

God's Dice

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[Note on this draft]

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This document is still a working draft. Some sections are more polished than others. Some sections are mere talking points or conversations on the development of God's Dice. My thanks to the many people who have taken an interest in this world and have been willing to contribute to its development.

Anyone interested in contributing to discussions of the world of God's Dice should visit the Bulldrek gaming discussion forums at <http://www.bulldrek.com/viewforum.php?f=4>

[What is God's Dice]

God's dice is a future world designed for use as a role playing game setting. Currently, God's Dice is only a setting and does not have its own rules set. For rules, we will be using Fate, which is distributed for free at <http://www.evilhat.com/projects/fudge/fate/> and is based on Fudge (<http://www.fudgerpg.com/>)

Later, rules specifically for God's Dice will be developed or simply customized from the Fate rules, but for now, Fate as written is more than enough.

[The Vision]

The year is 2921, and Sol System is a bustling, thriving, humming society. Faster-Than-Light travel (FTL) continues to elude humanity, so even while there has been very little exploration of things outside Sol's immediately neighborhood, within the range of conventional propulsion systems, mankind and its offshoots have colonized and filled up every niche they could find or create. Minor sections of the earth have been regreened and preserved, but the majority of earth's 28 billion people live and survive in monolithic tower cities rising sometimes rising thousands of meters above the ground, as well as burrowing deep into the earth below.

Earth's massive space industry is located—not surprisingly—in space. Literally millions of satellites swarm about the earth providing communication, energy and a host of other services. Thousands of inhabited vessels occupy this same space as well. All this complex traffic is controlled in its intricate dance by the Terran Co-op Traffic Network, with most of the permanent bodies being concentrated in the equatorial plane, forming the glittering “Rings of Earth” visible both from ground and space.

Luna is fully colonized. It's interior is burrowed through with innumerable catacombs, blistering into sealed domes and towers on the surface. All of these pieces are linked together with a single sealed atmosphere, forming an ecosphere that falls just a few steps short of being self-sustaining.

Mars has been terraformed and is finally green (although technically, it's more of a muddy yellowish when viewed from space). Lakes and rivers and even small seas have been reborn on Mars, and an entirely engineered ecology populates the planet—including the Martians themselves. Deimos and Phobos and all of the thousands of satellites in Martian orbit

Despite centuries of exploration, exploitation, and development, the Asteroid Belt is still seen mostly a lawless frontier. Everything within the Belt is governed by the Belt Authority—a coalition of business and governmental entities who have agreed to help enforce and protect the laws and rights of all member entities. But the Belt is a big space, and generally Belters are of the opinion that minding

your own business is the best way to ensure that you are the only one minding your business.

As the viability of habitats has grown, Sol System has seen more and more people who no longer feel they need to be tied to a planetary mass. Throughout the system, but especially concentrated between Venus and Mars, hundreds of thousands of ships and habitats circle Sol. Some of these may be little more than personal yachts or family sized units on a three year cruise around the sun, but others range in size up to massive spinning cities and agri-stations miles long and housing a million people or more.

Beyond the Belt, the Jovian Alliance is the newest growing power among the Solar governances. They have stations on all of Jupiter's large moons as well as orbiting habitats and other satellites. Jupiter is rich in resources, and its inhabitants formed the Jovian Alliance to protect their economic interests. There are mining operations among Jupiter's moons and rings. Hydrogen skimmers mine the Jovian upper atmosphere. The Jovians even charge tolls for ships that bleed off Jupiter's angular momentum, using the gas giant as a slingshot for greater speed.

Beyond Jupiter is the true Fringe. There are legitimate science stations and other operations around Saturn and even the further planets. At least fifty permanent stations are known to exist in the Oort cloud beyond Pluto. But the Fringe is also the home to outsiders. Those wishing privacy, or looking to pursue a unique and different lifestyle often find that opportunity in the Fringe. The Fringe is not limited to simply the outer reaches of Sol System though. There are Fringe and Fringe-like elements among the independent-minded Belters or even in Solar orbits tilted far from the plane of the elliptic—comet-like habitats that only pass through the inhabited parts of the system once every dozen or more years. There are Fringers in the quixotic realm of the far inner system—near Mercury's orbit, or even closer. Anywhere that the order of Sol breaks down—there you will find the Fringe.

[The People of God's Dice]

[Shades of Humanity: a brief history of sentient species]

Note on genetic mods and species: The term race is commonly used to describe any variant or offshoot of humanity. More correctly though, race only truly applies to the minor variances found in original human stock—Negro, caucasian, Australian aborigine, etc. To correctly refer to the modified and created sentient beings of the last seven centuries, one truly needs to speak of species and sub-species, mods and breeds. In the Sol System of the 30th century, species are specifically defined by their capacity to interbreed with others of their own species. Geneticists have found that the human genome is remarkably flexible. The human species has already accepted numerous extensive modifications for individuals of all stripes, and have found that surprisingly many of them can still procreate normally and in many cases, still pass along their designer genes into future generations. Others have modded themselves beyond the range of traditional genetic intercompatibility or even beyond the ability to even try. For such as these, offspring, if desired, are typically engineered—sometimes from the individual's own genetic material (or mixed with one or more partners) and sometimes built from scratch, as it were. Within *homo sapiens* are numerous races, breeds, and sub-species which are all intercompatible and yet markedly distinct.

Races, as mentioned, are those naturally occurring variations in humanity that existed prior to the age of genetic modification. Breeds and sub-species are lines of individuals with engineered traits that are distinctive and inheritable, yet still compatible with *homo sapiens*. The distinction is subtle, but generally a breed is still decisively human in appearance and function, while a sub-species is one that is not immediately recognizable as compatible with other humans.

Ever since the creation of the Martian species, there has been an interest by all sorts of groups in creating new species. These are engineered individuals who are reproductively compatible with others of their type. In creating a new species, a conscious decision is made to engineer a set of traits that will then be passed along to future generations in perpetuity. This

can be done for philosophical reasons—as with Martians and the Nosaji, or for business reasons such as Spacers and Dogs, or—if you believe the Huong—sometimes out of necessity.

The genetic manipulation of humans which began in the twenty-first century to combat a variety of inherited defects, expanded in the following decades to include elective modifications for cosmetic, recreational and occupational reasons. In the 23rd century, the Martians took it to the next level—they recreated themselves as a new race of man.

The Martians were a practical people. They had already terraformed Mars and populated it with a completely engineered and uniquely Martian ecology. To transform themselves to better suit their planet seemed completely natural.

With the success of the Martians, the People Maker division of the interplanetary Chimera Corporation applied the best of their Zero-G environment modifications to create a new species wholly suited to life in space. The result was the uncreatively named Spacers.

By this time, other corporations had already caught onto the possibilities of engineering common animals with slightly increased intelligence to be used as novel pets, guard animals, or cheap labor—especially out in space where inspectors were generally few and far between. Thus were born the Dogs.

