalactic Era

As stated, in the classic Foundation series Asimov never mentions going beyond our galaxy. The Seldon Plan to create a Second Galactic Empire seems to have as its only goal the reunification of the Milky Way.³³¹ And given that “Piper’s original plan was to write at least one novel per century of his future history”, it is likely that he did not intend to write anything beyond “The Keeper”. He already had plenty of centuries, over many millennia, to fill in. As John Carr puts it, “Even had he lived his full life span it is doubtful that he would have ever finished this monumental task”.³³²

However, it is interesting that in Beam’s Future History, the fall of his first two universal states are preceded by a last period of expansion. Refugees from the Terran Federation establish the Sword-Worlds a couple centuries before the Federation breaks up for good; while under Emperor Paul XXII, the First Galactic Empire embarks on the settlement of many new worlds, and this is probably only a century or two before the Empire collapses.

By extension, this should mean that, before Piper’s Fifth Galactic Empire eventually falls, possibly around AE 40,000, it actually sends out the first exploratory and colonizing expeditions to the Magellanic Clouds; the initial small steps toward an ‘Intergalactic Era’. This possibility was briefly mentioned on the last page of the main paper, but now let’s take a closer look.

The Milky Way is surrounded by a group of smaller galactic nebulae and globular clusters; the closest being the Magellanic Clouds. Andromeda, however, is a full-sized galaxy; “the nearest major galaxy to the Milky Way.”³³³ It has its own group of satellite galaxies, including NGC 147, NGC 185 and NGC 205. A great distance separates the two main galaxies. In Piper’s time, Andromeda was estimated to be about 1.5 million light-years away; today, that figure is more like 2.5 million light-years.³³⁴ So I think the best way to envision them are parallels of two nearby stars. The Milky Way galaxy would parallel Sol and the inner planets, while its satellite galaxies and clusters would parallel the outer planets of the Solar System. Similarly, the Andromeda galaxy would parallel Alpha Centauri and its inner system, with the satellite galaxies paralleling its outer planets.

The first hyperships sent to explore the Magellanic Clouds would then parallel the first spaceships sent to the Moons of Jupiter and Titan in the early years of the Interplanetary Age. In Beam’s time, the Magellanic Clouds were estimated to be roughly 163,000 light-years from the Milky Way.³³⁵ At the estimated ship speed of 10 ly/hr during the early Fifth Empire, it would take 1.86 years to reach them. This is not an insuperable obstacle. In fact, it’s about the same amount of estimated time it took the System States refugees to reach the Sword-World cluster from Abigor—“close to 2 years” (see page 18). Moreover, one would assume that, during the Fifth Empire’s 11,000-plus years of existence, further improvements are made to hyperdrive technology. By the time of the later Fifth Empire, ships may be able to traverse the Milky Way in just a few months. This would parallel the First Galactic Empire of “Ministry of Disturbance”, whose ships could reach Odin from the Imperial frontiers in just a month or two.

Now let’s figure out a speed. We estimated the ship speed of “Ministry” as 3.26 ly/hr, and this was more than three times faster than 1 ly/hr, the ship speed during the Interregnum of *Space Viking*. If we assume a similar advance during the later Fifth Galactic Empire, then ship speeds will be more than three times faster than 10 ly/hr, or say 32.5 ly/hr for convenience. At that speed, it would take a hypership about 209 days, or almost exactly seven months, to reach the Magellanic Clouds. This is not much longer than six months, thereby approximately aligning with Piper’s ‘six months to everywhere’; his habit of conveniently making the planets of his stories six months from the center of civilization.

Though the scale on the source map below is not correct (due to the view being oblique), here’s a rough look at the early years leading up to the potential Intergalactic Era. (Figure 47.)

But to reach Andromeda, a ship traveling 32.5 ly/hr would take 1,923 days, or about 5.3 years.³³⁶ This is a much greater length of time, but actually not too different than 4.2 years; the time it would take a normal-space ship traveling at the speed of light to reach Alpha Centauri. So for truly intergalactic travel to be possible, it would seem that a quantum leap in hyperdrive technology is required. The development of an ‘ultra-hyperdrive’ would parallel the development of hyperdrive itself, a quantum leap over normal-space drive, which made interstellar travel possible.

Such an advance would probably occur either during the Sixth Interregnum, by the successor states of the Fifth Galactic Empire; or during the postulated Sixth Galactic Empire. If we continue the trend from the **General Timeline**, the Fifth Galactic Empire will fall circa AE 40,748. The Sixth Interregnum will

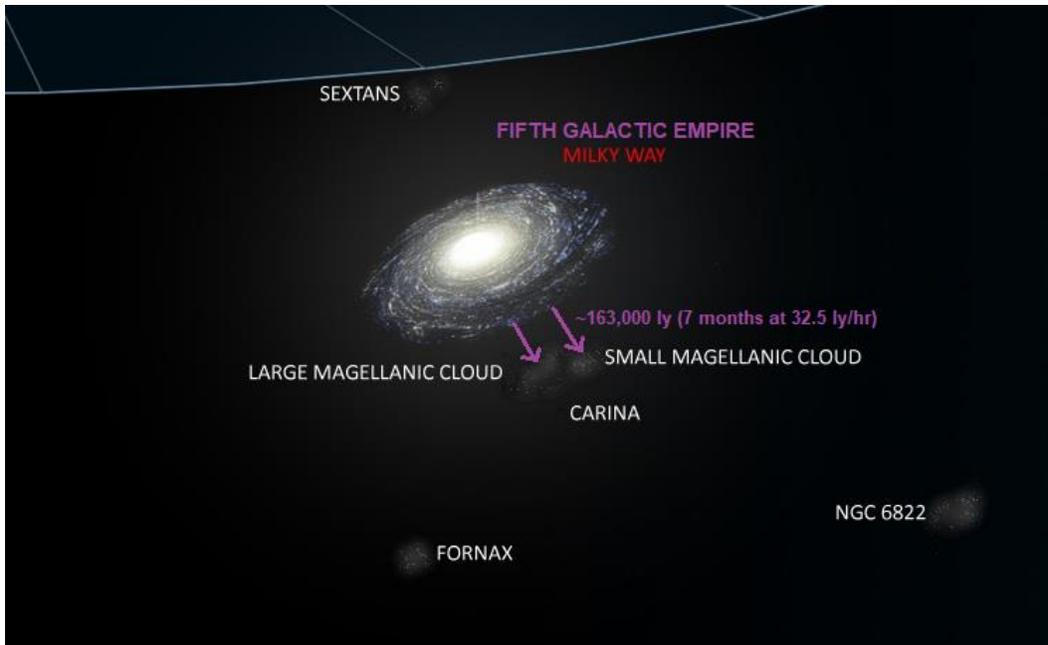


Figure 47. Postulated expeditions to the Magellanic Clouds by the later Fifth Galactic Empire, circa AE 40,000. ³³⁷

follow, and last around 10,662 years; ending circa AE 51,410, when the Sixth Galactic Empire is established. Assuming the Sixth Empire is the state which begins the colonization of the Andromeda galaxy, it would in effect become the 'First Intergalactic Empire'.

From the relative positions of the two galaxies and their satellites, it is likely that the first intergalactic expedition does not take a direct route to Andromeda. It would probably attempt to reach Andromeda's satellite galaxy NGC 185, which is a bit closer to the Milky Way. From there, stepping-stone fashion, the expedition, or following ones, could then move on to NGC 147 (also closer to the Milky Way) before making the final jump to Andromeda. Once these tenuous connections are firmly established, direct flights between the Milky Way and Andromeda would begin.

In any case, here's a map of what that might look like.

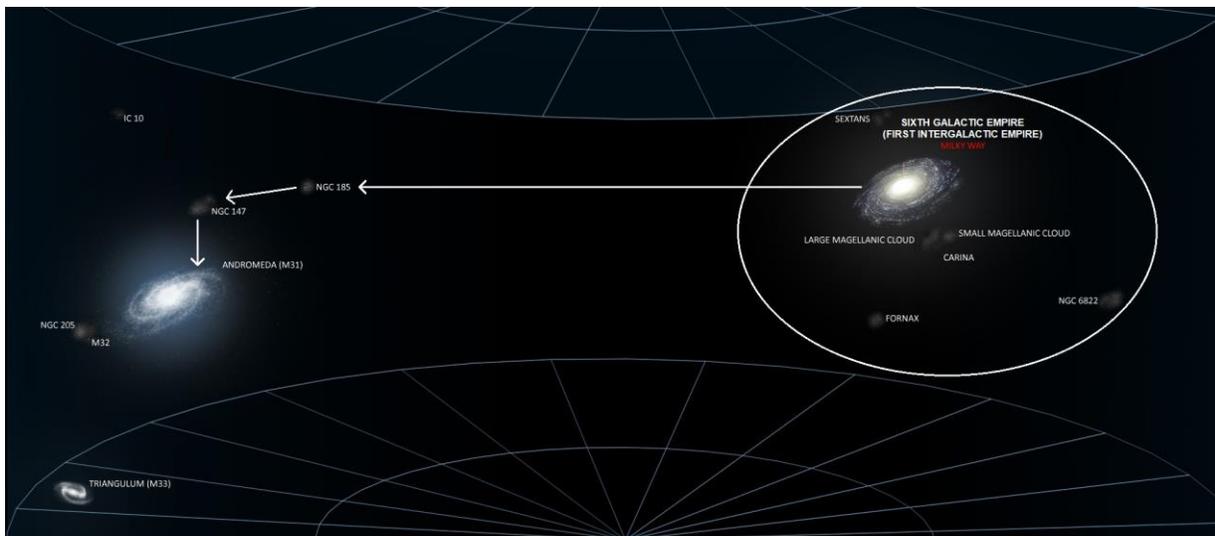


Figure 48. Route of the first ultra-hyperdrive flights to Andromeda, circa AE 52,000. The beginning of an Intergalactic Era. ³³⁸

I would further assume that the ultra-hyperdrive has a similar relative speed between galaxies that the original hyperdrive did between stars. For the first interstellar expedition, this was a minimum of 62.57 hr/ly, or 11.5 days, from Sol to Alpha Centauri. That means it should take at least a couple of weeks, and perhaps a couple of months, for ultra-hyperdrive ships of the Sixth Galactic Empire to reach Andromeda. The colonization of galaxies not much farther out than Andromeda then becomes feasible, and would parallel the colonization of stars not much farther than Alpha Centauri. The early years of intergalactic exploration would echo, on a much larger scale, the early years of interstellar exploration.

Zooming out from Figure 48 gives us this more expansive view, revealing the local group of galaxies out to 20 million light-years.

