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Yinrih Mathematics

Image

The yinrih use a dozenal numeral system. The highest place value is closest to the beginning of the line, which means the digits decrease in value going from right to left. The yinrih also use a set of symbols representing orders of magnitude similar to how we use K, M, G etc to represent thousands, millions etc. Instead of being based on powers of 1000 (or every third power of 10) they're based on powers of 1728, which is 1000 in base 12, or 1 great gross.

Not pictured is the negative sign, which is a small upper half circle placed before first digit on the midline. There is also a similar symbol to denote imaginary numbers (which the yinrih call perpendicular or orthogonal numbers) which is a small lower half circle. You can denote a negative imaginary number with a full circle.

Mind Candy

Humans use anesthetic to make the blindingly painful and mentally scarring experience of having your eyes sliced open, viscera exposed, or limbs hacked off more tolerable. This is accomplished by inducing unconsciousness in the patient.

Since yinrih can't lose consciousness, they've had to come up with other ways to not give patients PTSD. The most straightforward way is by making surgery less invasive. Micro Mechs have already been mentioned. The fixed external surgical robots that healers use to avoid the hygiene issues that accompany their four-legged body plan are also designed to be as minimally invasive as possible. Many surgical procedures thus be carried out with the application of a local analgesic. Additionally, some operations can be performed during the patient's torpor period when the nervous system is less responsive to external stimuli. But what if you're amputating a limb? There's no way to do that with anything approaching subtlety. The answer is simple: send the patient on a wild drug trip! Psychedelic drugs are the only way outside of suspension to prevent a patient from processing the intense pain signals generated by invasive surgery.

There's a thriving black market for this so-called *mind candy*, and addiction is prevalent among healers. The illicit use, possession, distribution, and manufacture of mind candy is subject to severe punishments in most jurisdictions. The Spacer Confederacy is perhaps the only exception, though individual colonies like Wayfarers' Haven may still penalize these actions.

Medi-mechs

Here's a possible resolution to two mutually exclusive taboos:

1. Males may not work in medicine.
2. Females may not be in the military.

So what answer is there for military medics?

The same answer I seem to have for pretty much everything: Mechs!

Medics on the front lines are actually mechs operated remotely by healers. That way, they're not *technically* in combat. Healers are already experts at piloting mechs remotely since they use micro mechs for non invasive internal surgery.

Another option is that battlefield medics are a regular position. The people who seek to become medics are all either males who want to learn medicine or females who want to see combat, but the taboos against male healers and female soldiers are so strong that the healers are reluctant to teach the males much medicine and the soldiers are reluctant to teach the females much about combat, so you have either a decent soldier whose bad at medicine, or an excellent doctor who isn't good in a fight.

Of the two possible solutions, I have to admit the second option opens up more worldbuilding opportunities, but I just can't say no to mechs.

Yeaning Sickness

Yeaning Sickness is the name given to the symptoms of withdrawal after being in suspension. It is characterized by temporary blindness and an inability to move. It can last from a few hours to about a week, depending on how long one is suspended, although one can power through the symptoms faster through sheer force of will. The crew of the Dewfall manage to bounce back in half an hour. Yeaning sickness is the principle reason why Suspension isn't used all the time to interface with computers or mechanical systems. This only applies to people who don't go insane due to the alteration of time perception or become addicted to the sensory input. The insanity is fairly self-explanatory, but addiction happens at the neurological level, meaning the person cannot leave suspension without causing brain death. At least some people, Firefly among them, do not respond to treatment and must remain in suspension indefinitely.

It remains to be seen if the three effects of suspension (halting metabolism, replacement of sensory input, and alteration of time perception) must occur together or can be induced selectively.

While not technically considered part of yeaning sickness, missionaries who come out of long-term suspension must deal with the neurogel that has permeated their lungs and digestive system over the centuries. A bit of a First Contact faux pas occurs when Iris vomits the remaining neurogel out of her stomach in front of the bewildered humans who witness the Dewfall's landing.

More on Ferries

Image

Here's a possible concept of what interplanetary ferries look like: a ring of engines surrounding a passenger cabin in the middle.

The engines consist of two main force projectors. One is active during the first half of the journey, accelerating the craft forward at a constant 1 g. Halfway through, it switches to the forward force projector, decelerating at a constant 1 g. There is a ring of smaller force projectors around the engine for lateral movement, and each engine has its own reactor to power the projector array.

Large force projectors like the ones used here cannot be used in atmosphere because reasons, but smaller force projectors like the ones used in paw gauntlets for powered armor are safe.

The bar to becoming a ferry pilot isn't quite as high as you might think. Tod compares himself to a trucker rather than a pilot when discussing his career with humans. Most tasks are automated, and the pilot is there to respond quickly to abnormal situations. Docking and undocking from space elevators may have to be done manually if the port in question doesn't have an auto docking system, and that's one of the few times the pilot directly controls the ship's movements.

Prospective pilots need only undergo a few days of simulator training followed by a longer period of on the job observation as a copilot.

Ferry pilots play a game called "spot the spacers" where you try to guess who among the passengers accustomed to microgravity and who isn't. Spacers can usually be heard complaining about having their paws on the ground even though they're not on a planet, while non spacers spend the brief window of weightlessness in the middle of the trip puking into barf bags.

Monkey Fox Linemen

Random factoid:

As you would expect from an arboreal species, monkey foxes make excellent linemen, well, linewomen. The lowly task of maintaining utility poles and transmission lines is usually the domain of acolytes and seminarians, but some ordained hearthkeepers make a point of continuing this work after attaining the clerical state in order to keep themselves humble.

Indeed, the theme of the simple laywoman who couldn't quite make it through the seminary, but who nevertheless keeps working on the lines in humble service to her community, shows up time and again in Claravian hagiographies.

In addition to the transmission lines, power poles also support inert paw cabling that runs above and/or below the live wires. Workers climb up to the paw cabling and brachiate along the line to wherever they need to go. Depending on the local gravity, they may even skip climbing the pole and jump up to grab the paw cabling directly.

Untrained laymen aren't supposed to, but especially on low gravity worlds, you'll see random people brachiating along this paw cabling just to get from A to B. This is very dangerous, since you're still in close proximity to high voltage transmission lines. Yinrih are lighter than humans, and even the high voltage lines are set up to support the weight of at least one worker just to be safe. As long as her body doesn't bridge the high voltage wiring with a lower voltage surface, she can traverse the transmission lines like a squirrel, but it's far to easy to slip up and connect the power line to ground with the body, which is why the paw cabling exists.