Dogs were obviously not equal to humans in intelligence, but were certainly smarter than chimps, and with the language center, talking to a Dog was eerily like talking to a bright three-year-old. In a hard fought court battle from 2418 to 2420, the Industrial Supplier for Sol corporation, the main supplier of Dogs system-wide, showed that despite the presence of human genetic material and their uncanny intelligence, Dogs were still only animals and therefore, property.

Then the nightmare began. Someone at ISS realized that raising Dogs from pups was way too frustrating and time-consuming, and retro-engineering new Dogs from common dogs still required training and some time to “regenerate” the extra bulk needed for the sapient species. It was much easier to simply retro-engineer a human, because the additional body mass was already there, and the basics of language and skill would still be in place even though most

memory and personality are lost in the conversion. Conveniently, ISS had for decades been contracted to run prisons in space for numerous Terran governments, and they therefore had no shortage of expendable persons as raw material. Sure, the occasional subject was left with untreatable psychosis or seizures, and there were a lot of prisoners now unaccounted for, but as long as everything looked good on paper, no one ever came out to examine their practices.

Uh... the history trails off here. More later.

[Sentient Species of Sol]

Terrans: These are *homo sapiens*. Called Terrans because of their origin on Earth, Terrans are actually the majority population of the entire Sol System and can be found anywhere that can be made habitable. Most everybody has some type of artificial genetics either inherited or elective. Ironically, the fanatical "pureblood" groups were actually retro-engineered to revert to the naturally evolved genotype.

Martian: Short and thick. Engineered for the harsh conditions of Mars's terraformed surface.

Dogs: Customized dogmen. All are genetically one species, but come in two races--the Gorkur whose ancestors were created from actual common dogs, and the Rorrekhim who are descended from modified humans. Dogs of either kind range in IQ from the original design of maybe 50 or 60 up to fully "habilitated" individuals who can match or exceed the average human.

Sung: Eccentric and artistic. Taller and thicker than humans, but with a fluid grace and otherworldly beauty. Sung have no centralized nervous system, but instead carry a diffuse neural net with many redundancies.

Nosaji: Tall and slender, with beautiful feminine forms, all Nosaji are genetically identical and descended from a single wealthy individual centuries ago. They are smart and strong and capable, as well as supremely arrogant.

Spacers: Hairless, intelligent gray orangutans, designed for life in space. They have a long prehensile tail, and human-like hands on all four limbs. Given an air supply, spacers can even survive

in the vacuum of space for extended periods.

Nightfliers: A more recent group of spacefarers. Nightfliers in the vacuum of space unfurl into large manta-like forms that glide across empty space on even the faintest hint of solar wind.

Huong: Mysterious outsiders who have recently returned to Sol after a 400 year journey on the first habitat to travel outside our system. The Huong are mysterious and troubling. Amazingly efficient and competent, they settle anywhere in the system in pairs or small family units. They refuse to explain their full origin.

Chhar: Suspected to be a sub-species of *homo sapiens*, the aggressive Chhar are apparently made up of three or four different phenotypes. There are the statuesque masters—like tall models of human perfection, and they are surrounded by beings in a bizarre variety of forms.

[Dogs]

Labs and Dobermans, Boxers, Dalmatians, Great Danes, German Shepherds—these were the raw material for the first Dogs. Embryos from these animals were modified and lab-grown to be manual laborers on the outer planets and their moons. Their designers gave them heightened intelligence with an actual language center in their left brain (to better understand and follow instructions). They were also given hands of a sort to perform a wider range of tasks. Their hind legs are shorter and thicker than an actual dog's to allow them to stand upright much like a bear. A Dog's hands also have pads on the backs of their fingers to allow them to move swiftly on all fours. They were smarter than chimps, but the court ruled that they were not truly sapient and therefore had only minimal rights.

Then someone at ISS got the bright idea that it would be faster and cheaper if instead of growing all our Dogs from pups, we just retro-fitted some expendable humans that no one would ever miss. Convenient that ISS also owned numerous contract prisons on various outer stations.

Many convicts died in the retrofitting process, and the loss of memory, ability, and identity instilled severe emotional instability and even psychosis in

others, but there were more than enough “successes” to turn a profit.

Inevitably, of course, Terran organizations became wise to the situation, and the enslavement of the Dogs came to an end (and the Robbruck as well). In an effort to make reparations, the majority of dogs were retrofitted to correct the genetically imposed mental inferiority and apathy of their race. The morality and correctness of this action were never questioned much at the time. The upgraded intelligence was virally induced—that is, the dogooders simply released batches of a P-class carrier in Dog populated areas and waited for results. Some saw no immediate change and for most, they were old enough that to utilize these new capacities was near impossible. In most cases, however, these genetic improvements were carried on to future generations. The effects of an entire generation of children of “normal” intelligence being born to and raised by parents with a mean IQ under 60 were dramatic, and many sociologists trace current ills in Dog society to that era. Essentially, in a span of twenty years, Sol saw the creation of a vast people with no culture of their own.

Dogs today are still largely manual laborers, and there are two distinct types of Dogs. The Gurlur are those who are descended from the original dogs. The Rorrekhim are those who are descended from retrofitted human prisoners. They do make up a single species, and there are many Dogs of mixed blood, but largely, they remain separate. The Gurlur, while horrified by their origin as a species, feel that reparations have been made and generally strive to make a better life for themselves and their children. Rorrekhim, however, feel they are superior to the Gurlur by virtue of their origin. They rightly feel that humankind wronged their ancestors, and believe that all of their troubles are humankind’s fault. They could be right. Neither side has much love for the other.

While both sides have individuals with traits of Dobermans, Labradors, mixes, etc., a Dog can generally tell a Gurlur from a Rorrekhim on sight. Other races have no clue.

Random Thoughts

Dogs as pets? Don't know. The intelligence "cure" that was foisted on the Dogs was not entirely successful, so there's still a large chunk of their population in the semi-intelligent state (ranging on

up through "normal" and beyond).

What is the attitude of Dogs in general to their semi-intelligent brothers and sisters? This is not as simple as just equating them with mentally handicapped humans. These semi-sapient beings are still totally normal--technically, there's nothing "wrong" with them... they are exactly as designed.

I was thinking that even some intelligent Dogs would keep some of the lesser ones as part of their household for cheap labor and other purposes. What about a successful Dog businessman (businessdog?) who has a mate and 4 pups, but also keeps a stable of 3 non-intelligent bitches for his sexual recreation?

My guess is that Dogs in general have no problem with other Dogs doing something like this. After all, we're all one people and we need to take care of each other. But I'm sure they would frown on anyone else pulling this shit, even though I'm sure it's done all the time. Non-Dogs in general would probably frown on the entire practice.

So what would *you* do if 25% of your population was perfectly physically capable, but only had IQs between 45 and 70?

[Martians]

Martians were the first of the created races. The moral, legal, ethical issues involved in not being human were extensive, and conflict and controversy raged for several years. But we won't go into that.

Mars life is tough. The terraformers planned a detailed and complex ecosystem, very different from that on Earth. The Martians wanted to shape themselves to fit their planet—become truly Martian.