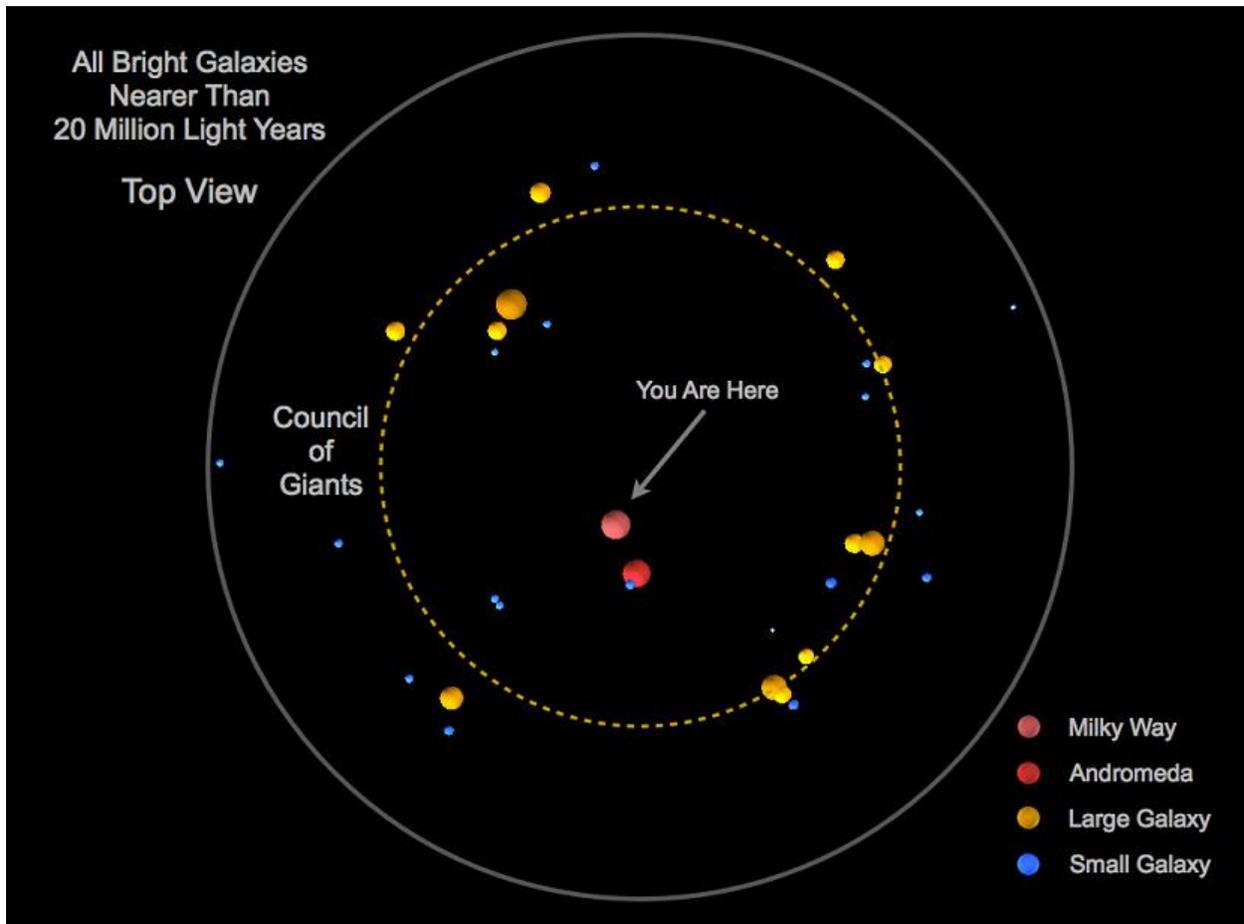


Figure 49. The local group of galaxies, out to 20 million light-years. ³³⁹

The Milky Way and Andromeda are surrounded by “the Council of Giants”, a rough circle of twelve large galaxies. There are also 18 smaller galaxies within this neighborhood; I suppose these could be called the ‘Council of Dwarfs’. At any rate, given that the population of our galaxy should be very high by this time (see below), all the Council galaxies are probably colonized directly from the Milky Way.

However, several of the nearest galaxies are actually closer to Andromeda. In Figure 49, they are the ones along the bottom half of the dashed circle. Thus, at least a few of the Council galaxies could be colonized by expeditions setting out from Andromeda, while the rest would be settled from the Milky Way. (Figure 50, below.) Since it should only take a few weeks to a couple of months to reach Andromeda, the ultra-hyperdrive ships should take a couple months to half a year to reach all the galaxies within the 20 million light-year radius. Thus, the initial burst of intergalactic expansion could fit within Piper’s unstated axiom of ‘six months to everywhere’.

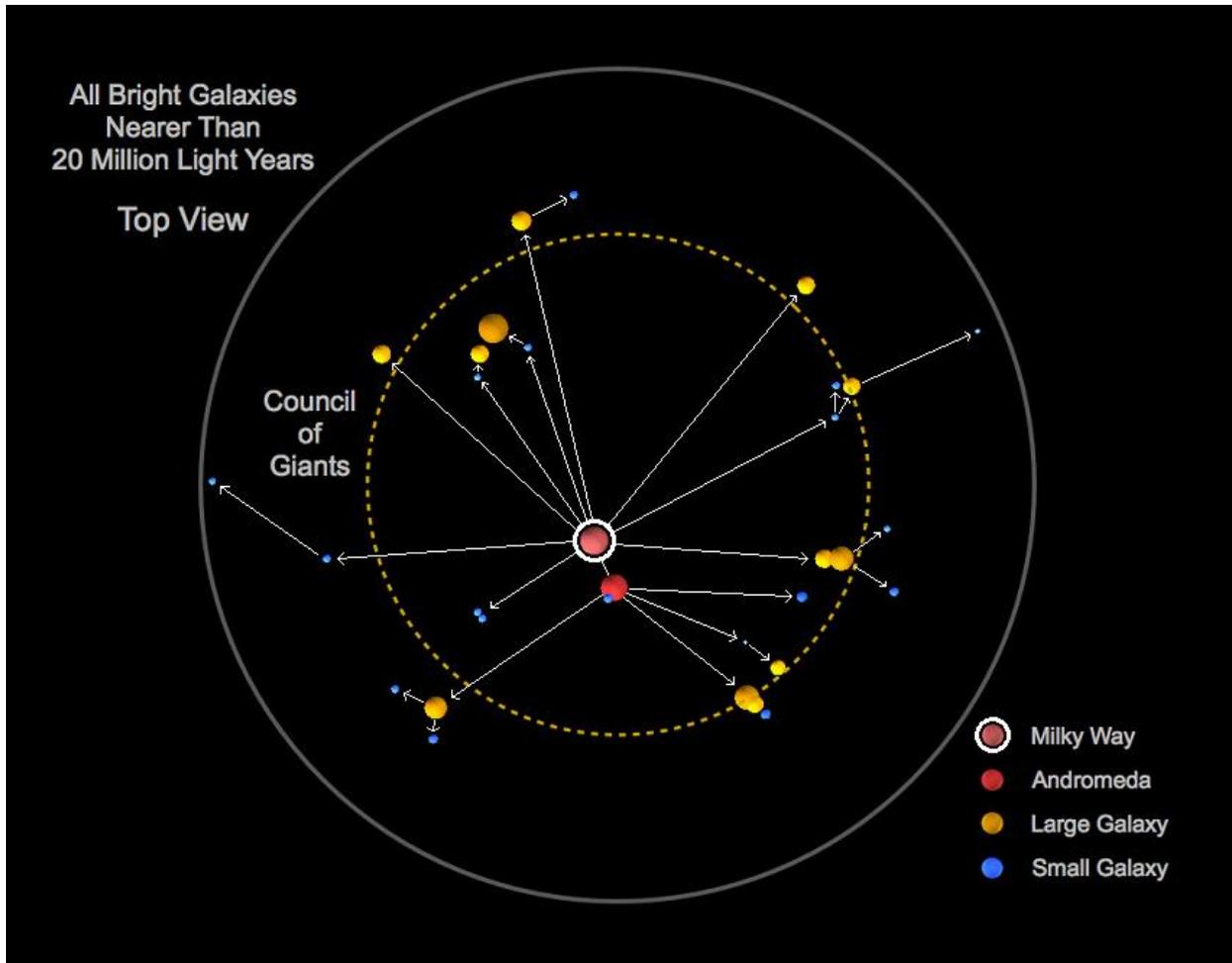


Figure 50. Postulated ultra-hyperdrive expeditions in the local galactic neighborhood, circa AE 52,000.

One major difference in this parallel is that it will take much longer to colonize whole galaxies than it did to colonize individual stellar systems! But while Terro-Humanity required 30,000 years to conquer the Milky Way, I believe settling Andromeda and other nearby galaxies will be more rapid. For by this far-future era, the scale of things is vast indeed. First, the human population of the Milky Way is likely to be at least a quintillion, as in Asimov's Foundation series.³⁴⁰ Second, due to medical advances, it is probable that human beings of the time have much longer lifespans, with consequently longer periods in which they can have children.³⁴¹ This should contribute to a swifter rise in the already huge general population. And third, it is likely that ships of this era are much larger as well; possibly the size of small moons (like the iconic Death Star), making the transfer of substantial numbers of colonists much easier.

Beyond this point it seems unnecessary to go. For past the nearby ring of the Council of Giants, hundreds of billions of other galaxies await, to be explored and colonized during the many hundreds of millennia of the First Intergalactic Empire and its successors. Until that high, far-off day finally dawns when *Homo sapiens terra* completes its evolution into *Hyper sapiens universalis*, and presumably leaves this cosmos to continue its eternal, upward climb toward infinity, in other dimensions of existence.³⁴²

ENDNOTES

1. “A Star Map of Federation and Empire”

1. John F. Carr, *H. Beam Piper: A Biography* (Jefferson, NC: McFarland & Co., Inc.), p. 37 Carr writes that “Piper was quite the hiker and on more than one occasion was enlisted for surveying duty.” The evidence he cites is from a letter to Ferd Coleman, in which Beam wrote, “I’ll be in Williamsport on Tuesday afternoon, as I have finished with my work surveying the Skyline Trail and am on my way home.” (sourced from Don Coleman, “The Early Letters,” unpublished collection of the H. Beam Piper-Ferd Coleman letters, in author’s possession, dated 1991, p. 141)

In “Police Operation”, set in Pennsylvania, Piper included mention of “a quadrangle sheet” being used while searching for the Venusian nighthound. (H. Beam Piper, *Paratime* (New York, NY: Ace Books, 1981), p. 41) I always took this to mean a US Geological Survey quadrangle, which are fairly large sheets. This is supported by Calvin Morrison, who, after ending up in otherwhen Hostigos, makes a “relief map” of the central Pennsylvania area. “It was based on what he remembered from the U.S. Geological Survey quadrangle sheets he’d used on the State Police, on interviews with hundreds of soldiers, woodsmen, peasants and landlords, and on a good bit of personal horseback reconnaissance.” (H. Beam Piper, *Lord Kalvan of Otherwhen* (New York, NY: Ace Books, 1965), p. 65)

In Beam’s time, USGS quads were the most accurate maps available, and from his surveying work, he apparently had a hand in helping to make them so. “The best known USGS maps are the 1:24,000-scale topographic maps, also known as 7.5-minute quadrangles. From approximately 1947 to 1992, more than 55,000 7.5-minute maps were made to cover the 48 conterminous states. Similar maps at varying scales were produced during the same time period for Alaska, Hawaii, and US Territories. The 7.5-minute series was declared complete in 1992, and at that time was the only uniform map series that covered the United States in considerable detail.”

<https://www.usgs.gov/core-science-systems/national-geospatial-program/topographic-maps/>

2. Jerry Pournelle, Preface to *Federation* (New York, NY: Ace Books, 1981), p. viii, emphasis added

2. Galactic Orientation

3. H. Beam Piper, *Empire* (New York, NY: Ace Books, 1981), p. 136

4. H. Beam Piper, *Federation* (New York, NY: Ace Books, 1981), p. 226

5. <https://www.nasa.gov/jpl/charting-the-milky-way-from-the-inside-out> Credits: NASA/JPL-Caltech/R. Hurt (SSC/Caltech)

It is possible that Federation-era star-maps use the galactic ‘longitude’ of Sol as the prime meridian, as the NASA base map does, rather than the longitude passing through the center of the galaxy. This would make a certain amount of sense, because due to the slow speed of Federation starships, the vast majority of the galaxy will remain unexplored for many centuries to come, and therefore of little practical account.

However, the Emperor’s reference to Sol being “on the western side” of the galaxy implies a prime meridian through the galactic center, dividing it into western and eastern halves. Even if that doesn’t begin during the Federation period, one would certainly think that the First ‘Galactic’ Empire would take a galaxy-wide view, even though it only controls a small part of it. This seems to be suggested by the chart in Paul XXII’s study. “He entered the big oval room, lighted from overhead by the great star-map in the ceiling...He lit a cigarette and leaned back, looking up at the glowing swirl of billions of billions of tiny lights in the ceiling. At least, there were supposed to be billions of billions of them; he’d never counted them, and neither had any of the seventeen Rodriks and sixteen Pauls before him who had sat under them.” (Piper, *Empire*, p.135)

3. From the New World to ‘New Worlds’

6. Carr, *Piper Biography*, pp. 87, 129, 133

7. https://en.wikipedia.org/wiki/Orion_Arm It must be noted that on my source map, the Orion Arm appears to be more like 35,000 light-years long, rather than ten.

8. According to Google, it is 9,721 miles from the top of Greenland to Cape Horn. Leaving Greenland out, it is 9,444 miles from Ellesmere Island, Canada to Cape Horn.

9. In my maps, I have therefore italicized the names of the gaps, following cartographic practice for terrestrial water bodies. This follows the style of Nils Jeppe’s galactic maps, on his now-defunct website www.enderra.com.