Tailslengths and Heartbeats

The standard unit of length at Focus is the *Tailslength* or just *tail* which, while long since redefined in terms of physical constants, is meant to approximate the length of an adult yinrih's tail.

The standard unit of time in scientific circles doesn't mesh neatly into the Yih calendar as the SI second does with hours and days. It's called the *heartbeat* or simply *beat* It approximates a yinrih's resting heart rate, though, as above, it has been redefined experimentally.

The heartbeat is used as the basis for the *Spacer Epoch*, which is an alternative way of reckoning time used by Spacers, not bound to planetary rotations or orbits. The Spacer Epoch is defined as the number of heartbeats since the founding of the first permanent orbital colony, which occurred in the Yih year 3461.

Fly Like A Brick

Womb ships don't do atmospheric re-entry the same way as human spacecraft. They fully engage their reverse force projector array to bleed off all their kinetic energy until their ground speed is zero, then they drop like a stone into the atmosphere over the intended landing spot, using a parachute to slow their vertical speed.

More Mech Musings

The more I think about it, the more the idea of knighthood being linked to mechs in the same way it's associated with horses in European culture makes sense.

I've also decided that mechs as a concept evolved out of powered armor, with armor getting bigger and bulkier slowly over time until it wasn't a person wearing a suit but a pilot driving a machine.

So I think I'll change the Commonthroat word for mech (currently translated as "limbed vehicle") and give it a single morpheme that encompasses anything from bulkier powered armor to big stompy walking war crimes. The word for a mech pilot would either be identical to, or related to, the word for knight.

I also think a sharp distinction will be made between remotely controlled mechs such as those used by healers and the internally piloted mechs used by soldiers. Remote mechs are safer and can get microscopically small, but you lose some situational awareness and there's input lag. No big deal in most situations, but on the battlefield a fraction of a second can make all the difference and you can't afford to that loss of awareness.

More on Mechs and the Knights of the Sun

The martial aspects of knighthood are largely downplayed outside of Hearthside, but some, such as Lodestar, undertake mech pilot training as a way to maintain tradition, and besides, who doesn't want to stomp around in a big metal robot?

The cockpit is located in the mech's torso, with a hatch on the belly granting access to the pilot. Movement and weapons systems are controlled by paw keyers and tail-actuated analog controls located at the base of the seat. Sensor feeds are presented to the pilot via a HUD visor. Typical weapons include a back-mounted artillery cannon and plasma claws located on the forepaws. The rear paws have sharp metal claws designed to dig into the ground, allowing the mech to rear up on its hind feet.

Large mechs represent the upper limit of practical force projector applications in atmosphere, and arrays of projector plates are located on the palms of mech's paws, allowing the mech to walk without damaging roads and other structures underfoot. As with smaller powered armor, the force projectors also allow mechs to climb smooth vertical surfaces.

Like their pilots, mechs also have tails, which serve as melee weapons as well as allowing the mech to balance on its hind feet. Other cynoidomorphic features are included mostly out of tradition, such as antenna arrays positioned on the snout like whiskers, and heatsinks shaped like a yinrih's upright ears.

One quirk of large yinrih machines that humans find disquieting is their sound, or rather, complete lack of sound. One expects a building-sized robot to make _some_ sort of noise while running, like the roar of an engine or the whine of servo motors, but the only audible part of a mech's operation is the dull thud of its tread across the ground. This absence of mechanical noise gives the impression that the mech is a living thing moving of its own accord.

Yinrih mech pilots often joke with their human friends that it's nice that humans have to look up at them for a change.

Powered Armor Helmet

Image

A helmet used with yinrih powered armor. A few things to note:

There are ear guards. While this sacrifices some of the ears' motility it keeps them from getting damaged. Note the colored chevrons on the back of the ear guards. These aren't present when concealment is necessary. They're reflective and fluorescent, and they help identify individuals when working in law enforcement or peacekeeping.

Speaking of identification, the helmet looks gray, but it's actually brightly colored in a hue below the human visible range. Again, it's there to increase visibility, like a safety vest.

There are air filter inlets along the muzzle. Air is actively filtered from the environment normally, but they can be closed and air can be supplied by reserve tanks. However, this robs the wearer of vital olfactory information.

On the inside of the mouthpiece there are tongue-actuated switches and a hydration line that uses a sipper valve. The hydration line can be fed by taking in ambient water vapor. Some of the water goes to the hydration line, some is used as coolant, and some is electrolytically separated, with the hydrogen used for fusion reactor fuel and the oxygen either exhausted into the air or used to fill the emergency tanks mentioned above.

At the nape of the neck there is an umbilical port that attaches the spine of the torso jacket, possibly via magnets. One of the criteria for the design of the armor is that it has to be able to be donned without assistance. The umbilical is attached by tossing the head back so the port makes contact with the terminating end of the cable bundle running along the spine. The bundle carries power, water, data, and emergency air.

The HUD visor displays relevant data in an unobtrusive manner. In particular, it can show a video feed from the two drone capsules stored on either side of the spine. When deployed, the drones hover near the operator. They can be used as gun turrets, allowing the wearer to run 'n gun despite the yinrih's lack of dedicated grasping appendages.

There are also sensors in the helmet that use patterns of eye blinks, complimenting the tongue actuated switches and allowing even more paws-free input.

Womb Ship Layout

Image

Here's a simple womb ship layout. There is extra storage in a basement that can be accessed through removable floor panels. Exposed flat surfaces are covered in paw loops that allow anchoring and movement. The interior is small enough that paw cabling isn't necessary.

The interior remains with breathable air throughout the duration of the journey, but the individual amnions are also pressure sealed and can withstand hard vacuum in the event of a hull breach exposing the interior to the outside.

The entrance hatch is locked with an ink pad. Each missionary has a unique pattern they can trace with their writing claw to allow access to the inside. The pad not only recognizes the pattern, but also the unique chemical makeup of an individual's ink, allowing for two-factor authentication in a single action.

More on Micro Mechs

Image

Here's a healer's micro mech.