The change was not a drastic one. Martians, on average stand just over 1.6 meters tall when raised in Mars' one-third Earth-Standard gravity. They are thickly built with a layer of subcutaneous fat and limbs proportionately shorter than an unaltered human—a body type borrowed (with some modification) from the old Eskimos of Earth. Martian bodies are more energy efficient than humans', requiring about 40% less food to sustain the same activity level. Additionally, Martians can draw sustenance from practically any animal or

vegetable matter (they are, however, strict vegetarians). A Martian lost in the wilderness could survive for weeks on RedGrass and water before vitamin deficiencies finally got to him.

Martian skin, hair, and eye colors range as do Terrans'. The most uncomfortable thing for most races about working with Martians is that Martian "room temperature" is about 50-55 degrees Fahrenheit, and they consider anything over 60 as warm.

[Sung]

Without a central nervous system, the Sung can essentially multi-task. Their mental process all work much faster, and they can work on multiple issues, OR multiple parts of the same issue, simultaneously. Mentally they are very quick. Physically, this slows them down. In physical action, they tend to be more deliberate, almost like they're doing Tai Chi with every action. (OK, not quite that slow, but it's the same feel.)

Sung communication is subtle and complex--every gesture, every inflection, every intake of breath can carry its own subtle meaning. Debating a Sung is futile for most people. Sung are master strategists and experts with sarcasm. If a Sung decides to insult you, you'll know for sure that you've been insulted, but it may take a few days to figure out what exactly it was they said that was so bad. Masters of courtly manner and wit.

For quick physical description, Sung stand slightly taller than humans and proportionally slightly heavier for someone raised in the same gravity. Their skin ranges from near-white to almost black, but always with a faint violet tinge (the violet was sort of the "signature" of their lead genetic designer Sung Markiel). Their hair is normally silver, black, or violet. Their eyes are always jet black, with irises that fill their entire eye (they have no whites to their eyes)--this can be very disconcerting to other races, because you can't tell which way a Sung is looking.

[Spacers]

Spacers look like nothing so much as hairless, orangutans with two meters of prehensile tail and slightly enlarged heads. The resemblance to orangutans is no accident—the designers felt that

without gravity, upright posture could actually be more inconvenient than anything else, and so the orange ape's basic structure formed the chassis of the new Spacer genotype. They have four humanlike hands, and no feet. Most remarkable though is the Spacer's ability to survive in the vacuum of space. The spacer's layered and pocketed epidermis reacts to a vacuum by stiffening as it fills its alternating sections with either fluid or gasses. This allows the spacer to spend hours in a vacuum (provided he has an adequate air supply), and also affords fair protection from extremes of heat and cold. The prehensile tail of a spacer is not terribly dexterous, and is intended chiefly for use as a tether when in freefall, leaving all four hands free to work. Spacer skin color ranges from gray to black to brown to deep red. Spacers often have more than one color, and the two generally fade smoothly into one another. Any spot where color shifts abruptly (with a distinct line between them) is considered a blemish like a birthmark and is often listed as an identifying feature. Unlike true orangutans, Spacers do not display great gender differences—instead, displaying the more slender frame and larger proportional heads of juvenile orangs.

[Huong]

The habitat Armstrong left Sol for Alpha Centauri before the advent of FTL communication. En route, they were struck by a disaster which they will not discuss. The result is that the only survivors on a 4,000 inhabitant hab were the captain, Mika Moon; her chief of security, Jenna Davis; and genetic engineer Jean-Phillip Huong.

The fact that a brilliant experimental geneticist was one of only three survivors leads many to suspect foul play in the Armstrong disaster--that and the fact that all cryogenic chambers went down when the hull was breached (despite backup systems) and 4000 people died, yet the propulsion systems mysteriously remained intact. But again, the Huong won't explain (if they even know), so nobody knows for sure what happened.

The Armstrong was now off course, and the ramscoops would need months to gather enough fuel for course corrections. (First rotation would have to be powered down, and then corrections made, and meanwhile, they lose billions of kilometers.) It was too late for Alpha Centauri.

Alpha Centauri was the least of their worries however--Jean-Phillip was dying and had a desperate plan to preserve the legacy of the Armstrong. Using his own genetic material, plus that of Moon and Davis, he created two dozen complement embryos and placed them in cryogenic storage with instructions to the autodoc on how to implant them. Jean-Phillip then died.

Mika and Jenna, over the next decade, each gave birth to three sets of twins, and together, they raised 12 children. Thus begins the Huong.

Outwardly, the Huong are indistinguishable from *homo sapiens*. They are, however, a distinct species. The primary difference is their method of reproduction. In human beings, each of the parents' gametes (sperm or egg) carry exactly half of that parent's genetic code. Two halves combine to form a new and unique child. In the Huong, each sperm or egg contains the respective parent's entire genetic code. When the egg and sperm come together, the chromosome pairings on each divide, and the separate halves go to separate twin babies. Therefore, one twin has half of the mother's genes as well as half of the father's genes, and the other twin has the other halves. Therefore, the twins share no genes in common, and may reproduce together. So from generation to generation, this single gene set simply keeps getting jumbled and recombined in each new set of twins.

The catch to this is that a Huong may ONLY safely mate with his or her twin (also known as his or her complement). Because of their unique heritage, all Huong are as closely related, genetically, as human siblings except for their complement to whom they are not related at all.

[Confused yet?]

Huong all look very similar as they share so many genes, but any individual usually looks nothing like his or her twin.

Technically, there are two strains of Huong--the Moon-Huong, descended from Captain Moon and Jean-Phillip Huong; and the Davis-Huong, descended from Huong and Jenna Davis.

Jean-Phillip was from the Asian Protectorate and of Eurasian ancestry. Mika Moon (also from the AP) was Korean. Jenna Davis' family originally

emigrated from a North American nation to the Armstrong, and came from a long line of mixed African and European heritage.

The Moon-Huong, then, have decidedly Asian features: dark eyes, dark straight hair, almond shaped eyes. They tend to be small and thin.

The Davis-Huong tend to have a slightly Asian cast to the eyes (some more than others) and tend to be slightly larger and lighter skinned than the Moon-Huong. Occasionally, a Davis-Huong is extremely light-skinned, in which case, his or her complement will be several shades darker than the average. Davis-Huong also have dark hair and eyes, but occasionally lighter brown eyes or auburn streaked hair can be found.

In personality, the Huong are extremely driven. They have a powerful work ethic, ambition, intelligence, and (sometimes unfortunately) an instinctive trust of others. One of their failings (especially for those raised primarily on the Armstrong or in the rare Huong communities) is that they assume most everybody is like they are in personality. They simply don't understand sometimes how people can be so deceitful, hateful, lazy or just plain incompetent. Such things are foreign to them--the stuff of old fiction and history books.

Only recently returned to Sol (just in the last few decades), Huong can be found almost anywhere. The exploration of this new solar system is exciting to them. Twin pairs will often find an attractive new location and simply settle down to begin a new life.

Huong do not often establish new communities (yet). It is usually just a single twin pair, and since they appear human, they tend to blend well.