10. www.firelab.org/western-hemisphere

4. The Anglo-American Terran Federation

11. H. Beam Piper, *Four-Day Planet/Lone Star Planet* (New York, NY: Ace Books, 1979), pp. 193, 196

12. John F. Carr, Introduction to *Federation*, p. xxix

13. Piper, *Empire*, p. 28

14. As John Carr puts it, "Another historical analog used by Piper was the war in the Pacific during World War II. In *Cosmic Computer* the planet Poictesme, the former headquarters of the Third Terran [Fleet-Army] Force during the System States War, has become in the post-war period a deserted backwater. Most of those remaining on Poictesme earn their living by salvaging old army vehicles and stores—a way of life that still continues on one or two Pacific atolls. The survivors have created a belief system around Merlin, the legendary computer that was reputed to have won the war for the Federation, reminiscent of the Cargo Cults much in vogue among Pacific Islanders after the parachute drops of W.W.II." (Carr, *Federation Introduction*, pp. xx-xxi) I can't find the reference, but believe John also compares the Merlin Project to the Manhattan Project. Both of these classified efforts help win major wars.

The Civil War parallels are fairly numerous, and include Colonel Klem Zareff, an "old Rebel" officer, who now owns a "plantation" on Poictesme, and whose first name is evocative of a rural Southerner. (H. Beam Piper, *The Cosmic Computer* (New York, NY: Ace Books, 1963), pp. 10, 13, 35) See my 2009 paper, "A Flag for the System States Alliance", for much more.

In addition, it is my belief that Beam modeled the Secession of Venus, which is related to the end of the First Federation and beginning of the Second, on the American Revolution, which caused the fall of the First British Empire and the rise of the Second. See my 2019 paper "Overview of Historical Models in the Early Future History, Part 1".

5. American and Federation Expansion

15. Colin McEvedy, *The Penguin Atlas of North American History* (London, England: Penguin Books, 1988), p. 67

16. William Sheehan, "W.W. Morgan and the Discovery of the Spiral Arm Structure of our Galaxy", *Journal of Astronomical History and Heritage*, 11(1), 3-21, 2008, p. 16

17. According to Google, Washington is 120 miles from Rehoboth Beach, Delaware, which lies just south of the entrance to Delaware Bay.

18. Piper, *Federation*, p. 276; *Four-Day Planet*, pp. 4-5; and
H. Beam Piper, *Little Fuzzy* (New York, NY: Ace Books, 1962), p. 8

19. If we take Piper's distances at face value, it would be as if the initial wave of expansion went out to about 700 light-years in various directions (save to the galactic east), and in the following centuries the Federation explored and colonized the volume thus delineated. This seems contrary to common sense, which would have the earlier settled planets closer to Sol, not farther away.

20. On his now-unavailable website www.enderra.com, Nils Jeppe had some excellent charts of our part of the galaxy, which show several such features along the inner edge of the Orion Arm and within the Orion-Sagittarius Gap. He also includes gaps within the Orion Arm, which would parallel the inland lakes and rivers of North America.

21. H. Beam Piper, *Space Viking* (New York, NY: Ace Books, 1963), p. 32

22. Camille Flammarion, et. al., *The Flammarion Book of Astronomy* (New York, NY: Simon and Shuster, Inc., 1964), pp. 551

23. www.atlasoftheuniverse.com/5000lys.html

24. Piper, *Space Viking*, p. 33

25. John F. Carr, timeline in *Empire* But see **Appendix 4, Evidence for a Large Federation and Empire**. Because there are other references in Piper which suggest that the Terran Federation and First Galactic Empire are much larger.

6. From Confederate States to System States

26. John F. Carr, Introduction to *Empire*, p. 3
27. www.the-map-as-history.com/timeline/Usa/
28. Piper, *Cosmic Computer*, p. 242; and *Federation*, p. 190
29. Piper, *Cosmic Computer*, p. 29
30. *Ibid.*, p. 43

7. Internal Configuration of the Terran Federation

31. Carr, *Piper Biography*, p. 79
32. Robert A. Heinlein, *Between Planets* (New York, NY: Charles Scribner's Sons, 1951), back jacket
33. Carr, *Piper Biography*, pp. 97, 117 Sourced from Michael E. Knerr, "Piper", unpublished manuscript in John Carr's possession, dated 1983, pp. 19-20, 49-50.
34. John F. Carr, Introduction to *Uller Uprising*, p. vi
35. John D. Clark, Introduction to *Uller Uprising*, pp. xi, xvi
36. H. Beam Piper, *Uller Uprising* (New York, NY: Ace Books, 1983), pp. 7, 67, 99 Carlos von Schlichten mentions that Paula Quinton arrived on the *City of Canberra* three months ago, and the next ship is expected in another three months. This suggests that Niflheim is about 6 months away from Uller, confirmed by Dirk Prinsloo's statement that "It takes six months for a ship to go between here and Nif" (*ibid.*, pp. 22, 67, 100).
37. Nils Jeppe, "Mapping H. Beam Piper, Part 5: The Dislocation of Nu Puppis" Unfortunately, in early 2020 Mr. Jeppe took down his enderra.com website. But I have retained printouts of his former Piper posts and charts.
38. Nils Jeppe, "Mapping H. Beam Piper, Part 3: To Niflheim!"; and "Mapping H. Beam Piper, Part 4: Hyperspeed and Niflheim Revisited" Formerly on his enderra.com website.
39. Carr, *Piper Biography*, p. 157; and Piper, *Federation*, pp. 276, 283 The Terrans then decide to use Adriaan de Ruyter's yacht, the *Voortrekker*, for the trip to Terra; both because it's faster than the *Stellex*, and they need the *Stellex* to stay on Freya and continue trading with Yggdrasil. "*Voortrekker* has a lot lower mass-to-power ratio, and better Dillinghams", so the trip to Terra will only take "Four months" rather than six. (Piper, *Federation*, p. 283) Four months is 121.6 days, which means *Voortrekker* travels at a much faster rate than the *Stellex*; 4.17 hr/ly, rather than 6.257.
40. *Ibid.*, p. 267 It's supposed to take three months there and back, meaning Yggdrasil is six weeks away.
41. *Ibid.*, p. 280
42. Piper, *Uller Uprising*, p. 95
43. Piper, *Federation*, p. 282
44. Carr, *Piper Biography*, pp. 162-163
45. Piper, *Four-Day/Lone Star*, p. 7
46. Carr, *Piper Biography*, p. 213
47. Piper, *Four-Day/Lone Star*, pp. 4-5, 6
48. *Ibid.*, pp. 213, 215-216 Walt and Tom may attend the University of Montevideo, or at least a college

somewhere in South America. This is because they're preceded by Tom's older sister, Linda Kivelson, whose 'secret mission' to Terra includes contacting Argentine Exotic Organics, in order to re-establish competitive wax-buying on Fenris. (ibid., p. 67) This suggests that Linda is attending classes in South America, either in, or close to, Argentina. And Montevideo is just across the Rio de la Plata from Buenos Aires.

Incidentally, there is mention of "a real Old-Terran-style Western" movie "filmed in South America, with real horses", which "would go over big" on Fenris. (ibid., p. 2) This may be a hint that Walt and Tom, who will presumably be in South America, may well get to see some real horses themselves, and perhaps even ride them.

49. Ibid., pp. 25, 199, 206

50. Ibid., pp. 7, 199

51. Ibid., p. 199

52. Piper, *Federation*, p. 226

53. Ibid., p. 175

54. Nu Puppis is a "B8 type star, blue-white and hot" (Clark, *Uller* Introduction, p. xvi), so I gave it a blue color on the map. Sol is of course a G-type star, Beta Hydri is also a "G-0 (solar) type star, of approximately the same size as Sol (ibid., p. xi), while Fenris orbits a G4 sun, slightly cooler than Sol (Piper, *Four-Day/Lone Star*, pp. 4, 5). So these are all depicted in yellow.

Although not specified by Beam, Eta Stellex is probably a G star too, because Freya is a Terra-type planet which seems to be slightly warmer than Earth (Piper, *Federation*, p. 223). And since Gimli is named for a Norse heaven, it probably has a Sol-like star as well, though this may be a white star rather than yellow. That leaves the sun of Yggdrasil and Loki, which I assume is also Sol-type, since it has two habitable planets in its system.

55. Piper, *Four-Day/Lone Star*, p. 6; and *Little Fuzzy*, p. 8

56. Carr, *Piper Biography*, p. 103

57. H. Beam Piper, *First Cycle* (New York, NY: Ace Books, 1982), pp. 4, 5 The "Greater" Terran Federation apparently means its interstellar version, which suggests there was once a 'Lesser' Terran Federation, presumably confined to the Solar System. The dividing line being the development of hyperdrive. "Primary Dispersion" dating seems to refer to the primary dispersion of electrons, or 'first chain reaction' which inaugurated the Atomic Era.

58. Ibid., p.199 Pickering obviously means Beta 'Hydri' II, not Beta Hydrae, which is a different star.

59. Piper, *First Cycle*, p. 5; and *Cosmic Computer*, p. 139

60. Piper, *First Cycle*, p. 5; *Cosmic Computer*, p. 14 and *Federation*, p. 188 Conn's three trips to Koshchei occur on pp. 135-161, 175-185, and 196-197 of *The Cosmic Computer*.

61. Piper, *First Cycle*, pp. 4, 5 The stars and planets of the Elektran system were given Greek names some seven years before Piper wrote "When in the Course—". So this is long before he had Karl Zahanov mention that "The Astrographic Commission won't accept Helleno-Roman names for anything outside the Sol system. They prefer names from Norse mythology, as long as they last." (Piper, *Federation*, p. 226)

Thus, if Beam had ever gone back and gotten *First Cycle* into shape for publication, he would likely have had to change the Greek names, as well as the references to the Greater Terran Federation and Primary Dispersion dating. He could have cast the Greek names as Carpenter's *proposals* for the system, but (as Absalom possibly expects), the Astrographic Commission rejects them.

62. https://en.wikipedia.org/wiki/Canes_Venatici, https://en.wikipedia.org/wiki/Beta_Canum_Venaticorum, https://en.wikipedia.org/wiki/La_Superba, <https://www.universeguide.com/star/rscanumvenaticorum>, and https://en.wikipedia.org/wiki/AM_Canum_Venaticorum *First Cycle* describes the formation of the current Elektran system, caused when a red dwarf star (Rubra) intrudes, destroying the fifth and second planets, then falling into an orbit around Elektra. (Piper, *First Cycle*, pp. 1, 2) Rubra may have been partly inspired by La Superba, Y Canum Venaticorum, which is described as "one of the reddest stars in the sky", "deep red in color", and "a strikingly red giant star" (https://en.wikipedia.org/wiki/Canes_Venatici, and https://en.wikipedia.org/wiki/La_Superba) Elektra thereby becomes a binary system; this could be based on the binary stars comprising Alpha Canum Venaticorum.