The device above the mech is a biopsy capsule. They're stored on the mech's back in those pods, and expand outward into a ring. Starched over the ring is an elastic polymer that engulfs the mass or tumor or polyp or whatever the healer needs to extract, and can re-attach to the back once collected. The mech's muzzle has whiskers that translate tactile information to a helmet worn by the healer, and there are also olfactory relays on the tip of the mech's snout. Healer's micro mechs can range in size from smaller than a blood cell to the size of a small pill. Other features of healer's micro mechs include laser scalpels allowing for the excising of samples and force projectors allowing vertical and aerial mobility. Although originally invented for medical purposes, micro mechs quickly found use in espionage, as they allow the operator to be a fly on the wall, as it were.

Counter-intelligence strategies had to be developed to combat micro mech spies, how to detect, chase, and catch these Lilliputian saboteurs. These detection and catching methods developed into micro mech sports, where micro mech pilots compete to outrun an opponent on foot, while the unarmored yinrih attempts to neutralize his smaller quarry. A variant where the mech pilots try to touch the wet part of their opponent's nose is where **EXTREME** snoot booping comes from. While a popular spectator sport, it's not very thrilling when viewed from the on-foot participant's perspective, since it looks like someone chasing and squashing a troublesome insect. But when viewed from the mech pilot's perspective, it becomes a Dark-Souls-esque boss battle.

Micro mechs used in sports are much larger than the ones used by healers, being about the size of a thumb. Sport mechs are themselves repurposed by enterprising pickpockets. Healers can and do often operate on themselves using micro mechs. Although the olfactory relays make colonoscopies rather unpleasant.

Negative and Lateral Numbers

Here are the negative and lateral (imaginary) number signs. A negative sign is an upper half circle placed before the number. A lateral sign is a lower half circle placed before the number. A full circle indicates a negative lateral number.

Image

Another tidbit: Yinrih divide the natural numbers {0,1,2,3...} into two sets. One is called "natural" as before, and includes the number zero. They also have "tangible numbers" which are the set of all positive integers {1,2,3,4...}

I like math, but math doesn't like me.

Thoughts on Terraforming

I think, at least at first, the Bright Way might lose interest in the other planets of Focus after determining they're lifeless. This opens the door for Neoshamanists and other miscellaneous actors to swoop in and start getting the terraforming ball rolling.

So by the dawn of the space age, Claravian research monasteries have grown to become the vulpithecine equivalent to higher education, with young adult yinrih studying under the research monks, who by now have branched out beyond spaceflight and related disciplines to cover other hard sciences. Other groups like Neoshamanists found their own institutions of higher learning patterned after the model pioneered by the Claravian monks. Though as I wrote above, they view the endeavor of scientific research differently than the Bright Way. Wayfarers see the study of Creation as an act of worship of the Creator, expanding the Realm of the Known further into the Realm of the Knowable, getting closer and closer to the impassable boundary that separates the natural and supernatural. Neoshamanists believe that every idea already exists within the single universal noosphere, and that nobody truly invents new things, but rather comes upon that part of the noosphere where it had always existed Their own analogs to research monks map the noosphere.

One of these Neoshamanist institutions starts exploring the idea of terraforming Newhome. They engineer a kind of anaerobic microbe that very, very rapidly metabolizes several different compounds into oxygen, but because it's anaerobic, oxygen kills it, so it sets up a negative feedback loo[that ends up killing it off just as the atmosphere becomes breathable for higher lifeforms.

After the space age dawns, various political movements advocate the settling of Newhome, with Neoshamanists being at the forefront. The first colonists have to spend centuries stranded alone in an airless wasteland with little to do besides seeding the environment with these oxygenating microbes, so they start a machine-worshiping cult, as one does.

retribution field generator

Image

Bit of a lazy one today. This is the retribution field generator featured in one of my stories. When activated, the cube creates a force field that absorbs the kinetic energy of incoming projectiles. Then it unleashes that energy back at the attacker. Honestly it doesn't make a whole lot of sense. I was originally going to explain it as a cultural quirk stemming form the Bright Way's just war doctrines, a weirdly quantitatively literal interpretation of the Lex Talionis, where you could only apply *the exact same* force as was used against you. But for now it only exists due to the rule of cool.

The dials cut into the corners are for setting various parameters of the field like diameter and expected energy load. The gray surface is a biometric ink reader. The device is keyed to a specific user for safety. Not only does it require that person's ink, you need to trace the correct pattern in order to prime the device.

While they're usually pretty reliable, they do have a shelf life. The one used as in impromptu storm shelter didn't activate right away because it had been in storage for over 250 years.

It also makes a surprisingly satisfying fidget toy.

Paw Gauntlet

Image

This is a front paw gauntlet used in yinrih powered armor, with the palm facing up. The purple pads on the digits and palm are *force projectors* (Commonthroat name TBD). They use Science™ to exert force at a distance. They can also generate a negative force normal to the surface they're pressed against to allow the wearer to climb smooth walls and ceilings.

By thrusting the palm forward, a force extends outward, acting as a long-distance punch. It may be able to be used like the Mage Hand spell from D&D, allowing object manipulation over short distances.

One technique is to cup the two front paws together before thrusting the forelimbs forward. This overloads the two projectors, causing them to generate a large ball of concussive force that is launched forward at high velocity. This is frowned upon because it burns out the projectors very quickly. This little trick is inspired by the Kamehameha from DBZ, as in there are actual yinrih weeaboos who thought the move looked cool and wanted to see if they could pull it off with force projectors. Sometimes when in zero gravity they'll even use all four paws to do it. The other reason it's frowned upon is that it has some serious kickback. Since the person performing the move is reared up on their hind feet, it almost always results in them losing their balance or even flying across the room.

The flexible material that the gauntlet is made of is called *Pseudosinew* (Commonthroat name also TBD). It's a fine mesh of artificial musculature. It can enhance dexterity and strength passively to some degree. When powered it can do that even better, as well as block small non-relativistic projectiles by reflexively tensing up when struck, sort of like a "non Neutonian solid".

Amnions

Image
This is an *amnion*, or suspension capsule. This is how yinrih missionaries survive interstellar voyages going slower than light. Womb ships are only able to reach about 0.1c. Since Focus and Sol are about 25 light-years apart, it took the *Dewfall* about 250 years to get to Earth.