But rumors abound. Their secrecy about the original Armstrong catastrophe has created numerous conspiracy theories. Why did only the three survive? If the event was so tragic, how did it not destroy the entire ship, and how were they ever able to recover? Why did Jean-Phillip limit himself to only using the genetic material of the survivors? What was Jean-Phillip dying from that left him enough time to design a new species and yet couldn't be fixed by the ship's autodoc? More importantly, where the hell were they for 427 years? They claim they never made it to Alpha Centauri, so where did they go? What did they learn? Their standard answer is that

they were simply adrift for many years, and then it took them forever to reorient themselves and get turned around. Conspiracy theorists love to explain how they could not possibly had fuel, supplies, etc to last so long and MUST have stopped somewhere to gather raw materials. But all of that is speculation.

Add to all of this their quick spread through Sol now that they have returned, and the seemingly incestuous nature of their relationships, and it is no wonder that some suspect a more sinister purpose behind it all.

[Nightfliers]

contributed by Cazmonster

The nightfliers are less a race and more a lifestyle. They have chosen to undergo a large number of radical surgeries and viral modifications in order to become creatures that can quite literally live in the hard vacuum of space. Even today, there are very few nightfliers who regularly make contact with the rest of humanity. Most pursue a quixotic existence away from even the smallest habitations.

In space, a nightflier resembles nothing so much as a massive Manta ray from Terra's oceans. Massive wings, spanning many meters (an average nightflier has a wingspan of thirty meters) make up most of their bodies. Their torsos are an open lattice work with many hundreds of fine, yet incredibly strong filters. In order to perceive the far larger expanse that is space, they have two incredibly well-developed organs that can emit and receive energy over a large part of the spectrum. They can 'hear' radio waves, 'see' in high-definition radar and 'taste' magnetic anomalies over a great distance.

In human habitats, which they rarely visit, they can 'retract' their extensive wings into a large cloak, with the receptor organs appearing to be a clasp on the cloak. Their bodies constrict down to a human height of about two and a half meters and their arms and legs become functional once again. Their human heads are exposed in this form, but are almost featureless. They lack noses and ears, they eyes are covered over in protective lenses and their mouths are narrow slits.

While very large in humanoid form, the average nightflier weighs no more than sixty kilograms. They are not physically strong, as their existence in

space requires musculature that serves little purpose in a humanoid form. However, their tissues are quite tough and flexible.

In order to communicate, most nightfliers carry a radio transceiver with a speaker somewhere on their person. They have few other possessions as they have no need of them in their native habitat.

[Nosaji]

In the year 2415, Aaron Nosaji, at the age of 29, transformed himself into a new species of mankind. Or rather, he created from himself Mariah Nosaji who would later spawn the entire Nosaji race as we know it.

Aaron Nosaji was an ambitious and wealthy young man. He believed that virtually all of Sol System's ills stemmed from inferior people. As someone who was truly superior, he saw it as his duty to produce superior children and do his part of making the universe a better place by spreading his superior genes to all corners of the system. To this end, he cloned his first son Mariah from his own tissue. His second son (also named Aaron) was cloned five years later.

By the time Mariah was entering adolescence, the elder Aaron realized that his solution was incomplete. His sons may well be his clones, but they were also individuals who would not always adhere to their father's ideals. Aaron had not solved his problem of maintaining genetic purity—he had only delayed the inevitable dilution of his genes.

And then the solution came to him—the only way to ensure that his genes were cloned with each new generation into perpetuity was to make it a biological imperative. Therefore, Aaron commissioned the original Nosaji mod and retrofitted both of his sons to be the first true Nosaji. Aaron II died in the process.

Nosaji are asexual beings. All Nosaji are genetically identical. They are tall for their gravity (all Nosaji habits tend to maintain simulated gravity at about 2 stone). They are all also generally feminine in form, although broad shouldered with potential for some muscle bulk. They are pale complected and have naturally blond straight hair and pale gray-green eyes. A healthy, emotionally stable, mature Nosaji

can, with an act of will, release a fertilized egg to be implanted in his own womb (although female in appearance, Nosaji refer to themselves in the masculine).

All Nosaji maintain some of Aaron's arrogance and megalomania to a greater or lesser degree; however, this usually manifests itself as a racial superiority thing. Nosaji, on reaching maturity, tend to acquire a "wanderlust." It is expected that as they enter adulthood, they will spend some time in the greater society of Sol System, experiencing other cultures and species and proving (to themselves at least) their ability dominate any venture they choose to undertake.

Nosaji all wear extensive facial tattoos, and are most often inked across other areas as well. Tattoos are always in black and are usually symmetrical, usually made up of abstract lines and patterns. Tattooing is begun in adolescence and every Nosaji's ink is unique to the individual.

Nosaji speak a dialect of English, but can communicate volumes with one another using gestures, body language and intonation. The unwary observer may notice that two Nosaji appear to be hiding something from him in their conversation, but even having noticed it would find it near impossible to interpret what was being said.

Nosaji love competition—to prove one's worth. They are not big believers in luck: if all Nosaji are born identical, they reason, then the one who reaps the greatest rewards must be the one who studied, trained, and worked the hardest.

In mainstream society, one rarely sees more than one or two Nosaji at a time. When among others, they are generally striving for individual achievement, which would be diluted if shared.

[Governments]

As you can imagine, governments within Sol come in all shapes and sizes, but here I'll discuss the two largest--the only two planetary governments in the system: Earth and Mars.

[Earth]

The official world government of Earth is known as

the United Governances of Sol or UGS. They include Sol in their title, even though the UGS doesn't extend much past the moon's orbit.

And the UGS doesn't encompass every single community and inhabitant of Earth--just 99+% of them.

The UGS is an alliance or confederation of sorts. It holds more influence than the modern UN, but not so much as say The Articles of Confederation (for you U.S. history buffs). The individual Governances referred to are all highly intertwined in a way that most Terrans can't explain and non-Terrans can't even begin to comprehend.

Essentially, any governances are contractually based. That is, all members of a particular governance have chosen to be a part of that group--"subscribed" if you will. As a subscriber, they are tied to that entity's laws, benefits and restrictions. Citizens may change governances at will if they are disatisfied with current policy, although their voting weight and influence generally does not transfer for 30 days.

Almost all governances are entirely extraterritorial, so it becomes very confusing when even members of the same household could potentially belong to different political entities. All sorts of services may be rolled up with your political affiliation, including communication, transportation, law enforcement, etc etc. But in some cases, all of those things are entirely contracted out.

Thus, global terms and conditions are hammered out by the UGS council, made up of representatives and voting strength of the various governances. There are several massive machines that do nothing 24 hours a day but calculate the up to the second voting strength of each faction, based not just on head count, but also financial strength, resources and influence.

The people of Earth are convinced that they live under the greatest system ever devised. All people are free to choose any government they wish or none at all, and everyone is better for it. Non-Terrans think they're all full of shit. Non-Terrans are of the opinion that this overarching UGS structure that maintains such "freedom" is really just its own oppressive meta-government and is just as restrictive as any other. Terrans dismiss such talk as the ignorance of off-world hick bumpkins.