63. Piper, *First Cycle*, p. 5; and *Federation*, p. 208
64. Piper, *Little Fuzzy*, p. 8
65. Ibid., p. 11; and H. Beam Piper, *Fuzzies and Other People* (New York, NY: Ace Books, 1984), p. 210
66. Piper, *Space Viking*, p. 223; and *Federation*, p. 189
67. Piper, *Little Fuzzy*, p. 45
68. Piper, *Other Fuzzies*, p. 213
69. Piper, *Cosmic Computer*, p. 1
70. Piper, *Federation*, p. 175
71. In that case, the distance to Piper's main planet, Poictesme, would be correct, but the distance to the secondary planet, Odin, would be incorrect. The reverse of Freya-Yggdrasil, Fenris-Gimli and Uller-Niflheim. A closer Odin would place it firmly within the Norse core, and the term 'milk-run' always made me think of short, local stops; not a huge trading network.
72. Piper, *Cosmic Computer*, p. 4
73. Piper, *Federation*, p. 175
74. Piper, *Space Viking*, pp. 35-36
75. Abigor is mentioned on *Cosmic Computer*, p. 225 and *Space Viking* p. 10; Ashmodai on *Cosmic Computer* pp. 66 and 232; Belphegor also on *Cosmic Computer* p. 232; Baphomet on *Cosmic Computer* p. 232 as well, also on *Little Fuzzy*, p. 164; and Mephistopheles on *Cosmic Computer* p. 16. The 'literary' category includes Beowulf (*Space Viking*, pp. 75, 93-97, 118), Hiawatha (*Federation*, p. 192), Moruna (also *Federation*, p. 192), and possibly Tetragrammaton (*Space Viking*, pp. 131, 132, 134).
76. Piper, *Little Fuzzy*, pp. 52, 65
77. Piper does not state the color of most stars which have habitable planets. So continuing the theme from **endnote 54**, I have assumed that most of them are yellow stars, similar to Sol. These include the primaries of Baldur, Marduk, Odin, Freya, Yggdrasil and Loki. Audhumla is named for the gigantic, celestial cow of Norse myth. I therefore gave its primary a white color, suggestive of milk. As for Irminsul, its Norse namesake "was said to possess a ponderous brazen chariot, in which he rode across the sky". (H.A. Guerber, *The Norsemen* (London, England: Senate/Studio Editions, 1994), p. 30) So Irminsul's sun was given a darker yellow, or 'bronze', color. Volund is named for the smith of the gods, which made a red sun the logical choice. And to counterbalance all the yellow stars, I used white and red for the two remaining unnamed stars along the Terra-Odin milk run.
- I likewise assume that Poictesme's primary, Alpha Gartner, is a yellow star. But the Gartner Trisystem has no other Terra-type planets, which could mean that Beta and Gamma Gartner are not yellow stars. Erring on the side of caution, I only made one of them, Gamma Gartner, another non-yellow sun.
- Elektra is described as a "yellow-white star" (Piper, *First Cycle*, p. 1). The sun of Beowulf may be the same color; see Figure 17 and **endnote 141**.
78. Piper, *Four-Day/Lone Star*, p. 196
79. Asgard is mentioned on *Federation* p. 175; Bifrost also on that page, as well as *Uller Uprising* p. 16; Fafnir on *Federation* p. 58; Hoth on *Space Viking* pp. 35 and 205; Irminsul on *Federation* p. 58, *Cosmic Computer* p. 23 and *Space Viking* p. 113; Ithavoll on *Space Viking* p. 162; Ithunn on *Space Viking* p. 120; Midgard on *Uller Uprising* p. 138; and Skathi on *Space Viking* p. 182. I can't find the reference for Valhalla.
80. Piper, *Space Viking*, p. 113
81. Ibid., p. 162

82. Piper, *Empire*, p. 132

83. Guerber, *Norsemen*, p. 60 I also made the sun of Volund red, for a similar reason. Volund “was a very clever smith, and could manufacture the most dainty ornaments of silver and gold, as well as magic weapons which no blow could break”. (ibid., p. 176) The smithcraft of Volund is therefore suggestive of fire and furnaces.

84. Piper, *Space Viking*, pp. 136, 147

85. Piper, *First Cycle*, pp. 1, 5

86. H. Beam Piper, *Fuzzy Sapiens* (New York, NY: Ace Books, 1964), p. 136

87. Ibid.

88. Piper does say that after a ship gets to Gimli, it'll take “two more months” for one to arrive on Zarathustra (ibid.). So is this a clue that Gimli is 2 months away, not one? If so, that would just about align with the 175 ly distance. Because 83.33 ly times 2 is 166.66 ly, and 91 ly times 2 is 184 ly. And a 175 ly distance is roughly midway between 167 and 184 ly.

89. Carr, *Piper Biography*, pp. 212-214 For example, Beam places *Four-Day Planet* in the “Mid-IV Century”, whereas internal evidence suggests that the story actually takes place circa AE 495. That is, the ‘Late V Century’, a difference of almost 150 years. Another major error is his date “About 1450 A.E., [when the first] Sword World ships enter [the] Old Federation space-volume”. But *Space Viking* takes place in the “Early XVIII Century”, or circa AE 1705; and Lucas Trask says that the first Sword-World ship traveled from Morglay to the Old Federation “three hundred and fifty years ago” (Piper, *Space Viking*, p. 10). This would be around AE 1350; another full century mistake by Beam.

90. See section 18. **The Second Galactic Empire.**

91. I modeled my ship-speed chart on that of Nils Jeppe, in “Mapping H. Beam Piper, Part 4: Hyperspeed and Niflheim Revisited”. Formerly on his www.enderra.com site, now unavailable.

92. Piper, *Cosmic Computer*, p. 241

8. The Federation Fleet-Army Forces

93. Ibid., pp. 1, 5

94. McEvedy, *North American History Atlas*, p. 97 Some have speculated that Marduk was the capital of the Alliance. But if my assumptions have been generally accurate so far, a likelier candidate is Baldur. Its estimated location is about 115 ly from the estimated border of the System States. Not too different from the Alliance GHQ, which Klem Zareff put at about 100 ly from the frontier.

95. Piper, *Federation*, p. 197

96. Piper, *Cosmic Computer*, pp. 68, 79

97. Piper, *Space Viking*, pp. 214, 219

98. Ibid., pp. 35-36

99. Piper, *Federation*, p. 189 (and see **section 12**, below.)

100. Ibid.

9. From Confederate Refugees to Alliance Refugees

101. Piper, *Cosmic Computer*, p. 225

102. Piper, *Space Viking*, p. 10

103. <https://en.wikipedia.org/wiki/Confederados>

104. Piper, *Space Viking*, pp. 40, 41

10. The Relative Locations of Tanith, Xochitl and Gram

105. Ibid., pp. 194, 199

106. Ibid., pp. 192, 193, 204

107. Ibid., pp. 41, 102

108. Ibid., pp. 202-203, 204

109. Piper describes Gram's primary as a "huge red sun" (ibid., p. 1). That's why 'Gram' (really its sun, whose name is not given) is colored red on my map. The sun of Gram is presumably a red giant, though it could be a red dwarf, which in that case would be much closer to Gram than Sol is to Terra. Xochitl's primary is not defined, so like Ertado's Star, I assume that it's a yellow Sol-like sun.

Here I must again acknowledge my debt to Nils Jeppe, whose chart of the Terra-Uller-Niflheim configuration on www.enderra.com ("Mapping H. Beam Piper, Part 5: The Dislocation of Nu Puppis") inspired this map, as well as Figure 17, which depicts the three-planet raid in *Space Viking*.

110. Piper, *Space Viking*, p. 242

111. www.google.com/maps

11. The Sword-Worlds

112. Bart J. Bok and Priscilla F. Bok, *The Milky Way* (Cambridge, MA: Harvard University Press, 1974), p. 207

113. The refugees apparently leave Abigor just after the end of the System States War, in AE 855. (Carr, *Piper Biography*, p. 213) Excalibur would then be discovered and settled no earlier than two years later, in AE 857. But it probably takes a bit longer, given that Piper's colonizing expeditions in "When in the Course—" and "Naudsonce" require four years to find a habitable planet. So for convenience, let's say that Excalibur is founded circa AE 860.

A generation is generally considered to be about 30 years. "From [Excalibur], their grandchildren had colonized Joyeuse and Durendal and Flamberge; Hautleclere had been colonized in the next generation from Joyeuse, and Gram from Hautleclere." (Piper, *Space Viking*, p. 10) So Joyeuse, Durendal and Flamberge are settled around AE 920, and Hautleclere about AE 950. Assuming Gram is colonized in the next generation from Hautleclere, this would be circa AE 980; if the next generation after that, AE 1010. The latter figure would place Gram's settlement in the last century of the Terran Federation, which "completely vanished by 1100 A.E." (Carr, *Piper Biography*, p. 213)

114. Piper, *Space Viking*, p. 10

115. Ibid., pp. 32, 39

116. Ibid., p. 10

117. Ibid., p. 36

118. <https://en.wikipedia.org/wiki/Confederados>

119. Pierre Nidal-Vaquet, editor, *The Harper Atlas of World History* (New York, NY: HarperCollins Publishers Inc., 1992), p. 81)

120. <https://www.historyhit.com/facts-about-viking-longships/>

121. The development of faster hyperships parallels another Sword-World advance, which is superior robots. Beam provides a practical reason for this. Marduk is heavily populated, so many chores are performed by human servants, providing them with gainful employment. Robots are consequently not well developed. But the Sword-Worlds are low in population, requiring more and better robots to perform menial tasks. (Piper, *Space Viking*, pp. 165-166)

122. John F. Carr, Introduction to "The Return", *Empire*, p. 181; and Piper, *Space Viking*, p. 112

123. Piper, *Space Viking*, pp. 99-100, 231

124. https://en.wikipedia.org/wiki/Erich_von_Falkenhayn "Militarily, Falkenhayn had a mixed record. His offensive at Verdun proved a strategic failure. During the campaign against Romania in 1916 Falkenhayn demonstrated considerable skill in command of the German 9th Army, driving the Romanians from Transylvania, breaking through the Southern Carpathians and forcing the shattered Romanian forces northeast into Moldavia. His defence of Palestine in 1917 was also a failure but his forces, overwhelmingly Ottoman in composition, were outnumbered and outclassed and casualties were fairly equal."

Despite his mixed record, "Winston Churchill considered him to be the ablest by far of the German generals in World War I. Dupuy also ranked him near the top of the German commanders, just below Hindenburg and Ludendorff." And, "All sources portray Falkenhayn as a loyal, honest and punctilious friend and superior. His positive legacy his conduct during the war in Palestine in 1917. As his biographer Holger Afflerbach wrote, "An inhuman excess against the Jews in Palestine was prevented only by Falkenhayn's conduct, which against the background of the German history of the 20th century has a special meaning, and one that distinguishes Falkenhayn." "

This last exploit seems similar to Commodore Hastings in "A Slave is a Slave", who is mentioned as preventing a pogrom on Anath. (See **endnote 216**.)

125. Piper, *Space Viking*, p. 39

126. Ibid.

127. Ibid., pp. 9-10

128. Ibid., pp. 206, 242-243

129. Ibid., pp. 68, 192 Otto Harkaman says that "King Napolyon [of Flamberge] was going to help the Elmersans", which presumably means that Joyeuse has sided with the Oaskarsans. (ibid., p. 30)

130. Ibid., pp. 11, 206

12. The Relative Locations of Tanith, Khepera, Amaterasu and Beowulf

131. Felix Guirand, editor, *Larousse Encyclopedia of Mythology* (New York, NY: Prometheus Press, 1960), p. 13

132. As it comes from "an Old English epic poem" (<https://en.wikipedia.org/wiki/Beowulf>), Beowulf is not a mythological name. The planet Beowulf should therefore belong among the "naming planets for almost anything" category, which lie farther out than the mythology-named planets.

133. Piper, *Space Viking*, pp. 66, 75, 98

134. Ibid., p. 76

135. Ibid., pp. 82-93

136. Ibid., p. 82

137. Ibid., p. 200

138. Ibid., pp. 93-98

139. Ibid., p. 75

140. Ibid., p. 108 Harkaman "dismissed the whole thing as chicken-stealing, but he had lost some men and the ship showed a few fresh scars." This suggests he visited at least one planet that could put up a halfway decent fight, supported by the very next sentence. "A good deal of what was transshipped to the *Rozinante* was manufactured goods which would compete with merchandise produced on Gram." That certainly suggests an advanced, industrialized planet, somewhere between the level of Amaterasu (which did not give the Space Vikings a fight) and Beowulf (which gave them a tough fight).

141. Actually, if they went to Beowulf first, they would have to travel about 400 light-years (out to Amaterasu, then back to Taniith) before being able to repair their ships, rather than 230 lys.

Beowulf is the fourth planet of an F-7 star (ibid., p. 94). That should make its primary yellow-white in color. (https://en.wikipedia.org/wiki/F-type_main-sequence_star) A hotter, more massive star, logically making its fourth planet the closest to Terra-type, rather than its third. I assume that Khepera and Amaterasu orbit G-type stars, very similar to Sol, which is why they are a standard yellow in color.

13. Base Planets and Trade Planets

142. Piper, *Space Viking*, pp. 32, 33

143. Ibid., pp. 35, 36, 61, 67, 105, 205

144. Ibid., pp. 114, 120, 121

145. Ibid., pp. 118, 119, 123, 126, 127

146. Ibid., p. 51

147. Ibid., p. 127

148. Ibid., pp. 189-190

149. Ibid., p. 190

150. In the original version of this map, I gave Dagon an indigo-colored star. For two reasons. First, Dagon was the national god of the Philistines, and was depicted as half man, half fish. So I reasoned that Dagon could be a half-water world, with a bluish sun to also reflect this maritime characteristic. But I couldn't make it the same shade of blue as Marduk, Baldur and Odin, because unlike them, Dagon is not a fully civilized world with a culture descended uninterruptedly from the Terran Federation. It has a Sword-World culture superimposed on a completely interrupted Federation-era society.