These amnions are why missionary vessels are called *womb ships*. The interior is lined with these suspension capsules, making it look like a yinrih womb-nest.

The amnion itself is just a gimbaled chaimber attached to the interior wall of the ship. The yellow fluid inside is where the magic happens. It's called *neurogel*. Neurogel does a few things: It holds dissolved oxygen better than just about anything, so it can be used as a ventilation medium. It provides a cushion against high G-forces, it serves as an interface between the brain and the ship's electronics without any invasive implants, and it halts metabolism while keeping the brain oxygenated. Yinrih are incapable of fully losing consciousness, so they can't sleep away the journey. Instead, the neurogel speeds up their time perception so things seem to happen quicker.

While in suspension, the brain is active but the hormones produced by the body are not present. The mind is effectively floating in cyberspace, a being of pure intellect unhindered by animal instinct or emotion. Amnions have few legitimate uses outside of interstellar travel. For some the temptation is strong to simply remain eternally suspended in this solipsistic bubble, and recreational suspension is both widespread and a serious social problem.

This one looks *way* to humanoid. I'm back to forgetting the other two limbs, and the ones I did draw are way to thick. I think the head looks pretty good, though. Don't expect a lot of artistic improvement, or even consistency. I can't perceive depth in real life, so I doubt I can recreate it on paper.

Mech

Image

Here's a typical mech used by the Knights of the Sun.

Another take on the amnion

> *HolyHandGrenade! wrote: 2024-12-07T02:15:57+00:00* What fun! Now it’s only a matter of time before you’re selling merch for us ~~terraboos~~ humans (jk of course, unless you really want to...).

I've said it before and I'll say it again. On the internet nobody knows you're a monkey fox.

Here's another take on the amnion. There's no invasive connection between the occupant and the machine, it's all mediated through the neurogel. They don't even have to shave their fur. There's no metabolism outside of the brain and nervous system, so there's no waste to dispose of, though the gel is circulated and filtered.

Given enough time, the lungs and alimentary canal fill completely with gel. This is a feature, not a bug. The gel acts as a liquid ventilation medium for when the occupant is going into and out of suspension, when the capsule is full of gel but their metabolism is still going. Since the womb ship is traveling at relativistic speed, the gel permiating their body cavities acts as a cushion against high acceleration.

Much like incubators, suspension capsules are overengineered for safety. They can function in hard vacuum in the event the womb ship's interior is depressurized, and can even survive underwater.

Image

I mentioned this on the Discord server, but the reason I only just now started putting conworlding stuff out on the internet even though I've been doing this since the 90s is because I read some amateur sci-fi stories from Reddit last year and it made me realize that fiction (or any art) doesn't have to be perfect to be unironically enjoyable. I think a decade or so of YouTube critics picking apart shows and movies for every possible flaw had me conditioned to think otherwise.

The fact that others have shown interest in my work has been tremendously encouraging. I never had the sort of hobbies that outsiders could enjoy. My siblings were into things like Irish dancing and marching band. I spent my free time reading books about dead languages and obsessively refreshing the Wikipedia page on Proto-Indo-European morphology to see if there was any new info. My parents would brag to their friends about said Irish dancing and marching band, but I didn't get much of a mention. While they weren't trying to belittle me, indeed they encouraged me insofar as they understood what I was doing, buying me books about Latin and such, but that's just it, it's hard to make someone who isn't into conlanging or conworlding understand what's involved, let alone interested.

Polymerite

Polymerite is a plastic that can be cured to give it the strength of steel. It can be formed using injection molding or additive manufacturing. After it is formed, it is cured by exposing it to gamma rays, either directly or by bombarding it with positrons to selectively stimulate matter-antimatter annihilation similar to a PET scan.

There are different grades of polymerite that can be used for different applications. The four most well-known are pink, orange, green, and blue. Polymerite is naturally fluorescent and translucent. It can be painted, but is often left bare to achieve a singular aesthetic.

Even after curing, polymerite is biodegradable, albeit under very specific conditions that do not occur naturally.

This is my interpretation of the *plasteel* found in other sci-fi. I first heard the term used in Dune, but I don't recall reading an explanation of how it's manufactured or what its benefits are.

Port Side View of a Womb Ship

Image

The hatch is at the forward end of the ship. The shroud protecting the pressure vessel has a sensor array that is fed into the simulacrum in realtime. Log summaries are sent in batches at regular intervals through the ansible back to mission control as well. The ship's leasemind will log what it thinks are technosignatures (usually non random radio emissions), but false positives are not uncommon and mission control must wait for a confirmation from one of the missionaries before reporting that life has been found.

The ring encircling the ship is the main force projector array. It's used at the beginning of the journey to accelerate the ship to relativistic speed. It slows the ship down when entering a solar system. Landing is accomplished by projecting a force opposing the ship's velocity vector until the ship achieves zero ground speed, whereupon the force projector array is jettisoned and the ship plummets to the ground, deploying a parachute once the air gets thick enough and landing skids just before touchdown.

Reentry is rough, and since the healer has to be yeaned first in order to oversee the safe yeaning of the rest of the crew, she's usually coming out of suspension while the ship is landing.

The Dewfall in 3D

Image

Here's a 3D "render" of the *Dewfall* (really it's a screenshot of the Plasticity viewport because I'm too lazy to export it to Blender for actual rendering).

While the colors are mostly there to differentiate the different parts, the forward impact shield is made of high-grade polymerite and is thus really that neon blue translucent color.

As mentioned in the other post, the force projectors are jettisoned before landing, along with the ring and supporting structures.

I changed the design so the hatch is now at the back. That makes way more sense. Womb ships travel at relativistic speed, meaning anything hitting the ship is traveling at relativistic speed. The hatch is the weakest part of the hull, so it should go in the back where it's much less likely to be hit.

The craft is somewhere between a camper van and a shipping container in size.

The Dewfall in Landing Mode

Image

This is more or less what a womb ship looks like after it has landed. The force projectors (the green structures on the earlier image) and the impact shield (the blue outer shell) are jettisoned before the ship de-orbits.

There are now "pawdles" (handle bars) along the outside of the ship to aid in traversal during EVAs.

Before being jettisoned, the force projectors bleed off the ship's remaining kinetic energy until its ground speed is zero. The (as-yet-unrendered) supporting pylons connecting the impact shield to the pressure vessel are explosively decoupled, disconnecting the engine assembly from the pressure vessel. Once the two parts of the ship are a safe distance apart, the force projectors themselves explode, shattering the impact shield and other parts into smaller shrapnel that disintegrate on reentry.