And while this Utopia works well for the middle and upper classes, the poor are (as usual) trodden upon. There are many who, despite subscription to a good governance, simply fall through the cracks and can't get back up. In the gutters, there is much that is no longer maintained, because no individual governance will take responsibility, and the UGS can't find consensus or doesn't deem it important enough yet.

[Mars]

Mars, Deimos, Phobos, and all Mars orbiters form a single unified government--the Martian Republic, or just plain Mars. It is essentially a free market democratic government, but on a more local level, things are grouped into families, collectives, contractual districts, etc based on physical territory, and all of these are essentially socialist groupings (some stricter than others), and supposedly each is entered into "voluntarily" by all of its members. However, since your affiliation is determined by where you live, and since most people are born citizens of a certain group, very few truly believe in this whole patriotic "voluntary" talk anymore.

The central Martian government is primarily concerned with (in no particular order): foreign policy, protection of Mars' ecosystem, and protection of Martian citizens. Most other stuff is left to local governments, but in times of need, a lot of stuff seems to fall under those "protection" clauses.

Two notable events stand out in Martian history:

- 1) Martian Independence--this was declared before Mars was completely terraformed, and was led by Sanderson Dean, the "Grandfather of Mars" and one of the first true Martians. Technically, Dean was just one of many great early Martians, but he was the first Martian governor, and like George Washington, he's kind of a stand-out figure.
- 2) The Declaration of Sovereignty--one of the boldest moves in Martian history. The Declaration of Sovereignty stated that in order to protect Mars and its fragile and developing ecosystem, the Mars Republic claimed sovereignty over everything in Mars orbit out to 10 million kilometers. Time was given for ships and habitats in long term orbits to move if they wished, but after January 1, 2683,

everything within shouting distance of Mars suddenly fell under Martian rule.

Protests were made, and the UGS took action and issued warnings and sanctions, but basically--what are you gonna do? Fears ran high for a while that Earth would take similar action to force the remaining non-UGS members near Earth to join. But those fears were unfounded, and the Earth never made any such move.

[Other Groups]

Israel: A nation without land. Literally nuked from the face of the Earth, Israel has survived as a non-territorial nation. They control the vast majority of the FTL communications net and therefore have a potential stranglehold on the rest of the system.

Nosaji: Nosaji is a nation, a people, a corporation, a power. Nosaji is a small to mid range power. Its physical territory officially consists of a single megalithic habitat in solar orbit at about 120 million clicks. However, their holdings are well diversified and very extensive. Probably their largest sources of income are Nosaji Chemical (a huge chemical manufacturing company) and Linear Hawk Systems (makers of interplanetary propulsion systems).

And that's all I've got so far. So what media is there, and who controls it? Who are the other corporations in power? Are there other fringe/splinter groups that can be considered system powers? How about religious political entities? I need to work on this.

[Technology & Science]

There is no faster-than-light (FTL) travel. Physical entities are limited by the speed of light. For practical purposes, the highest sustainable speed for living beings is probably 10% of the speed of light, simply due to radiation/shielding concerns. Non-living things could go a little faster, but not for long. This means that when the habitat Armstrong decided to head for Alpha Centauri, they were looking at probably a 150 year round trip (Earth time--somewhat shorter for them). That'd be several years just getting up to top speed, 35 to 40 years cruising, several more years to decelerate, and then reverse the whole process coming home. Of course, it took the Armstrong much longer than that, but that's another story.

Long term probes/drones have been sent to other systems and have broadcast back results, but other than the Armstrong and one or two other isolated cases, no people have left the solar system. And only the Armstrong returned successfully.

FTL communication IS possible (and very popular). Here's the basics of it. An FTLcom link must first be established. A beam of (unnamed) particles/energy is transmitted from station A to station B. This initial link is made at normal light speed. Once station B receives, it must calibrate and broadcast its confirmation back along the same beam (also at lightspeed). Once the link is made, the transceiving process for (unnamed) energy is its own mirror image in time. Meaning a change in any single part of the beam causes a simultaneous change in every other part of the beam. And as long as both ends can continue to compensate for movement, gravity, etc, you now have instant communication. So if you want to set up an FTLcom link from Earth to Saturn, you need to wait 18 hours for the beam to get there and back, but after that it's all good. The solar system is criss-crossed by millions of these links, all forming a massive communication net that keeps the system humming.

Cybertechnology is cheap and easy. Replacement parts are a simple matter. But it's also considered pretty primitive. If you want more muscle, why not go for a genetic refit?

Cyber-interface with computers? Ah, deckers. OK, here we go. You want to communicate with machines, you get a shunt. A shunt is essentially a device inserted into your nervous system (usually the spinal cord) that reroutes your nerve impulses. Commands to your muscles going out are read as commands to the machine or program you are working with. Feedback from those machines is sent back to your brain as sensations to interpret. Machines don't read your thoughts, although, by subvocalizing with your shunt, you can speak to the machine--in essence, send your thoughts into the thing.

But here's where fiction got it wrong. They always talk about jacking into a machine and moving at the speed of thought. Well you know what? You do. And surprisingly, most of us don't think all that fast. Seriously, without the physical reflexes to worry about, sure you'll get *a little* faster within the machine, but c'mon. When a new stimulus hits you,

how long does it take your mind to register, work it over, and then react? Plugging into a computer doesn't make that process any faster. So you may read stories about the lightning fast hacker knocking down security measures on the fly, but in reality, no human mind will ever be a match for a crappy computer on its own turf. The best you can do is have all the programs prepared ahead of time, and just let them go. Sure, you can go along for the ride, and the lights are really pretty, but you're not gonna be helping.

So why shunt at all? Well, because it really is the most efficient interface you can find. People have tons of legitimate uses for machines, and shunts will give you the absolute best control, reaction time, etc. Ship's pilots in space are almost always shunted into the ship for just that reason. For everyday use, shunts are out of vogue. The idea of invasive technology is distasteful. Most people use elaborate holographic rooms that allow them to stand within the program, and the room reacts to them. It's nearly the same experience as a shunt (without the sensation of touch), but external rather than internal.

Power sources: I don't friggin know. I say solar and fusion, but I'm just pulling that out of my ass. It's not really that important yet. Just know that energy is plentiful and cheap.

Momentum on the other hand, now there's a new commodity. One of the fastest ways to accelerate a ship up to top speed is to make a quick orbit of a large body and "slingshot" off the other side. Jupiter is extremely popular for this use. Now the Jovians, in their loosely affiliated fledgling Alliance, have decided it's time to starting charging a toll for that. Essentially, every ship that uses Jupiter for a boost peels off some of the planet's momentum for its own use. Sure the amount is near negligible, but the Jovians are thinking long term here. Over time, this stuff adds up.

Genetic engineering: I think we've pretty much established that we can do whatever we want here. The only real limit is common sense. I don't want to install any artificial constraints for "game balance" reasons to limit the number of beneficial modifications you can have (like SR cyber and bio ware), but we will use a rule of common sense. There has to be really good reasons for it, and all the pieces need to make sense together and in context. It is taken for granted that nearly everyone encountered will have modification of some sort.