Also on the original map, Jagannath was given an orange star; mainly because it is a Hindu deity, and Hinduism is usually represented by saffron, a shade of light orange. Nergal is the Babylonian god of war, paralleling Mars, so red was a natural choice. Hoth had a white star because the god Hoth (Hodur) represents winter, in opposition to Baldur, who represents summer. (Guerber, *Norsemen*, pp. 141, 213)

By the way, the placement of Indra and Ganpat in the outer Federation might seem to violate Beam's suggestion that the planets in this region are named "for almost anything", rather than for deities, like the planets settled in earlier times. But since the Federation is a three-dimensional volume of space, it is quite possible that Indra and Ganpat are 'above' or 'below' Taniith. Rather than being farther out, they would be more or less the same distance from Terra, just in a different plane or planes. This obviously could not be depicted very well on my two-dimensional map.

14. The League of Civilized Worlds

151. Piper, *Space Viking*, pp. 60, 64, 73, 162-163 The seemingly-incongruous figure for the distance from Aditya to Marduk will be discussed in **Appendix 4. Evidence for a Large Federation and Empire.**

152. Ibid., p. 242

153. Ibid., p. 218

154. Ibid., p. 136, 202 Gimli is not actually named as one of Marduk's trade planets. But it is inferred, as there is a small commercial company, Startraders, Ltd., which (allegedly) makes milk runs between Marduk and Gimli. Gimli is also the rallying point for Royal Mardukan Navy ships in opposition to Zasparr Makann, which are later joined by vessels of Taniith, Beowulf and Amaterasu. Gimli then becomes the staging ground for the allied fleet which liberates Marduk. (ibid., pp. 182, 214, 219-223) Taken together, these references certainly imply some sort of Mardukan sovereignty over the planet.

155. Ibid., p. 131

156. Ibid., p. 137

157. Ibid., pp. 214, 216, 222, 223

158. Ibid., p. 137

159. Piper, *Four-Day/Lone Star*, p. 216

160. www.quora.com I always thought it was 'shall', but the correct form appears to be "The South *will* rise again." However, the historical model of the League of Civilized Worlds is not the Confederacy—that was the model for the System States Alliance—but the Hanseatic League of northern Germany. See next endnote.

15. The Spheres of Influence

161. Piper, *Space Viking*, p. 159 Beam partly modeled the Terran Federation on the Roman Empire, which explains the Neobarbarians and Space Vikings of the post-Federation period. They parallel the Germanic barbarians who overran the Western Roman Empire, followed a few centuries later by the blood-stained Viking Age. The League of Civilized Worlds, which grows into the First Galactic Empire, the successor-state of the Federation, therefore parallels the Hanseatic League, which was a major player in the Holy Roman Empire, the successor-state of western Rome. The Holy Roman Empire was a hodge-podge of 300 or so semi-independent states; paralleled in Piper by the hundreds of member planets of the Galactic Empire, each of which is "sovereign in its own internal affairs". Prince Trevannion says, "We will not attempt to force every planetary government into a common pattern, or dictate the ways in which they govern themselves." (Piper, *Empire*, pp. 87. 89)

162. Carr, *Piper Biography*, pp. 213, 214; and Piper, *Empire*, p. 87

163. Piper, *Space Viking*, pp. 155, 242 In their book, however, John Carr and Mike Robertson have Marduk pull out of the League, effectively causing its collapse. (John F. Carr and Mike Robertson, *The Last Space Viking* (Boalsburg, PA: Pequod Press, 2011), p. 100) This event seems to be at variance with Beam's statements.

164. Piper, *Space Viking*, pp. 35, 36, 56, 57 We therefore end up with another bit of Piper-style irony. Because while Prince Trask is portrayed as 'superior' to Prince Simon in *Space Viking*, and gives him sound advice in the art of leadership, their heirs actually reverse roles. This may begin with Simon's son, King Stephen, who should be about 15 years older than the heir of Lucas, who I believe is named Arthur Trask.

165. Piper, *Empire*, p. 87

166. In Marduk's case at least, the expansion will serve to provide challenging work for its excessively numerous and idle-prone population. In contrast to the low-population Sword-Worlds, a Mardukan Navy captain says that "We have too many people on Marduk, and all of them want soft jobs as nobles' servants...Those that want any kind of jobs." (Piper, *Space Viking*, p. 166)

This seems very similar to the "non-worker" problem of the Galactic Empire. Too many Imperial citizens do not have gainful employment, they simply live off the proceeds of selling their votes. So Emperor Paul XXII and Prince Travann propose to use them to colonize new worlds beyond the Empire's borders. "And that'll mean, eventually, an end to vote-selling, and the non-workers'll have to find work. We'll find it for them." (Piper, *Empire*, p. 178)

In the latter case, the excess, idle population is used to colonize "New worlds" "far beyond the boundaries of the Empire", so that "the Empire won't die; it'll start growing again." (ibid., pp. 175, 176) So I think it likely this is a repeat of Mardukan practice. The revived monarchy under King Simon I and his successors send some of Marduk's excess population to begin colonizing new worlds, beyond the Old Federation's frontiers. And given Marduk's location, these new worlds will be mostly to the south and west of Old Federation space.

I should also mention that the increased speed of interregnum hyperships should cause the Old Federation to become 'narrower', in the sense that it would seem confining once the spheres of interest begin expanding. The relative narrowness of the Old Federation (only 1600 light-years across) would then parallel Europe, a small continent which became confining to the rising populations and power of European nations like France, Spain and England.

167. Piper, *Space Viking*, p. 162

168. Ibid., p. 193

169. Piper, *Uller Uprising*, pp. 8, 9, 48, 49

170. Piper, *Empire*, pp. 132-133

171. Piper, *Space Viking*, p. 166
172. *Ibid.*, pp. 242-243
173. *Ibid.*, pp. 151, 162, 163
174. *Ibid.*, p. 12
175. Piper, *Federation*, pp. 236, 237
176. Piper, *Cosmic Computer*, p. 7
177. Carr, *Empire* Introduction, p. 3
178. Piper, *Empire*, pp. 175, 176

16. The Sphere of Gilgamesh

179. Piper, *Space Viking*, pp. 112, 113
180. *Ibid.*, p. 112
181. *Ibid.* They are not in the Sword-Worlds, however. Lucas Trask “had first heard of Gilgameshers...on Gram, from Harkaman and Karffard and Van Larch and the others.” (*ibid.*, p. 111) These men are all Space Vikings who have been in the Old Federation. Trask only meets a few Gilgameshers after he travels to the Old Federation and takes over the planet Tanith.
182. *Ibid.*, pp. 152, 180
183. *Ibid.*, p. 179
184. Piper, *Fuzzy Sapiens*, p. 189
185. Piper, *Space Viking*, p. 179 There are Gilgameshers on Ithunn, as well. (*ibid.*, p. 120)
186. *Ibid.*, p. 190 Harkaman leaves the Gilgameshers on Dagon alone when he sacks Fedrig Barragon’s base.
187. Piper, *Empire*, p. 68; and *Space Viking*, p. 137
188. John F. Carr and William Taylor, “Star Distances” (unpublished list)
189. Piper, *Space Viking*, p. 112 This is a “five-ship...raid” which happened “About a century before” *Space Viking*, or roughly AE 1605. Only one ship escaped the wrath of the Gilgameshers, and even that had to be “sold for scrap after reaching a friendly base.”
190. *Ibid.*, pp. 179-180, 217, 228 The Gilgamesh colony on Marduk is “cooperative with [Mardukan Space] Naval Intelligence”, and later, a Gilgamesh freighter is chartered as a troopship for the liberation of Marduk.
191. Incidentally, since there are no Gilgameshers in the Sword-Worlds (see **endnote 181**), the Space Viking raid circa AE 1605 was probably a surprise attack. But even then, the Gilgameshers beat the Space Vikings’ pants off.
192. Piper, *Space Viking*, pp. 179, 195
193. Piper, *Cosmic Computer*, pp. 16, 21, 169
194. *Ibid.*, pp. 243, 244
195. *Ibid.*, p. 227
196. Piper, *Space Viking*, p. 207

- 197. Piper, *Cosmic Computer*, pp. 232-233
- 198. *Ibid.*, p. 243
- 199. *Ibid.*, p. 242
- 200. Piper, *Empire*, p. 68
- 201. Piper, *Cosmic Computer*, pp. 179, 181
- 202. Piper, *Space Viking*, p. 112
- 203. *Ibid.*
- 204. Piper, *Cosmic Computer*, pp. 171, 213, 226, 246
- 205. Piper, *Space Viking*, p. 112
- 206. Piper, *Cosmic Computer*, p. 16
- 207. *Ibid.*, p. 215
- 208. Piper, *Space Viking*, pp. 152, 174, 191

17. The First Galactic Empire

- 209. Carr and Robertson, *Last Space Viking*, p. 6
- 210. Carr, *Piper Biography*, p. 213; and *Empire* timeline
- 211. Carr, *Piper Biography*, p. 214; and Piper, *Empire*, p. 80
- 212. Piper, *Empire*, pp. 138, 139, emphasis added
- 213. *Ibid.*, pp. 137-138
- 214. *Ibid.*, p. 119
- 215. <https://en.wikipedia.org/wiki/Pogrom>

216. Piper, *Space Viking*, p. 152 Since Hastings stops the pogrom on Anath, it appears that the Galactic Empire is actually protecting the Gilgameshers. On the face of it, it makes sense to stop a massacre and/or expulsion of innocent people, if you have the power to do so. But this action by the Imperial Space Navy seems to go against the Imperial policy of non-interference with the internal affairs of its member planets' governments. In "Ministry of Disturbance", Emperor Paul XXII notes that "The planetary king of Excalibur had been assassinated by his brother and two nephews, all three of whom were now fighting among themselves. As nobody had anything to fight with except small arms and a few light cannon, there would be no intervention." (Piper, *Empire*, p. 139)

So if various local factions decide to kill each other over who controls the planet, which could result in large numbers of innocent civilians becoming casualties, the Empire won't interfere; but if that same planet decides to kill or expel a disliked and unwanted group of off-worlders who don't belong there, the Empire *will* interfere? That doesn't appear to make sense—unless it is somehow *necessary* that the Gilgameshers remain on the planet.

217. Of course, the Empire's total of 1,365 planets includes the twelve Sword-Worlds, while the Federation's total of 500 planets does not. But the Sword-Worlds represent the 'last gasp' of Federation-era expansion, and we know the Galactic Empire is about to do the same. Emperor Paul XXII and Prince Yorn Travann conspire to "get people out onto new planets, [so that] the Empire won't die; it'll start growing again." (*ibid.*, p. 176) This means the late Federation total of 512 human-inhabited planets would have to be compared with the late Empire total of 1400 or more. Resulting in roughly the same ratio, as 512 times 2.73 equals 1,398.

- 218. Piper, *Empire*, p. 136

219. Ibid.

220. Ibid., pp. 73, 74 It works out this way. At the beginning of “Slave”, the Midyear Feasts are about 150 days away (ibid., p. 92). The “next day” is mentioned, then “the next afternoon” after that, then “the next morning” (ibid., pp. 97, 104, 105). So now the Midyear Feasts are only about 147 days away. The decision to “send the *Irma* back to Odin” is presumably a few days after that (ibid., p. 108). So it takes the *Irma* about 144 days to travel to Odin and back, minus 2 days because it arrives back at Aditya two days before the Feasts begin (ibid., p. 114). So say 142 days for the round trip.

The *Irma* must remain on Odin for at least a few days, while Vann Shatrak makes his report to the Imperial authorities, his promotion is processed, the troops are gathered to send with him back to Aditya, compensation for the former slave-owners are processed, and any other details are taken care of. In fact, I would make it a week. So we’re now at 135 days for the actual flight time. That translates to 3264 hours, or 1632 hours each way. Divide that by our estimated 3.26 ly/hr speed, and Aditya would be located about 500.6 ly from Odin.