This is done primarily for ritual purposes. Along with the ceremonial shattering of the main reactor chamber during the rite of alightment, the missionaries want to make it *very* clear that they bear no hostile intent by cutting off their only means of escape, and are putting themselves at the mercy of these alien sophonts. This attitude also informs the strict taboo against bringing weapons or money. The former is broken by Tod by bringing his power armor and the retribution field generator, and the latter is broken accidentally by all of them because there's loose 'pocket' change hiding in nooks and crannies of their impedimenta.

The Dewfall in Flight

Image

Here's the *Dewfall* textured in Blender.

Myosteol

Myosteol is the human name for a chemical added to the potable water of orbital colonies that negates the bone and muscle atrophy that spacers would otherwise experience. It's toxic to humans. Humans can add tablets to drinking water to neutralize it. Human-friendly colonies like Wayfarers' Haven also make human-potable water available.

Force Projector Brainstorming

Force projectors ground Newton's third law to its room without supper. They consist in a molecule-thin sheet of crystalline material that experiences a reactionless force normal to its surface when a voltage is applied across it. The higher the voltage, the stronger the force.

Force projectors convert surrounding oxygen to ozone when running, which is why very large projectors that run continuously like you see in spacecraft cannot be used in atmosphere. The projector plates on the paws of large mechs are the largest practical terrestrial application for them.

From a Doylist perspective, I can remember vehemently not wanting force projectors to be used for aircraft or to allow things to hover in midair, while still using them for powered armor and spacecraft, but I honestly can't remember why. I think it had to do with the absence of artificial gravity in this universe, but if anyone has any suggestions I'd love to hear them. I also don't want them to be what keeps Welkinstead's floating cities aloft.

Liquid Breathing

I've already established that neurogel acts as a ventilation medium, and the widespread use of recreational suspension implies that the general public is comfortable with the concept of liquid breathing.

So instead of scuba gear, yinrih divers fill their lungs with a fluid similar to but distinct from neurogel, which allows them to dive extremely deep and ascend back up without worrying about decompression sickness.

Some possible follow-ups are that they have to have a CO2 scrubber attached to a major artery like a dialysis shunt, that they have to be intubated with a similar device that absorbs CO2 directly from the lungs, or that the liquid causes respiratory issues if one is exposed to it over a long period of time like asbestos. Whatever it is, the surface dwellers of Sweetwater will be immediately recognizable for possessing this feature (a scar from where the CO2 scrubber was implanted, or a chronic cough from exposure).

Immortal

> *HolyHandGrenade! wrote: 2025-04-19T14:38:11+00:00* And now I'm 4th [:P]

I reran the stats just for you [:)]

Topic: The Lonely Galaxy Megathread (comments encouraged)
By: lurker
Stats generated on: Saturday April 19 2025 15:04

Time Stats (UTC)
Topic Started: Wednesday November 08 2023 12:11
Last Post: Saturday April 19 2025 14:04
Topic Lifespan: 528 days, 1:48:36
Longest Time Between Posts: 8 days, 12:59:31
Topic has been dormant for: 0:27:53.642554

Post Stats
Total Posts: 744
Contributing Users: 16

Posts by User
lurker: 501
Visions1: 95
Khemehekis: 29
HolyHandGrenade!: 21
WeepingElf: 20
foxcatdogwolf: 17
Arayaz: 17
Glenn: 16
TBPO: 16
eldin raigmore: 3
YoungConlanger: 3
conlang-creature: 2
Keenir: 1
Creyeditor: 1
Egerius: 1
Man in Space: 1

Here's your prize, a drawing of a Partisan Immortal mini mech I did on my iPad last night. This is the version seen in RTFM. This drawing is way more simplistic than I imagine them being, but the general body shape is there. I imagine them as gorilla-like, with longer forelimbs, a visor facing

down and forward, and a knuckle-walking gait. The visor is there for rule of cool. Since the pilot is in suspension he doesn't need nor can he use a direct view of the outside. He's getting a sensor feed pumped directly into his central nervous system by the neurogel he's pickled in. The best excuse I can give for why the visor is there is for shock value. To see what is essentially a corpse piloting a hulking war machine has to do something to the psyche.

Image

Ring Bounce and Other Radio Stuff

If it exists, a ham will either try to bounce radio waves off it or use it as an antenna. While Yih has an ionosphere that can be exploited for radio propagation at frequencies between 3 and 30 MHz, it also has a ring, which can reflect signals in the VHF and UHF ranges. As a much larger, closer, and most importantly, stationary object, Yih's ring is a much better reflector than Earth's moon, meaning ring bounce is a practical propagation mode, not just a "because we can" mode like Terran earth-moon-earth. It has some drawbacks, like only being viable at mid-latitudes.

Focus has a multi-year solar cycle much like Sol. The Farspeakers have a feast that marks the beginning of a new cycle.

Minnows

Minnows* are a class of mass-produced submarine used on Sweetwater. They're more of a sub "chassis" or rather outer and inner hull design with a small set of standardized components with an interior that can be customized by downstream manufacturers. Discarded minnows are a frequent site floating above the larger benthic cities. Some of the more plutocratic cities are so scandalously prodigal that they'll think nothing of abandoning them to the surface at the slightest inconvenience. The subs are infamous system-wide in their use as technicals repurposed by pirates and anti-AW insurgents.

*An English approximation referring to various taxa of small fishes often used as bait or eaten directly.

Novel power delivery method

idea: rather than using electric current to transport power, the Bright Way uses thick optical fibers and lasers. Imagine shining an extremely high-powered laser down a fiberoptic cable and having a really efficient solar cell on the other side to collect the energy. Using light like this would be very on-brand for the Bright Way.

In fact, the light may come directly from the star hearth.

Retribution field

Image

What it looks like when a projectile strikes an active retribution field as seen from the inside. Also an accurate representation of what retinal traction looks like.

Worldbuilding born of rage and frustration

The primary means of asynchronous long-form text communication (think email) and real-time voice and video communication (think phone calls) both categorize messages into solicited vs unsolicited.