Holographics: Very well done. Three dimensional holographic projections are very easy and very realistic, generally to the point of looking almost solid. Projection, though, normally requires a room or environment designed for the purpose or else specialized machinery strategically positioned around the target area.

Simsense: See shunts above. Can only effectively be done with shunts. For regular entertainment, most people prefer holographics.

Microtech: Also known as midges. This is an undeveloped area that I'd like to do more with. I imagine the midges as machinery *almost* too small to be seen, and they work in sets of dozens or hundreds to coordinate an effect. For example, you let loose 50 holo-midges, and they will fill an area to help display a holographic image. You have spy midges that seem no more than a swarm of gnats that coordinate to broadcast images back to the news van. And this is only the tip of the iceberg--what else can the little buggers do? Can they manipulate the flow of energy? Funnel heat out of an area? Purify air? Inject toxins? I haven't spent much time on midges, but I see them being a real area for creativity and unexpected applications. Not to mention all sorts of anti-midge technology.

Nanotech: Does not exist.

Weaponry: I don't know. I'd assume that most weaponry is very very illegal, but also, that most personal weapons would be deadly accurate and immediately devastating to any unprotected target. We're talking weapons so powerful that nobody should have them. If you're facing a guy with a gun and he decides to fire--count on being dead. On the other hand, there has probably been a lot of work on anti-personnel devices that target only living things and leave non-living items intact. Why? Who's idiot enough to fire a mega-disintegrator inside an sealed space station? Most conventional weapons would be devastating to a habitat... cut the wrong line or punch a hole in the wrong place, and suddenly 3 million lives are in jeopardy. People in space don't like to fuck around with that stuff.

Sung & shunts. The Sung do not have a central nervous system, but do have a diffuse nervous system. Many processing functions are duplicated throughout the body, so that injury in one area does not disable. Memory and some other higher

functions do have central storage within the head, but also backup copies elsewhere. And then I get fuzzy. I do not know if a shunt would work. They do have nerves, so one would think that you could shunt in at any of several processing nodes. If so, the Sung would be ones that could still function mostly normally while shunted, because they can focus their attention on multiple tasks. On the other hand, as E points out, I don't know what the Sung cultural attitude toward shunts would be either.

[Elementary School Physics]

A basic grasp of Newtonian physics comes early to 30th century denizens of space. Evidence of physics in action are everywhere and impossible to hide from:

“Mom, why do Io and Jupiter spin around in the sky like that? It makes me dizzy if I stare at them too long.”

They're not spinning, honey; we are. Lincoln is shaped like a giant wheel, and we stand on the inside of it, like this.

“Okay, if Lincoln is spinning, why don't we fall when we get to the top?”

Because the spinning is what keeps us in place. It's like this basket. If I turn it upside down, what will happen?

“All my cubes will fall out?”

Right—but watch what happens when I swing it in a big circle over my head. See? Even when the basket was upside down, the cubes stayed in. How come?

“The spinning?”

Yup—just like that. If you start something moving, it wants to keep moving in a straight line until something stops it. So when I swing the basket, is it moving pretty fast?

“Yes.”

And is it moving in a straight line?

“No.”

That's right. I got it moving, and it *wants* to move in a straight line, but it can't, because my hand keeps pulling the basket back in a circle. The cubes keep trying to move in that straight line away from me, but my hand keeps pulling the basket back against them. So as long as I keep spinning, the cubes are stuck to the bottom of the basket. Same thing with Lincoln—it's spinning pretty fast (over 500 klicks where we are), so our bodies want to keep moving in a straight line away from the center, but the curved shape of Lincoln keeps it moving in a circle instead, holding us in.

That's centripetal force.

"So if I was on the outside and let go, I'd just go flying off into space?"

If you let go—yes.

"Then why don't the Spacers go flying off? I've seen them walking on the outside all the time."

Well, for one thing, Spacers *never* let go. That's what their tails are for. Plus, they usually have at least two safety lines that tie them to the hab as well.

"Well Mom, is Jupiter spinning then? Because it looks like it is."

Yes—Jupiter spins. In fact, on the surface, Jupiter spins a heck of a lot faster than Lincoln does.

"Okay, then why doesn't everything on Jupiter go flying off into space?"

Because Jupiter is big.

"I don't get it."

It's called gravity. All physical things in the universe have mass—substance. Mass generates gravity, which is a force that pulls all other mass towards itself. So everything in the universe is pulling on every other thing out there.

"So I have gravity that tries to pull stuff towards me?"

Yes—all things have gravity. But gravity is so weak, that you can't even notice it unless it comes from something very very big.

"Like Lincoln?"

No—not even like Lincoln. To have gravity you would notice, a thing needs to be really huge—like a planet or a star or a moon. The bigger the object, the stronger the pull. But then the pull of gravity also gets weaker as you move farther away.

"Well, we learned that Jupiter is the biggest planet in Sol System, so it should be pulling us in, right?"

Yes, Jupiter's gravity pulls very hard on Lincoln, but we don't ever fall and hit the planet, because we are in orbit.

"Huh?"

Let me explain: Remember what happens to something when you start it moving? What does it want to do?

"Move in a straight line?"

Right. So imagine that this big ball is Jupiter, and imagine that this is us flying sideways above it here. We're moving pretty fast, so what does our ship want to do?

"Keep moving in a straight line."

That's right. But Jupiter has a lot of mass and a lot of gravity, so what does it do to our ship?

"Pulls it down?"

You got it. So let's watch what happens: if our ship is going too fast, then Jupiter's gravity can't pull us down fast enough, and even though it bends our path a little at first, soon we are far enough away that we don't feel its gravity anymore.

On the other hand, if we are moving too slow, then gravity pulls us down to Jupiter really fast and then...

"CRASH!"

That's right—we crash into the planet. But look what happens when our speed is just right: gravity keeps pulling us down, so we never get away, but we're going fast enough that we never quite fall into the planet either. As our path bends, we just make a giant circle going all the way around the planet over and over. That's our orbit. And as long as nothing

stops us, we can keep going like this for a long long time.

“So are Io and Ganymede and Europa all in orbit around Jupiter too?”

You bet—all the moons are.

“Then why don’t we all move at the same speed? You said we all have to move at exactly the right speed to stay in orbit. But Io doesn’t keep up with us. Sometimes it’s really close to Lincoln, and sometimes it moves way off or even goes behind Jupiter or something. Is Io going too slow? Is it going to fall into Jupiter some day?”

No honey—actually, Io is going a lot faster than we are, because it’s closer to Jupiter. I said you have to be at just the right speed to stay in orbit, but the right speed changes by how far from the planet you are. As you get closer to the planet, what happens to the pull of gravity from the planet?

“It gets stronger.”