As an aside, the consolidation process sure seems to take a long time. Aditya is annexed three full centuries after the Galactic Empire is established, and another century and a half before the “Empire [is] completely consolidated by [the] end of [the] Fourth Century” Imperial. (Carr, *Piper Biography*, pp. 213, 214)

221. Piper, *Empire*, pp. 65, 68, 74, 86 After “more important matters having been gotten out of the way, Aditya had come up for annexation”. Giving the impression that annexing Aditya is a minor detail in consolidating the Galactic Empire.

222. Ibid., p. 80 I assume it’s Shatrak who is speaking, although it could be Lanze Degbrend.

223. Carr, *Piper Biography*, p. 213

224. Piper, *Empire*, p. 137

225. Ibid., pp. 138, 152, 153, 154

226. Ibid., pp. 88, 137

227. Isaac Asimov, *Foundation* (New York, NY: Avon Books, 1966), p. 102 Asimov calls it “the old Prefect of Anacreon”, but a Prefect is the person ruling a Prefecture, not the Prefecture itself. The young Isaac seems to have used the word incorrectly, while the older Piper did not.

Assuming that Excalibur, one of the outermost planets of the Piper’s Galactic Empire, is still ruled by kings like Rodolf (Piper, *Space Viking*, p. 123), this would parallel Anacreon, one of the outermost planets of Asimov’s Galactic Empire, ruled by King Lepold. Rodolf and Lepold, both names slightly changed from our time (Rudolf and Leopold).

The deduction that Beam’s Imperial Prefectures contain a relatively small number of inhabited stellar systems would then parallel Asimov’s Prefects. “Following closely the boundaries of the old Prefect of Anacreon, [the Kingdom of Anacreon] embraced twenty-five stellar systems, six of which included more than one habitable world.” (Asimov, *Foundation*, p. 102.)

See **Appendix 5** for a closer comparison of Asimov’s and Piper’s First Galactic Empires.

228. Piper, *Empire*, p. 122

229. Ibid., p. 77 The constellation names are probably not too different in Imperial than they were in Lingua Terra. Because the only example of an Imperial word given by Piper is close to its original form. This is “*sixtifer*”, “an ancient word in one of the lost languages of pre-Atomic Terra...It meant, the basic, fundamental, question.” (ibid., p. 90)

This is derived from the English number “sixty-four”. It came to mean “a crucial question expressing the basic issue on a problematical subject”, because of the 1940s radio program “Take It or Leave It”. In this CBS radio quiz show, “the big prize was 64 silver dollars.” (www.merriem-webster.com/dictionary/sixty-four-dollar-question)

230. https://en.wikipedia.org/wiki/Milky_Way

231. Transferring the eastern part of the Odinic sphere to the Viceroyalty of Auriga leaves Orion as the only Viceroyalty containing no known planets. The question of capitals led me to create the planet ‘Odinova’, or New Odin. This is presumed to have been settled when Odin was in its expansionist phase, during the old spheres of influence period. Odinova would not be centrally located, being a bit closer to the inner border of the Viceroyalty of Orion, but could still be the capital. The name may also be a play on words, as Odinova could lie close to a nova or supernova. Either in a nearby stellar system, or Odinova is part of a binary system, one of whose stars went nova.

232. Piper, *Empire*, p. 85 Another possible configuration I entertained was a perfectly equal series of 'rays' emanating from the central circle around Odin. This would also reflect the Imperial Sun emblem, but seemed a bit too convenient. Since the Empire is not spherical in shape, it wouldn't look right anyway. (But see **endnote 235**.)

233. *Ibid.*, pp. 89, 136

234. *Ibid.*, p. 137

235. It must be admitted, however, that data from the Viceroyalty of Auriga should take much less time than 20 days to reach Odin. This may argue against the Empire having a central Viceroyalty. And that would tie in with my early idea that all ten Viceroyalties 'radiate' out from Odin. See **endnote 232**.

236. Carr, *Empire* timeline

237. Piper, *Empire*, pp. 136, 138, 142, 175

238. *Ibid.*, pp. 176, 178

239. Carr, *Empire* Introduction, p. 9

240. Piper, *Empire*, pp. 164, 175, 176, 178 A more in-depth look at the fall of the Galactic Empire, and Piper's historical model for instantaneous communications, can be found in my 2015 paper, "Emblems of Aditya".

18. The Second Galactic Empire

241. September 6 to October 12, 1492. Peter Lacey, editor, *Great Adventures that Changed our World* (The Reader's Digest Association, 1978), pp. 55, 57

242. Carr, *Piper Biography*, pp. 71, 134, 136, 141

243. Piper, *Empire*, p. 136

244. Piper, *Space Viking*, p. 12

245. Guerber, *Norsemen*, p. 202, 329, 330

246. *Ibid.*, pp. 210-212 Thok is "often presumed to be the god Loki in disguise", and it was Loki who persuaded Hodur (Hoth) to fire the fateful shaft of mistletoe at Baldur, which caused his death. (<https://en.wikipedia.org/wiki/Baldr>) Thus, the deduced destruction on the planet Baldur may be related to events on the planets Loki and/or Hoth.

247. In "Ministry of Disturbance", Paul's son Rod seems to be a good and intelligent lad. (Piper, *Empire*, pp. 141-142, 156, 170, 177) I therefore assume that when he ascends the throne as Galactic Emperor Rodrik XXII, he continues his father's energetic and expansionist policies. It may be during the reign of Rod's successors, Paul XXIII and Rodrik XXIII, that the reaction sets in and these policies are finally abandoned.

248. Piper, *Four-Day/Lone Star*, pp. 195, 196, 199 The Lokians are probably worked to death in *gold* mines, because we later learn that the Lokians were moved off their reservation when gold was discovered there. (Piper, *Fuzzy Sapiens*, p. 189)

And when Anton Gerrit escapes to Fenris and becomes Steve Ravick, head of the Hunter's Co-Operative, he finds a new 'gold mine'. This involves bilking the monster-hunters of earnings they should have gotten from the sale of tallow-wax. First by ending competitive wax-buying, and then incrementally lowering the price paid to the monster-hunters for their tallow-wax—even though the price on Terra remains constant—and splitting the money thus obtained with his sales representative there, Leo Belsher. (Piper, *Four-Day/Lone Star*, p. 19)

249. Piper, *Fuzzy Sapiens*, pp. 136, 150

250. Piper, *Space Viking*, pp. 195, 196, 202, 214, 216, 222

251. Carr, *Piper Biography*, pp. 213, 214

252. Piper, *Empire*, pp. 165, 166, 167, 175, 178

253. Guerber, *Norsemen*, pp. 338, 339

254. Piper, *Space Viking*, pp. 127, 162

255. <https://en.wikipedia.org/wiki/Ragnarök>

256. John F. Carr and William Taylor, "Worlds in the Old Federation and Sword-Worlds" (unpublished paper), p. 29

257. See my 2016 Paper, "Gimli the Unusual" for much more. Including why Isis, Ishtar, Gilgamesh and Zarathustra may be major worlds in the Second Empire, but Aton and Osiris are not.

19. The Third Galactic Empire

258. Piper, *Space Viking*, pp. 233

259. Piper, *Empire*, p. 223

260. Piper, *Cosmic Computer*, p. 243

261. *Ibid.*, p. 162

20. The Fourth Galactic Empire

262. Piper, *Empire*, p. 223

21. The Fifth Galactic Empire

263. Carr, *Piper Biography*, p. 214

264. A Google search yields the traditional 100,000 ly across. Wikipedia, however, gives it an "estimated visible diameter between 170,000 and 200,000 light-years". (https://en.wikipedia.org/wiki/Milky_Way)

265. Piper, *Empire*, pp. 221, 222

266. *Ibid.*, p. 223

267. *Ibid.*, p. 178

268. Piper, *Federation*, p. 4 The relay station is possibly at the original US lunar base, completed in 1974. But not necessarily, since by the 1996 of "Omnilingual", other lunar bases and outposts have undoubtedly been established.

269. Though I have placed Dremna at the *exact* center of the galaxy, I realize it is highly unlikely to be at that precise spot. It was apparently Harlow Shapley, American astronomer of the early Twentieth Century, who theorized a "zone of intense radiation" at the center, which would preclude its habitability by human beings. (Franz Joseph, *Star Fleet Technical Manual* (New York, NY: Ballantine Books, 1975), p. T0:02:07:00) Sometime later, it was postulated that there is a massive black hole at the center of the Milky Way. That would be another danger it would be wise to stay well away from.

How much of this Piper was aware of I don't know. But Dremna may actually be located along the outer edge of the Core. This would parallel Trantor in the Foundation series, in which Asimov's capital of the Galactic Empire is located "*in the central regions of the galaxy*", but only "as close to the center as a planet can get and still be habitable." (See **Appendix 5** and **endnote 320**.)

270. Bok and Bok, *Milky Way*, pp. 20, 21 "There is fairly general agreement among astronomers that the center of our Milky Way system lies somewhere between 8,000 and 11,000 parsecs from the Sun, with 10,000 parsecs representing the best compromise value." 10,000 parsecs is 32,600 light-years.

Incidentally, this is the Fourth Edition of the Boks' book. The Third Edition was published in 1957, when Piper was well into creating his Future History.

22. A General Timeline of Galactic Expansion

271. Piper, *Empire*, p. 241

272. Ibid., p. 17 “The Edge of the Knife” begins on “October 16, 1973”, and later Professor Chalmers knows that “There would be an Eastern-inspired uprising in Azerbaijan by the middle of the next year [1974]; before autumn, the Indian Communists would make their fatal attempt; the Thirty Days’ War would be the immediate result.” (ibid., p 55) Thus, Piper’s WWII takes place in the late summer and early fall of 1974. That’s AE 31.

273. In “The Future History”, Piper says that “By the time of the Nineteenth Century, the League [of Civilized Worlds] has turned into the Galactic Empire.” (Carr, *Piper Biography*, p. 213) John Carr takes the middle ground, interpreting the date as AE 1848 (Carr, *Empire* timeline). For reasons of my own, I believe this to be correct, or at least very close. (See my 2015 paper, *The Cosmic Computer—Piper’s Foundation?* for more.)

274. Carr, *Piper Biography*, p. 214 “Ministry” takes place in the “Twelfth Century Imperial”, and Beam says that the “Twentieth Century AE Corresponds to the First Century Imperial”. So we can calculate that the story occurs in the Thirty-First Century AE. That ends in AE 3099, meaning that “Ministry” should take place in the 3000s; say around AE 3050 for convenience. That in turn would correspond to 1150 Imperial Era, the middle of the Twelfth Century.

275. Piper, *Empire*, p. 223

276. Carr, *Empire* timeline However John derived it, I believe his AE 183 date for the end of the First Federation and beginning of the Second is absolutely right. Because this date is supported by the equation AE 1 = 1601 AD, which I believe reveals Beam’s system of historical models for the early Federation period. For more, see my 2019 paper “Overview of Historical Models in the Early Future History, Part 1”.

277. In Asimov, 30,000 years is how long the interregnum following the fall of the Galactic Empire will last, if the Seldon Plan is not followed. Thirty thousand is also the number of men (plus their wives and children) who will establish the First Foundation on Terminus, ostensibly to begin work on the *Encyclopedia Galactica* (Asimov, *Foundation*, p. 29, 30). **See Appendix 5.**

278. Piper, *Empire*, p. 222

279. Carr, *Piper Biography*, p. 213 The flight takes place in AE 192.

23. Piper’s Cosmogony...and Beyond?

280. Donald A. Wollheim, *The Universe Makers* (New York, NY: Harper & Row, Publishers, 1971), p. 42

281. Ibid., pp. 42-44

282. Ibid., p. 44

283. Piper, *Space Viking*, p. 233

284. Piper, *Empire*, p. 142

285. Piper, *Lord Kalvan*, p. 86 (total recall ability of First Level citizens); and H. Beam Piper, *Paratime* (New York, NY: Ace Books, 1981), pp. 57, 58, 64 (hypno-mech indoctrination), 234 (semi-telepathic rapport between Verkan Vall and Hadron Dalla), 51, 86, 92, 128, 129, 147 (psychic science and the Rhogom Foundation), and 81-82, 84, 86, 87-88 (Akor-Neb proof of reincarnation).