In order for a message to be considered solicited, both the sender and receiver must be registered in the other party's contact list. Registering mutual contact info involves a handshake protocol to ensure that the parties themselves are exchanging this info directly and not, say, a data broker receiving contact info from a 3rd party. Solicited messages are treated with higher priority, have a separate inbox, may trigger audible alerts when received, etc. Besides the obvious case of individual people sharing contact info, one may exchange info when registering with a doctor's office, school, or workplace so that important info can be disseminated. Government entities may offer similar services, and some governments require all accounts set up by their citizens to recognize government messages (disaster alerts and so on) as automatically solicited.

All other messages are considered unsolicited. Either party can at a later time categorize messages from a particular contact as unsolicited, and a sender may flag a message as unsolicited even if they have an established relationship with the receiver.

Sketch of a knight in his mech

Will post improvements if I feel like it.

Image

Here's a knight (Lodestar specifically) in the cockpit of his mech. Note the preference for a HUD visor rather than output displays

---

Image

Spoopy speculation

In honor of spoopy season, here's a shower thought I had regarding Firefly's current situation. I've established that neurogel acts as a bridge between a brain and a computer system. So far I've only explored how that looks from the suspended person's perspective, basically the Matrix. But if you recall the original draft of the Matrix explained the reason why the humans were in there was so their brains could serve as natural neural networks for the machines, not the stated purpose in the film that humans were a power source. I've also stated that AGI is impossible in the Lonely Galaxy. But thanks to neurogel we can take the A out of AGI and just have GI. What if, by accident or design, either Firefly's or the Partisan government's, Firefly's brain ends up integrated so tightly into the Capital Complex's network that he becomes a non-artificial general intelligence.

Further, what if, after discovering this, the Partisan government, instead of using oubliettes as a simulated Hell, uses them to subject prisoners to the same fate? To reiterate, suspension is *not* brain uploading. A person's mind/soul/consciousness is very much still bound to their body. All suspension does is provide alternative input/output.

More thoughts on Terraforming

Before i forget, terraforming may involve building artificial rings to moderate insolation on inner planets or even provide artificial light on far out dwarf lanets. These rings would also serve as spaceports and may be connected to the surface by a space elevator.

More on Terraforming

The processes used in terraforming lifeless planets were pioneered not by the Bright Way, but by the Lifebringers, a sect of Neoshamanists. Whereas the Bright Way sought sapient life dwelling among the stars, the Lifebringers attempted to recreate sapient life anew through artificial selection. They never achieved their goal, but did contribute tremendously to the fields of biology, ecology, medicine, and planetology along the way.

Once the other rocky planets of Focus were found to be devoid of life, the Bright Way lost interest in them, leaving the Lifebringers to go to work.

The foundation of the terraforming process is a complex microbiome selectively bred from existing species of extremophiles and chemotrophs on Yih. These come packaged together in something known as “rock eater”.

Different strains of microbe have different metabolic processes that contribute ultimately to oxygen formation and (perhaps not yet cannon) soil and water formation. In the early stages, a positive feedback loop is initiated whereby the more oxygen is produced the more certain species within the microbiome flourish, creating even more oxygen, however, other species that the oxygen producers depend on are anaerobic, and die after the partial pressure of O2 reaches breathable levels. This causes the oxygen producers to die in turn, and most of the rest of the microbiome collapses, leaving only the foundation on which natural life can subsist, completing the terraforming process.

How livable conditions are maintained afterward depends on the size of the body and its distance from Focus. Larger bodies can maintain the atmosphere through their own gravity assuming a self-generated magnetosphere is either already present or able to be kickstarted by Science™ (see the movie The Core for what I’m thinking here).

Smaller bodies require active intervention to maintain these conditions. The Science™ in this case is generated by orbital infrastructure which requires upkeep. The upside to this is that planet-wide climate control is possible, and the local weather service doesn’t predict the weather, they cause it. Moons and dwarf planets in the Outer Belt are nominally able to maintain an ambient temperature that humans would probably find “brisk” or “nippy”. (Also tentatively cannon, the populations of these planets have developed thicker fur to compensate, creating a distinct floofy Outlander phenotype.) Penny-pinching politicians sometimes decree that the global thermostat be turned down to “bone-chilling” to save money.

Bodies outside the orbit of Moonlitter are too far away for Focus to provide meaningful illumination, so more orbital infrastructure provides this light along with surface lighting.

Larger bodies can’t be actively climate controlled, and have their own more or less naturally evolving atmospheric processes as seen on Earth and Yih. Hearthside has artificial aerosols in its atmosphere that reduce surface insolation to livable levels. (Definitely already cannon is that

Hearthsiders have evolved larger ears to dissipate heat.)

Mitigating solar wind

Image

I read an article that proposes deploying a really, really strong magnet at the first Lagrange point, between a planet and its star, in order to shield the planet from solar wind. It occurred to me that you could create a mini sun with a magnetic field and provide naturalistic daylight as well as protection from solar wind.

Of course, the further away the mini sun is, the more powerful it would have to be to approximate daylight on an inner planet. Even in low orbit (about 500 miles up on Earth) it would have to be in the petawatt range. But I'm sure the hearthkeepers are up to the task. This would be part of the infrastructure owned by the Bright Way during the Age of Decadence. Since this sort of stuff would be extra necessary for Moonlitter's moons and dwarf planets in the Outer Belt, I can see the mismanagement or abuse of this infrastructure by the Bright Way as a major contributor to the unrest that leads to the war.

Leaseminds and Fabricators

Fabricators are what you get when you take a really fancy 3D printer and stick an AI art program inside.

Yinrih have a form of machine learning algorithm known in Commonthroat as <sfBqbcg> [yip, early falling weakening whine, huff short low strengthening whine, short low weak growl], or "leasemind". ("lease" is used here in the archaic sense of "false"). While it's probably used elsewhere, the most frequent use for leaseminds is in fabricators.

You can give a fabricator general commands and it will try and build what you ask for. However, fabricators usually have preloaded schematics with exact instructions on how to build something, and the leasemind is just there to troubleshoot small problems that arise during the building process.

The Dewfall is equipped with a fabricator, and its leasemind is used more extensively than usual. The missionaries try to adapt their technology to human ergonomics by feeding the leasemind data on humans and asking it to make normal yinrih tools adapted for human use. Just like real AI art programs, it often messes up. This usually takes the form of assuming humans have various yinrih features, like a muzzle, whiskers, a tail, extra thumbs, or prehensile feet.