Exactly. And if gravity is pulling down harder on us, then we need to be moving even faster to stay in orbit. It takes Lincoln almost nine hours to orbit around Jupiter, but Io is faster and takes less than 6½ hours to make the same trip. And the really close moons go even faster. Amalthea is very close to Jupiter, and it has to go so fast to stay ahead of Jupiter’s gravity that it goes all the way around Jupiter in just over an hour.

That’s what we call tides. There’s thousands or even millions of things that orbit around Jupiter or Sol or Earth, and closer orbits always move faster than farther ones. So even though Lincoln might be close to Salina right now, our hab is a little closer to Jupiter than theirs, so we move a little faster. Fifteen hours from now, we’ll be halfway around the planet from them, but since we always move a little faster, eventually, we will catch up to them again. It’s this movement—the tides—that makes travel so tricky. Whenever you go to travel to another hab or another planet, you always have to follow the tides and map exact locations. Because a trip that takes a few days right now might take two weeks if you wait a few days to leave.

[Gravity]

The term gravity is used fairly loosely. Technically, gravity is the attractive force between any two bodies. Gravity is a function of mass—the more mass, the more gravity it generates. Gravity also decreases with distance. However, in common parlance gravity is generally used to describe any force that keeps one’s feet stuck to the floor.

Gravity is of high importance in God’s Dice. First off, gravity is measured in Stone (abbreviated S). 1 Stone is equal to acceleration of 1 meter per second per second. Therefore, Earth gravity (One G in old terminology) is equal to about 9.8 Stone—this is generally rounded off to 10 Stone for convenience. Luna’s gravitational pull, for example, is equal to about 1.6 S; Mars has gravity of 3.7 S. Most habitats and manned stations in Sol System have a simulated gravity between 1 and 5 Stone.

The physiology of most sentient genotypes functions best when in some sort of moderate gravity. There are both zero-stone and high-stone mods that can assist with long term health and survival in such environments, but they are not common in most species. Gravity, as well, shapes the physiology and psychology of species. For example, individuals of any species who grow up in low-stone environments will generally be taller and slimmer than their high-stone counterparts. For example, Terran males stand approximately 1.8 meters when they have grown up on Earth, but Terran males from Luna are usually right around 2.1 meters tall.

In habitats and ships, the effects of gravity may be simulated by acceleration, either by direct linear acceleration, or by spinning the vessel.

Linear acceleration is... well, pretty straightforward. If a ship is accelerating at a rate of 2 m/s/s (or 2 S), then occupants within will feel a pull of “gravity” equal to 2 Stone (or about 1/5 Earth gravity) in the direction opposite that of acceleration. Once a vessel ceases to accelerate—whether it is coasting or falling or just sitting still—it ceases to have any subjective gravity within.

With spinning however, the appearance of gravity is created by centripetal force. When in a spinning vessel, inertia wants to keep everything inside moving in a straight line (i.e. flung out into space), but the outer hull of the ship keeps everything from flying away, and as a result, occupants of a spinning vessel find themselves stuck to the inside of the spinning hull as if by gravity. Short answer, if you

spin a space station, occupants within will experience “gravity” which causes them to stick to the outer wall of the ship. This force decreases as one gets closer to the center of spin, but it increases as the rate of spin increases.

[Modifications]

mod (mod)

- n.* 1) modification, esp. genetic modification
- 2) the process of making genetic modifications
- v.* 1) modify, esp. to modify genetically

mods, modded, modding

The way I see it, there are three ways of modifying a person.

1) Cybernetic mods. This is any cybernetic/implanted device. I imagine that in 2921, some of this still goes on, but it is for very limited applications. For major things (in most cultures) cyber mods are out of fashion.

2) Biotic mods. These are biological modifications made to your body--usually grown/regenerated from your own tissue--that make no change to your underlying genetic structure. You may well have a biotic third arm added, or biotic replacement eyes that see in the UV spectrum, or biotic lungs that can draw oxygen from a methane rich atmosphere; but none of these things affect your genetics. If you reproduce, you don't pass these traits on. Also, because they are artificially added, they are harder to maintain/repair if injured due to the high reliance on regenerative techniques in modern medicine.

3) Genetic mods. This is an alteration to one's genetic structure that is then, in one form or another, allowed to express itself. This is a riskier and more complicated procedure, but it also produces permanent changes that are encoded in your genetic structure and can even be passed on to your children if you are still capable of breeding. Genetic engineering of one's offspring is the most common use for this technology, but there are retrofit capabilities that allow mature adults to use gen mods.

Genetic modifications (or mods) first came into widespread use on Earth in the 21st century. At first, it was very limited in scope, and mostly used to correct genetic abnormalities. As the reliability and

effectiveness of modding became more apparent, people became bolder, using the mod process to select specific traits or even improvements for their offspring. As the technology became more advanced, it became possible to retro-fit mods to an existing being, usually requiring extensive surgery followed by regenerative therapy to allow full expression of many modded traits. By the 30th century, mods are commonplace. There are so many modifications and improvements woven into the human genetic code, that *homo sapiens* of today forget that their ancestors used to be much smaller and weaker, succumbed to a multitude of illnesses and generally didn't live much past 70 years.

[Travel through Sol System]

A conversation on space travel:

Eli: The Belt orbits (of course it surrounds it...but does it move?) the sun as well, neh? At least, I'm pretty sure it does. Wouldn't it be possible, then, for Earth Central to create asteroid free channels for the passage of ships and couriers and such? These areas would be the most heavily patrolled and relatively pirate-free. However, in efforts to remain ahead of schedule and ahead in costs (cross belt tariffs, suck) groups have taken to making runs across the danger zones. Not only do they risk the danger of having an asteroid smash into their windshield but they also risk attack from Pirates working The Belt and sites beyond.

I don't know, I'm seeing something like four MAJOR pirate organizations and a couple dozen Indeps trying to keep a living for themselves.

Beth: Physics of the solar system:

Things nearer the sun orbit faster than those farther from the sun. The inside of the asteroid belt, therefore, circles the sun more quickly than the outside. It is sort of a fluid thing. Also, their orbits are of very different shapes. Some are near circular, and some are very elliptical. Some stay right between Jupiter and Mars, but some stray in as far as Earth's orbit at times. Asteroids change relative position second to second and quite often collide.

Eli: Okay, so that's true, it makes sense. But I still see it as kind of like a record. The outside *is* going

faster, but if the point on the inside and the point on the outside are connected, they're still the radius.

So even though the orbits are changing shape and bouncing off each other, they still hold, roughly, the same paths, and the channel idea would sort of work. I guess there would have to be maintenance crews...that and eventually there would be no asteroids left from all the maintenance.

3278: Nope, sorry. The problem is, the inside and outside aren't *connected* like on a record. A better metaphor would be a drain; if you drew a dot on an inner asteroid, and one on and outer, and then drew a line between the two and let them go, the line wouldn't stay a line, it would become a spiral.

Similarly, the interior planets spin in the same way; their orbits are *much* faster than the exterior, and so there is no straight line between any of them. Instead, you have to keep track of where everything is now, and where it should be when you get there.