286. Carr, *Piper Biography*, pp. 39, 194

Appendix 1. Vertical Views

287. https://en.wikipedia.org/wiki/Milky_Way

288. Flammarion, *Book of Astronomy*, p. 551

289. https://en.wikipedia.org/wiki/Orion_Arm

290. Flammarion, *Book of Astronomy*, p. 550 Current estimates have greatly reduced this figure, placing Sol only “about 14 light years above” the plane of symmetry. (www.astrodigital.org/astronomy/solarsystemgalaxy.html) This is only 4.3 parsecs, much closer to the center of the Orion Arm than was thought in Beam’s time.

291. Carr, *Piper Biography*, p. 213

292. Guerber, *Norsemen*, p. 18. Hlidskialf “was not only an exalted throne, but also a mighty watch-tower, from whence he could overlook the whole world and see at a glance all that was happening among gods, giants, elves, dwarfs and men.” This brings to mind “the Octagon Tower” in “Ministry of Disturbance”, which seems to be the seat of power of Galactic Emperors. A mighty tower containing ‘an exalted throne’ (or at least a “big oval room”), where the emperors sit, and whence they watch over and rule the Galactic Empire. (Piper, *Empire*, pp. 135, 145)

293. But if Terra is actually only 14 ly above the Plane (see **endnote 290**), then Fenris would be about 54 ly below it, and Gimli about the same. Thereby placing both Fenris—the Wolf of Hel, or the Underworld—and lowly Gimli appropriately *below* the Plane of Symmetry.

Appendix 2. Star Maps of the Terran Federation and Galactic Empires

294. Another tip of the hat to Nils Jeppe and his former www.enderra.com website. On a couple of his excellent maps of the galaxy, Nils included his versions of the flags of the Terran Federation and the Galactic Empire. This inspired my inclusion of flags at the bottom of the map.

295. Piper, *Federation*, p. 184; and *Empire*, p. 48 The flag is also described as “a neat rectangle of blue bunting emblazoned with the wreathed globe of the Terran Federation”. (Piper, *Uller Uprising*, p. 14) See my 2009 paper “The Emblem of the Terran Federation” for more.

296. Piper, *Empire*, p. 21; and *Uller Uprising*, p. 150

297. See my 2014 paper “The Emblem of the Galactic Empire” for more.

298. Piper, *Cosmic Computer*, p. 45 That it is a black emblem on a green field is suggested by Fred Karski’s combat car. “It was green, with black trimmings, and lettered in black, GORDON VALLEY HOME GUARD.” Conn Maxwell’s reaction to this is, “What’s going on?...The System States Alliance in business again?” (ibid., p. 34)

299. See my 2009 paper “A Flag for the System States Alliance” for more.

300. Piper, *Empire*, p. 86

301. I brightened the border-colors of the First, Second and Fourth Empires for better visibility.

Appendix 3. The Voyage of the Gilgameshers

302. Piper, *Space Viking*, p. 113

303. Piper, *Lord Kalvan*, pp. 34, 36

304. Carr, “Return” Introduction, *Empire*, p. 181

305. Piper, *Fuzzy Sapiens*, p. 189; and *Space Viking*, p. 87

306. Piper, *Space Viking*, pp. 75, 93

307. Ibid., p. 113

Appendix 4. Evidence for a Large Federation and Empire

308. Piper, *Empire*, p. 87

309. Piper, *Space Viking*, p. 53

310. The estimated 5000 ly distance between the Sword-Worlds and 'large' First Empire would be more consistent with the distance from Mobile Alabama to Americana Brazil, which is 4569 miles. In the 'small' Federation and Empire, the distance is only 2000 light-years. See page 17 and Figure 9.

311. This is coincidentally John Carr's estimate for the Terra-Odin distance. (Carr and Taylor, "Star Distances", p. 1)

312. Issues to be addressed would include the following. As we saw on page 9, a ship speed of 6.257 hr/ly would mean that Yggdrasil and Loki are 200 ly from Freya, not 20; Uller would be 760 ly from Terra, not 76; and Niflheim would be 1480 ly from Terra, not 148. This causes a problem, since it would effectively rule out Beta Hydri and Nu Puppis as the primaries of Uller and Niflheim. Unless we assume that, in Beam's fictional galaxy, these are the true distances to those stars.

Moreover, Freya, Yggdrasil and Loki would probably not be located east of Terra, as in the main paper. Because at 700 and 780 ly respectively, these three planets would be well out in the Orion-Sagittarius Gap. Not impossible, but highly unlikely. The reference to the *Stellax* visiting six systems in four years before discovering Freya (Piper, *Federation*, p. 208) seems to suggest that they stay within the Orion Arm.

Another problem which comes to mind is that a 'large' Federation would violate Conn Maxwell's statement that the Alliance-Federation border is close to 1000 light-years. Because if the Federation has a radius of 6500 ly, then the border between the two belligerents should be not much less than the Federation's diameter of 13,000 ly! Unless, again, Beam was referring to the *depth* of the galactic arms, which are estimated to be 1000 ly on average. But that is not what appears to be meant.

This configuration does solve two problems. First, at the 6.257 hr/ly speed, Zarathustra would be 700 ly from Terra, not 500. Thereby making Zarathustra another example of Piper including a deliberate mistake regarding the distance to the main planet in a story. And Zarathustra at 700 ly would mean that Gimli, at about 674 ly out, could indeed be the nearest inhabited planet. Its minimum distance from Zarathustra would be 26 ly, but it is highly unlikely it is that close. On page 13, I estimated Gimli at being either 83 or 91 ly from Zarathustra, consistent with the one month travel time between the two planets, as mentioned in *Fuzzy Sapiens*. The only difference was the speed used. And at 6.257 hr/ly, a hypership would travel about 117 light-years in a month. So in the 'large' Federation and Empire, 117 ly would be the rough distance between Gimli and Zarathustra.

A 700 ly distance would place Zarathustra well inside the 'large' Norse Core, whose border should be around 1500 ly from Sol. But that may not be a problem, as Piper's named planets do not seem to be perfectly placed. There is at least some mixing. In *Space Viking* for example, Tanith is not far from Khepera, Beowulf and Amaterasu. These four planets, however, fall into four different categories. Tanith comes from Carthaginian mythology, Khepera comes from Egyptian mythology, Amaterasu from Japanese, and Beowulf from Old English literature. So there seems to be an element of randomness as to when planets are discovered, compared to what category of name is currently being used by the Astrographic Commission.

The second solved problem is Piper's reference in *Four-Day Planet* that "there's a real Old-Terran-style Western been showing on Völund that ought to be coming our way this time". (Piper, *Four-Day/Lone Star*, p. 2) This seems to suggest that Volund is closer to Terra than Fenris, and indeed is a planet on the Terra-Odin milk run. The people on Volund got to view the movie for a while, and now it's moving on outward to Fenris. But in Figure 7, I have Volund at roughly 304 ly from Terra, which is much farther out than Fenris, and Volund is not part of the Terra-Odin milk run.

313. Piper, *Empire*, p. 136

314. Among them, the color-coded uniforms of Imperial Space Navy personnel and the chief-slaves of the Lords-Master, the Octagon Tower on Odin and the eight-pointed star in the emblem of Aditya, and the Imperial colors of black and gold matching those of the Adityan Mastership. See my 2015 paper, "Emblems of Aditya" for more.

Appendix 5. The Galactic Empires of Asimov and Piper

315. Asimov's First Galactic Empire has a couple more levels of bureaucracy, probably because it controls the whole galaxy, while Piper's First Galactic Empire only covers a small portion. Its political system is elaborated upon in *Foundation*. "How the mighty had fallen! *Kingdoms!* They were prefects in the old days, all part of the same province, which in turn had been part of a sector, which in turn had been part of a quadrant, which in turn had been part of the all-embracing Galactic Empire." (Asimov, *Foundation*, p. 72)

So in Piper, the Galactic Empire has Planetary Proconsuls, Interstellar Prefects and (presumably Provincial) Viceroy, all under the Emperor; while in Asimov, the Galactic Empire has Planetary Procurators, Interstellar Prefects, Provincial Viceroy, Sector Viceroy and Quadrant Tetrarchs, all under the Emperor. (See my 2014 paper, "The Emblem of the Galactic Empire", Appendix 1, for more.)

316. Piper, *Empire*, p. 66

317. Asimov, *Foundation*, pp. 61, 76, 100, 105, 116 The phrase also underlies Hober Mallow's refusal to wage an overt military campaign against the Republic of Korell, relying instead on economic forces to win what "was certainly the most unfought war on record" (ibid., p. 200).

Piper continues by showing how Asimov (or Hardin) is wrong, at least in some circumstances. "Of course, [Count Erskyll] was absolutely right, though not in the way he meant. Only the incompetent wait until the last extremity to use force, and by then, it is usually too late to use anything, even prayer." (Piper, *Empire*, p. 66)

In contrast to Isaac's characters, Beam's characters actually apply violence as a *first* resort, in order to save lives and avoid unnecessary destruction. When explaining the reason for the forceful annexation of Aditya, Commodore Shatrak elaborates the point. "You see, Count Erskyll, we really had to do it this way, for their own good...What we did, we just landed suddenly, knocked out their army, seized the center of government, before anybody could do anything. If we'd landed the way you'd wanted us to, somebody would have resisted, and the next thing, we'd have had to kill five or six thousand of them and blow down a couple of towns, and we'd have lost a lot of our own people doing it. You might say, we had to do it to save them from themselves." (ibid., p. 68)

318. In his later novels *Foundation's Edge* and *Foundation and Earth*, published four decades after the original series, Asimov finally took a look at that possibility. First, he has the Foundation develop a hypership that can travel 10,000 parsecs in half an hour, whereas previously such a trip would have taken a month. (Isaac Asimov, *Foundation's Edge* (Garden City, NY: Doubleday & Company, Inc., 1982), pp. 145-146) Ten thousand parsecs is 32,600 light-years, or about a third of the way across the galaxy. This means that previously, a hypership would have taken about 3 months to go from one end of the galaxy to the other, but now it only takes an hour and a half!

Second, he has Golan Trevize decide to support Gaia in its creation of Galaxia, in part because he realizes that there is a major flaw in the Seldon Plan. This is its unstated, underlying axiom that human beings are the only intelligent species in the galaxy. While that is true of the Milky Way, Trevize reasons that the Seldon Plan will fail if humanity encounters one or more alien intelligences in (or from) the Magellanic Clouds, the Andromeda galaxy, or any of the billions of galaxies beyond. (Isaac Asimov, *Foundation and Earth* (Garden City, NY: Doubleday & Company, Inc., 1986), pp. 492-493)

At an estimated speed of 65,000 light-years an hour, it would only take about 2.5 hours for one of these highly advanced Foundation ships to reach the Magellanic Clouds, "where no human ship has ever penetrated." (ibid., p. 493) Farther afield, it would only take about 38.5 hours to traverse the 2.5 million ly between the Milky Way and Andromeda galaxies. The numbers for the previous, slower ships would be 5 months to the Magellanic Clouds, and 6.3 years to the Andromeda galaxy. In the original Foundation novels, an Intergalactic Era is therefore already possible, while in the later Foundation novels, it has become an almost certainty.

319. Asimov, *Foundation*, p. 12 Aside from their parallel roles as capitals of the Milky Way, and locations at the center of the galaxy, Dremna and Trantor have another subtle connection. They're both modified anagrams. "Trantor" appears to be a modified anagram of "Otranto", a city in southern Italy. Just change the initial O into another r, and stick it at the end. Trantor therefore reflects the historical model Isaac used for the Galactic Empire; the Roman Empire, which was ruled from Italy.

Now for Dremna. When I first read *Empire* in 1981, I thought Dremna was not a very good name for the capital of the entire galaxy. Certainly not as 'cool' as Trantor. So why did Piper call it that, instead of something a bit more impressive-sounding? In the early 2000s, I realized that the name seems to be a modified anagram of "Denmark". Just leave off the k, and rearrange the letters. Why Denmark? Because it is a peninsula in northern Europe, mirroring Italy, a peninsula in southern Europe. Asimov's Galactic Empire (Rome/Otranto, Italian peninsula) is therefore paralleled by Piper's Galactic Empire (Denmark, Jutland peninsula).

And there's more. Because when the Roman Empire was flourishing, Denmark was a barbarous region beyond its outer edge. This may be Beam's parallel of the 'center versus periphery' theme of the Foundation series. Hari Seldon placed the First Foundation on Terminus, a planet at the edge of the galaxy farthest from Trantor. Similarly, Piper named his galactic capital for Denmark, a peninsula at the northern edge of Europe proper (not counting the Scandinavian peninsula), farthest from Italy.