The fabricator can't just replicate matter, you have to keep it topped up with raw materials (think metal powders that are melted and molded, silicon ingots cut into wafers, petroleum for making plastic, and so on.)

Edit: A hasty edit to address some pretty glaring economic implications: general purpose fabricators like you see on the Dewfall, for the most part, can only make commodities. More specialized products require more specialized fabricators. I'd be happy for anyone to poke more holes in the idea, or perhaps suggest ways this would effect how the economy works.

Let's assume a fabricator can produce a keyer and HUD specs, which are a pretty ubiquitous form of portable computer. This would imply that, when you needed a keyer and HUD specs, you wouldn't go out and buy them directly. You'd instead buy the raw materials needed to make them. If you wanted a new *model* of keyer and HUD specs, you'd purchase a schematic license like you purchase a software license in addition to the raw materials.

hmmm... Writing this down has forced me to consider the ramifications of such a device. At the end of the day what I need from an external perspective is a way for the missionaries on Earth to be able to produce a mass router without needing to know exactly how a mass router works. The missionaries aren't geniuses. This is probably Stormlight's wheelhouse, but he's not going to know how to turn raw aluminum and silicon into a mass router, although he's skilled enough to understand the principles of operation once they're explained to him and could operate one with some coaching.

Amnion Rendered in Lego Bricks

Image

So apparently there are CAD programs for building in Lego bricks. Since my drawing skills will inevitably be capped by my blindness, I figured I'd try a different medium. Here's another take on the amnion. It's pretty simple. There's a glass dome where the traveler is harnessed in, and a reservoir in the back that holds a supply of neurogel. The gel is constantly circulated and filtered to keep it clean. Since metabolism is halted while in suspension, there's no waste to get rid of per se, but I imagine a living body will have some stuff like dead fur that needs to be filtered out.

Image
Here's another whack at it. The monkey minifig looks pretty spot on as a yinrih except for the head and neck. Unfortunately you can't put anything in the tail. This program can import custom models, so I might try and take a wolf head and stick it on the monkey body using Blender or something.

Image
Here's another angle. I could get the wrench in the tail by disabling collision. I really need to see if I can tweak the model to make it look like an actual yinrih rather than a monkey. The paws should be grayish black instead of yellow and the head needs to be canine, and the tail should be longer and more muscular.

More Lego: Retribution Field Generator

Image

Here's another take on the retribution field generator. Did I mention I love neon translucent plastic?

The Star Hearth in Lego

Image

This one's unlit. Still working on making my builds more interesting. I'm learning the names of different types of pieces and their standard dimensions. Plates are 1/3 the height of a brick, and measurements are given in studs (the little pegs on the tops of the bricks). I'm glad I can render things in this CAD program rather than having to buy the physical bricks. Sure the physicality of building in real life would be more satisfying, but the stress of having to find a particular piece in a particular color would make it less fun.

Star Lanterns

Image
Star lanterns are like miniature star hearths. As such, they're also micro fusion reactors. they obtain hydrogen to fuse by taking in ambient water vapor and electrolytically separating the hydrogen and oxygen. They're small enough to fit in the hand, but output enough energy to power an average human household.

Missionaries bring star lanterns as gifts to newly discovered sapients.

I fixed the glass issue, a little bit. It still looks a little weird. It takes 3+ minutes for this to render, so making adjustments is time-consuming.

Raw Tailstone Crystals

Image
Here are some raw tailstone monocrystals. I haven't decided if tailstone can only be found naturally or if it can be synthesized. In either case, the best way to get tailstone currently involves going through the Partisans, since the Outer Belt has the highest concentration of tailstone (or tailstone components) in the system.

Maybe Earth, the moon, or other bodies at Sol are full to bursting with tailstone, which would have drastic implications for monkey fox geopolitics going forward, as the only reason the Partisans aren't a pariah state is they're a cheap source of tailstone, and a lot more besides, but tailstone is probably the yinrih's version of oil.

One detail I didn't work into the story above is that the giant monocrystals like you see in the image are fairly rare. Tailstone monocrystals are manufactured like silicon, where you have a small seed crystal that you get naturally that is grown in a bath to a single monocrystal. At some point in the formation process, the crystal structure "locks" and any wafers obtained from that crystal, or any smaller crystals broken from it, are interlinked via the underlay in the fashion mentioned in the story.

There are some big cybersecurity implications to this system. Say you ordered a batch of tailstone monocrystals from a supplier in Partisan terratory. The Partisan government could demand that the supplier grow larger monocrystals, and split them into several normal sized ones, offering half to the buyer and giving half to the Partisan government. Any communications made via underlay tunnels made with the half given to the buyer could be eavesdropped on by the Partisan government. There would be no way for the buyer to know the crystals were fractured before delivery, and as long as the Partisans don't send anything via their half, there's no way to know someone's listening.

There's also no way, physically, to verify the source of a message. All you know is the sender must have access to a wafer shaved from the same monocrystal you have, but there are ways of insuring nonrepudiation and message authentication that work as well for ansibles as they do on Earth. So yeah, lots of fun hacker shenanigans all around, especially when you put mass routers into the mix. You could poison the routing table and cause a whole freaking person to just show up somewhere they didn't want to go.

This concept probably won't be canon, but one idea I had was for "one way mass routers" that are used as oubliettes, just shunting people into the underlay with no way out.

Time will tell how long my ADHD brain will be interested in using Blender, but I'm already happier with these 3D models than I was with the 2D drawings. They're pretty simplistic, but it makes me nostalgic for the times when stuff with this little detail was considered top of the line graphics. Anyone remember the show Reboot? Loved that cartoon.

Underlay tunnel interface card

Image

Here's a sketch of the underlay tunnel interface card: because networking infrastructure is what I think of when I think sci-fi worldbuilding.

Now that I'm looking at it, it should have a face plate on the side opposite the pins. I did figure out how to do a bump map for the traces leading from the tailstone wafer to the pins, and the pins themselves are a texture mask mixing two shaders. I also had to UV unwrap the plane used as the PCB. While the piece itself isn't super well done, I'm happy I'm learning more about Blender.

Powered Armor Torso Jacket

Image

Here's a dorsal view of yinrih powered armor. The torso jacket is made of the same pseudosinew as the paw gauntlets. The helmet snaps magnetically onto the umbilical cable running along the spine. On either side of the spine near the shoulders are two drone capsules. The capsules act like the powerups from arcade scrolling shooters (I'm specifically thinking the force pod from R-Type), hovering near the operator and firing on command. They can also generate a retribution field around the wearer and any nearby friendlies.

Closer to the back legs are a micro fusion reactor, essentially a functional star lantern, as well as reserve tanks for water and O2.

The tail is covered in even more pseudosinew. It's used in close quarters combat along with retractable monomolecular claw blades built into the rear paw gauntlets. The most basic unarmed fighting style, used even by the tree-dwellers, is to rear up on the hind legs and attack with the front claws, which leaves the belly exposed. Powered armor addresses this strategy by allowing the wearer to shift his weight to the tail and thrust the rear feet forward with the claw blades extended to disembowel the attacker like a kangaroo kick.

And yes, Tod has a suit of powered armor, and yes, he brought it with him. Iris nearly tears him a new cloaca when she finds out, as it's considered sacrilege to bring weapons on a missionary journey. Tod points out (rather sensibly) that even assuming the local sophonts are friendly, there's no guarantee the wildlife is.

Why does a *peacekeeper* need this kind of powered armor? I don't know, military industrial complex I guess.

Why do I keep accidentally posting these as separate threads lol

Interplanetary Ferries

The interplanetary ferry system is how yinrih got around Focus before the invention of the mass router, and it's still how bulk cargo is transported afterward.

It was formerly run by the Bright Way before the War of dissolution, but now operates as a series of independent but interconnected spaceports and spacelines similar to how the aviation industry works on Earth.

Ferries are strictly spacefaring craft, unable to land on a planet's surface. Spaceports exist atop space elevators, or in the case of Yih, an array of freely orbiting structures that are accessed by smaller shuttle craft.

Spacers like to joke that ferries have "accidental gravity" because ferries have a constant acceleration of around 0.88 g (or the same gravity as Yih). This allows them to get from one point on the outer belt to the opposite side of the system in about 84 Earth days. They can accelerate faster, and some spacelines offer routes that use an acceleration of 1 g, which cuts off a lot of travel time at the cost of a higher gravity.

They operate by accelerating for half the trip, and decelerating for the second half.

They're set up like Victorian era / pre WW I steam ships, with cabins of various levels of opulence as well as common areas and food service.

Passenger ferries persist for a time after the mass router is invented, but eventually they're used for just cargo and the occasional pleasure cruise.

Micro Mechs

Micro mechs are remotely operated robots used in medical procedures. They range in size from smaller than a blood cell to the size of a grain of rice or a small pill. They're designed to enter the patient's body and aid in surgeries that would otherwise require invasive incisions. They're most widely used for endoscopy and removal of small tumors, calculi, and foreign bodies.

The healer operates the micro mech remotely while perching. Movement and manipulation is controlled by paw gauntlets and a tail sheath. Video, audio, olfactory, and tactile output (via the whiskers) are relayed from the mech to a helmet that covers the healer's head.

Micro mechs also make great spying tools, since they allow the operator to be a literal fly on the wall.

YAP and YIP

The Yinrih Ansible Protocol (YAP) is the human designation for the link layer protocol used to send information from one ansible to another. Ansibles sharing tailstone wafers from a single monocrystal are assigned unique ansible numbers at the manufacturer. When an ansible goes online, it sends a neighbor solicitation request to any other ansibles on the link. The neighbors respond with neighbor response packets containing their own ansible numbers. Once every ansible on the link is aware of every other ansible, they take turns in a time-division multiple access (TDMA) fashion, with each ansible having a designated time slot to send packets. When it's not sending packets, it passively listens for packets addressed to it (with its ansible number in the receive address portion of the packet.) The packet format is very spartan: a preamble, a receiver address, a sender address, a payload, and a checksum. The lengths of each field are TBD. The length of the address field creates a hard limit on the number of ansibles that can share a link. a six bit address field, for example, allows 64 ansibles (assuming an all zero address is viable, which it likely isn't.)

YAP is a best effort protocol, meaning message delivery is not guaranteed. If you want reliable message delivery you have to look to a higher layer protocol like YIP.

YIP (Yinrih internetworking protocol, also a human term) is the network layer protocol used when sending messages between ansible links, or between nodes on a more "conventional" non FTL network. YIP can operate in either a reliable (message delivery is guaranteed) or best effort (message delivery is not guaranteed) mode. YIP addresses are SUPPOSED to be globally unique, but the proliferation of network nodes eventually exhausted the smaller address space of the original YIP specification, and a new, non backwards compatible version had to be developed. Adoption was positively glacial, and there are STILL single stack networks using the older version of YIP by the time of First Contact, millennia after the publication of the new version of the protocol.

After First Contact, network bridges are developed to translate between human TCP/IP networks and cynoid YIP networks, making the Internet an interstellar, bi-species endeavor.

Sending YIP packets over YAP is known as YoY (YIP over YAP) and sending IP packets over YAP is called IoY (IP over YAP).

Some humans are disappointed (and others overjoyed) to find that the monkey fox version of the internet is almost exclusively a text-based affair thanks to the very low bandwidth achievable by ansibles. Multimedia content does exist, but isolated to non FTL planetwide networks. If you want to reach an interplanetary audience, you're stuck with what amounts to bulletin board systems or GOPHER.

There is also an application layer protocol used to coordinate flows among mass routers called MRP (mass routing protocol). It's a very common misconception that the matter transported over the Underlay is somehow digitized at ingress and rematerialized at egress. This confusion is compounded by the fact that mass flows are segmented and encapsulated in a manner analogous

to data while in the Underlay, but it's all still matter, just wrapped in sheaths of realspace. MRP is there to synchronize impulse buffers and route mass flows.

Edit: YAP should have an upper-layer protocol tag between the source address and the payload. That essentially mirrors the Ethernet frame format, and I wanted YAP to be a little unique in some way. I should see how TDMA works. Perhaps a sender address isn't necessary if everyone knows who's sending based on the time slot. Ethernet and wi-fi use CSMA instead. Ansibles sharing tailstone crystals also share a broadcast/collision domain similar to Wi-fi, or old Ethernet before switches. I have much to think about.