320. Ibid., p. 8 In *Foundation's Edge*, Asimov qualified Trantor's location somewhat, by taking into account astronomical discoveries made after the original Foundation trilogy. Thus, he says that Trantor is not at the *exact* center of the galaxy, but "It's as close to the center as a planet can get and still be habitable. It's closer than any other major populated system. The actual center of the galaxy consists of a black hole with a mass of nearly a million stars, so that the center is a violent place. As far as we know, there is no life in the actual center and maybe there just can't be any life there. Trantor is in the innermost subring of the spiral arms and, believe me, if you could see its night sky, you would think it was in the center of the galaxy. It's surrounded by an extremely rich clustering of stars." (Asimov, *Foundation's Edge*, p. 64)

321. Piper, *Empire*, p. 223; and Asimov, *Foundation*, pp. 7, 8

322. Asimov, *Foundation*, p. 18

323. Bok and Bok, *Milky Way*, p. 23

324. James Gunn, *Isaac Asimov, The Foundations of Science Fiction* (New York, NY: Oxford University Press, 1982), p. 40

325. Asimov, *Foundation*, pp. 33, 38, 44; and Isaac Asimov, *Foundation and Empire* (New York, NY: Avon Books, 1966), p. 75. Though they are called “the Four Kingdoms”, Asimov provided five names. In storytelling order, the fifth one mentioned is Loris; but later on, Lathan Devers calls it “one of the original Four Kingdoms. You might call it part of the [Foundation’s] inner line of defense.” (Asimov, *Foundation and Empire*, p. 65) That makes sense, as Loris is a match with the other Greek names; Anacreon, Smyrna and Konom. Thus, the real ‘fifth’ kingdom is Daribow, which is likely to be located on the far side of one of the Four Kingdoms, as seen from Terminus.

326. <https://en.wikipedia.org/wiki/Anacreon>, and <https://en.wikipedia.org/wiki/Smyrna>

Anacreon became the inspiration for the Anacreontic Society, a London amateur musical club. The official song of the society is “The Anacreontic Song”, often mistakenly called “To Anacreon in Heaven”, which is its opening line. The American national anthem, “The Star-Spangled Banner”, is set to the tune of “The Anacreontic Song”.

Asimov apparently knew these facts, because his Anacreon really is ‘in heaven’, being a planet and kingdom among the stars.

327. Edward Dodwell, *A Classical and Topographical Tour Through Greece* (London, England: Rodwell and Martin, 1819), p. 380; and <https://www.ancestry.com/name-origin?surname=loris>

Daribow always seemed like an odd name to me. But after some research, it appears to be a simple contraction of “Dari bow”, from a poem by the Irish poet Thomas Moore. Moore’s poem referred to the early American Republic’s conscious modeling of the classical Roman Republic. In it, he mocked the Americans’ ideals of Roman-style liberty, in light of their practice of slavery. Of this ‘new Rome’ in the New World, with its ‘new Senate’ on ‘Capitol Hill’, he sarcastically wrote, “Where tribunes rule, where dusky Dari bow, and what was Goose-Creek once [the Potomac] is Tiber now.” (Harriet I. Flower, editor, *The Cambridge Companion to the Roman Republic* (Cambridge, MA: Cambridge University Press, 2006), p. 412)

‘Dari’ seems to refer to Persians. Dari is the Afghan word for the Persian language, and is one of two official languages in Afghanistan, the other being Pashto. Dari is often called the “Afghan Persian”. However, “In historical usage, Dari refers to the Middle Persian court language of the Sassanids.” (<https://en.wikipedia.org/wiki/Dari>)

Though Persia and Afghanistan were never ruled by Rome, both were conquered by Alexander the Great. So it appears that Moore was connecting darker-skinned peoples (Dari, Negroes) in or from the east (Persia, Afghanistan, Africa) who bowed to western white overlords (Greeks, white Americans). Asimov’s use of “Daribow” would then suggest a planet of darker-skinned people who ‘bow’ to the ‘tribunes’ of the Galactic Empire.

As the empire of Alexander broke up, however, the Dari regained their independence. Similarly, when the Galactic Empire begins breaking up, Daribow declares its independence, becoming an independent ‘eastern’ kingdom once more.

Incidentally, Asimov’s connection of the planets Anacreon and Daribow makes sense, in light of this interesting fact about Thomas Moore. “In his lifetime, he was often referred to as Anacreon Moore.”

(https://en.wikipedia.org/wiki/Thomas_Moore)

328. https://en.wikipedia.org/wiki/Languages_of_the_Roman_Empire

329. Asimov, *Foundation*, p. 38

330. *Ibid.*, p. 55. Lord Dorwin’s dandified affectation of not pronouncing his r’s makes the actual quote “the Siwius sectah” and “Alpha Centauwi”.

Appendix 6. The Potential Intergalactic Era

331. Hari Seldon’s recorded words about the outcome of the Seldon Plan, “at its end is new and greater Empire!” (Asimov, *Foundation*, p. 70), could be taken to mean intergalactic expansion. For how can the Second Galactic Empire possibly be greater than the First, unless it is larger? But Seldon was just saying ‘greater’ in the sense of ‘better’. Its ruling class, the Second Foundation, will be a more enlightened, stable and efficient form of government, compared to that of the First Empire. This is confirmed by Asimov’s later Foundation tales; see **endnote 318**.

332. Carr, *Federation* Introduction, p. xviii

333. https://en.wikipedia.org/wiki/Andromeda_Galaxy

334. Flammarion, *Book of Astronomy*, p. 562 “The Andromeda nebula is thus 450,000 parsecs away.” That converts to 1,467,000 light-years. The current estimate is much greater; 767,000 parsecs, or a little more than 2.5 million light-years. (https://en.wikipedia.org/wiki/Andromeda_Galaxy)

335. Flammarion, *Book of Astronomy*, p. 566 This is still the case for the Large Magellanic Cloud; the Small Magellanic Cloud is currently estimated at 206,000 ly away. (https://en.wikipedia.org/wiki/Magellanic_Clouds)

336. This assumes that Andromeda is 1.5 million light-years away, as in Piper’s time. If we use the current estimate of 2.5 million ly, a ship traveling at 32.5 ly/hr would take 3205 days, or 8.78 years, to reach the Andromeda galaxy.

337. [https://commons.wikimedia.org/wiki/File:Universe_Reference_Map_\(Location\)_001.jpeg](https://commons.wikimedia.org/wiki/File:Universe_Reference_Map_(Location)_001.jpeg)

338. Ibid.

339. www.earthsky.org/space/astronomers-map-out-earths-place-in-the-universe As far as I can tell, the term ‘Council of Giants’ was first proposed in 2014. But since I have gone beyond the official end of Beam’s Future History anyway, I think it’s alright to use. Plus, it sounds cool.

340. During his trial, Hari Seldon says that “the [Galactic] Empire contains nearly a quintillion human beings.” (Asimov, *Foundation*, p. 27) In “Ministry of Disturbance”, Piper has Emperor Paul XXII state that his First Galactic Empire contains “a trillion and a half intelligent beings”, the vast majority of which are humans. (Piper, *Empire*, p. 136) One can then project that Beam’s Second Galactic Empire contains tens of trillions, up to a hundred trillion; his Third Empire contains hundreds of trillions, up to a quadrillion; his Fourth Empire contains tens of quadrillions, up to a hundred quadrillion; and his Fifth Empire contains hundreds of quadrillions, up to a quintillion.

341. In Piper’s Paratime series, First Level citizens have a lifespan of at least 500 years. (Piper, *Lord Kalvan*, p. 1) So it takes these Martio-Humans 100,000 years from the first settlement of Terra—at which time they probably lived the typical human average of 70 years or so—to attain this half-millennium lifespan.

Assuming a similar pace of advance, Beam’s Terro-Humans of 50,000 AE should have a lifespan halfway between 70 and 500 years. This would be about 285 years.

Isaac Asimov, however, didn’t take medical advances into account. The Foundation series apparently occurs about 60,000 years from now, but human lifespans of the time are the same as ours. For example, Hari Seldon lives to the age of 81; from Galactic Era 11,988 to 12,069. (Asimov, *Foundation*, p. 7) Furthermore, Isaac didn’t even consider the gravity angle. Seldon says that “My doctors tell me that I cannot live longer than a year or two.” (ibid., p. 36), but it is possible that he could have lived much longer, had he moved to a moon of Trantor (if it has one) or some other small body in the Trantorian system. Low gravity could have prolonged his life by many years.

Piper did take gravity into account, and very soon too. Only 800 years from now, he has General Foxx Travis retire to Luna, where the low gravity enables him to live to the very ripe age of 114. And Foxx isn’t dead yet, though he does seem to show a bit of decline between AE 894 and 896. (Piper, *Cosmic Computer*, pp. 20, 212)

342. I considered continuing the color-coded timeline in Figure 33, for these postulated, truly ‘Universal’ States, and their Interregna, during the Intergalactic Era. But the time spans are so long I would have to scale it way down for effective display; and this paper is already far longer than I intended.

For those who are interested, however, here are the numbers I got, using the 1.7 ratio.

Estimated timeline of Terro-Humanity beyond the Future History

AE 40,748	End of the Fifth Galactic Empire (after 11,292 years of existence)
AE 40,748 to 51,410	Sixth Interregnum (10,662 years)
AE 51,410 to 70,606	Sixth Galactic (or First Intergalactic) Empire (19,196 years)
AE 70,606 to 88,732	Seventh Interregnum (18,126 years)
AE 88,732 to 121,366	Second Intergalactic Empire (32,634 years)

AE 121,366 to 152,180	Eighth Interregnum (30,814 years)
AE 152,180 to 207,658	Third Intergalactic Empire (55,478 years)
AE 207,658 to 260,042	Ninth Interregnum (52,384 years)
AE 260,042 to 354,354	Fourth Intergalactic Empire (94,312 years)
AE 354,354 to 443,407	Tenth Interregnum (89,053 years)
AE 443,407 to 603,737	Fifth Intergalactic Empire (160,330 years)
AE 603,737 to 755,128	Eleventh Interregnum (151,391 years)
AE 755,128 to 1,027,689	Sixth Intergalactic (or First Universal) Empire (272,561 years)

The Fifth Galactic Empire is the first to encompass all the stars of the Milky Way, so the Fifth Intergalactic Empire could be the first to contain all the galaxies of the Universe. Assuming it is finite, that is. Another possibility is that the Sixth Intergalactic Empire unites the entire universe. Because it's span of existence contains the one million year mark in Beam's Future History. And this takes us back to Lucas Trask's prediction.

AE 1,027,689 is "a million or so years" from now, so it may be during the Sixth Intergalactic (or First Universal) Empire that *Homo sapiens terra* finishes evolving into *Hyper sapiens universalis*. Thereby fulfilling Prince Trask's ancient prediction (now undoubtedly long-forgotten) about human government being impossible until Terro-Humanity evolves into something different. But now, no longer a wild animal, and having explored and colonized the entire universe (or at least a very large part of it), Universal Man can now create an effective government which will last forever. This fulfills the seventh element of Wollheim's "Cosmogony of the Future", "the rise of a Permanent Galactic Civilization...Eventual rise of galactic harmony among intelligences. The exploration of other galaxies and of the entire universe." (Wollheim, *Universe Makers*, p. 441)

This puts us on the cusp of the eighth element of his cosmogony, "the Challenge to God"; or in Piper's agnostic case, Infinity/Eternity. "Galactic harmony and an undreamed-of high level of knowledge leads to experiments in creation, to harmony between galactic clusters, and possible exploration of other dimensions of existence. The effort to match Creation and to solve the last secrets of the universe." (ibid.) With his vast mental and technological powers, Beam's Universal Man could finally take on these challenges.

It is interesting that the Sixth Intergalactic (or First Universal) Empire may unite (or reunite) the entire cosmos, and begin the exploration of other dimensions of existence. Because this would parallel, on a much larger scale, the Sixth Galactic (or First Intergalactic) Empire, which reunited the Milky Way, and began the exploration of other galaxies. Which in turn paralleled, on a much larger scale, the initial unification of the Solar System and the beginning of interstellar exploration. Each one a turn of the cosmic clock, heralding a major advance.

Thus, for Universal Man, the cycle may be beginning once again.