So, no asteroid belt clearing, which is good, because I'd hate to have to explain the physics of moving millions of tonnes of rock from point a to point b. :)

Eli: Well shit. How, then, is travel through the belt feasible? Or are there stations set up above and below for space traffic?

Beth: Despite the vast number of objects in the Belt, it is still vastly empty space. A pilot could take a craft through most parts of the Belt and manually maneuver between any obstacles. This would be simple. The automated piloting programs would have even less trouble. Additionally, there are giant computers that do nothing but track the motions of every natural and artificial object within a light year of the sun.

Don't imagine the asteroid belt from Star Wars. That whole scene with the Millennium Falcon having to dodge in and out of the asteroids was bogus. A Belt that crowded would have so many impacts, that the whole thing would be ground to dust by now (much like portions of Saturn's rings).

Eli: I wasn't imagining the belt from Star Wars, but I still don't see a freighter getting through with ease. <shrug> I suppose I should do some non-fictional reading on it all...but I don't want to just yet <grin>

Beth: No, really, the asteroid belt is fairly sparse. There's lots and lots of stuff there, but there's also lots of space for it to be in. You could literally park your ship in the smack middle of the belt and depending on where you were, it would be very possible that you wouldn't be able to see ANY asteroids with the naked eye.

Scamp: Besides, isn't the belt a disk, like the aforementioned rings of Saturn? Wouldn't it just be safer to then plot an elliptical course that moves above the plane of the belt? What are the orbits of the planets in relation to the belt itself?

Beth: The vast majority of objects in the solar system (planets, asteroids, comets, etc) all move roughly within the same plane. Some items are tilted away from this plane by a few degrees--some are tilted more so.

In God's Dice, by convention, **most** manmade items orbiting the sun also fall into approximately the same plane, but there are notable exceptions.

Scamp: Ok, that's what I thought. What, other than added time, would prevent someone from taking an elliptical flight above (or below) the plane of the asteroid belt, in order to avoid the seedy belt dwellers?

Beth:
1) Momentum.

This will not apply in all situations, but remember that when you leave Earth, you carry with you the Earth's massive velocity as it rockets around the sun. So for many trips, countering that velocity to leave the plane of the elliptic is just not cost effective. This applies to a ship leaving **any** orbit--not just Earth's.

Again, it won't apply to every trip--for some, it may be beneficial to leave the main plane... to swim against the current as it were. But for economic reasons, I will wager that most routine traffic stays within the common plane of orbit.

2) Safety.

This is just a safety in numbers bit, but if something goes wrong with a particular trip, you are much more likely to find help in time if you are taking a major highway as opposed to a gravel country road.

This argument certainly won't apply to smugglers and certain individual interests, but major commercial ventures will want to keep consistent supply lines.

3) "That's just the way we've always done it."

Force of habit.

To go along with all this, though. I imagine that there are many Fringe communities that establish their primary orbit at a severe angle to the rest of the solar system. If you set your habitat to orbit at a wide angle, then you only cross the plane of the elliptic twice per local year. Nice way to ensure a little extra privacy and/or isolation.

3278: "Stationary" habitats could also stand above the plane of the ecliptic, if for no other reason than the fact that they have to worry slightly less about things whacking into them.

[Appendix A: Sung Stuff]

Note that the remaining Sung information was written by Eliahad and requires some modification for use. The three major changes will be:

- 1) The entire timeline must be shifted backwards about 250 years.
- 2) There can be no “Eye of the Storm” station. Gravity would be too harsh, and scientists say that the Great Spot on Jupiter will be gone by about 2500 AD.
- 3) Markiel Sung becomes a hermit in her later years. She retreats to a remote habitat rumored to be located in the Oort belt, where she continues her work in secret.

Sung Markiel

Markiel was born in 2837 to Suelgan and Rosa. Her parents were hard working scientists studying the moons of Jupiter, and Markiel grew up with that image in her mind. The giant orb filling most of the station’s view, swirling colors...

“It was the colors I remember the most, especially the red...I always called it a spot, never thinking of it as a storm. How could storms be that elegant or graceful? It moved at its own pace, a different pace, much like I did.”

-Sung Markiel *Memoirs*

Markiel was also born with high-functioning autism, of what is affectionately referred to as Fawcett Syndrome. The Fawcett Syndrome came into existence in 2786, when Dr. Kiel Fawcett determined that the new wave of genetic engineering in adults was bringing up new psychological problems in children. He speculated that it could be partially related to an incomplete splicing project, or even associated with the lack of base instincts. “After all,” he said in an interview, “How could we pack billions of years of evolution into one new genetically created creature?”

The Syndrome mainly manifests itself in the child’s ability to recognize simple social cues, which leads to difficulty in social interaction. Unfortunately for the engineers, it refused to manifest itself as a perceivable physical problem. To the sensors, scanners, and tests it appeared that everything was correct and functioning perfectly.

“I was 14 when they told me something was ‘wrong’ with me, and I just laughed at them. What else could I do? I’d already lived through the most important years of my life and done things that most other children don’t even dream of, and they wanted to tell me something was ‘wrong’? So what if I never said a ‘hello, how are you?’ So what if I blurted out answers in class and refused to sit in my chair? Isn’t the end result, what I am now, what is most important?”

-Sung Markiel *Memoirs*

Markiel was an introspective child, due partly to her ‘disability’ partly through her own fault, but she never stopped thinking, and reasoning. She took up the violin at age 4 and began to learn the intricacies of rhythm and harmony. They fascinated her to no end and there wasn’t a meal that she wasn’t beating out riffs with her silverware. Her parents looked into sending her to a conservatory, and in their research found the perfect home for their multitalented little girl.

Itzhak Zelter had founded the Martian Orbital Academy of Music and Science. It was his belief that the arts and sciences should be blended more closely, and it was his belief that that was most easily achieved through the synthesis of music and science. Classes that made up the day ranged from 20th century counterpoint to Advanced Micro-engineering.

“The Conservatory was perfect for me, even though I’m sure the teacher’s didn’t realize it at the time. I must’ve put them through hell in my stricter classes. I know Molly loved me though, she was my violin teacher. She fought for me every step of the way, and did her best to teach me why my parents kept getting referral slips. Molly taught me so much more than just instrumental technique, she taught me the skills I needed to survive the rest of my life.”

-Sung Markiel *Memoirs*

Markiel took to the classes like a Spacer learning to move in zero-g. She became one of the most loved and most hated children of the Academy, being disciplined numerous times for various reasons. She became as intimately familiar with the detention room as she did with the recital stages. Even with her referrals, she still remained the top student in all classes, and the finest violinist to ever grace the stages of the orbital concert circuit. She always refused sound amplification and alteration,

preferring the natural acoustics of her own sound, and the sound of the hall. It raised the playing of those around her as well. So used to the modifications that technology provided them, they had to struggle to perfect their own playing just to keep up with her.

"People would always ask me why I refused to play with amps or pitchbenders, I would always tell them to listen. See wonder in what is being created before your eyes. A small sounding box strung with four strings and a bridge can create a sound more beautiful than the most perfect technological creation built today. You can hear almost 3,000 years of evolution in that sound, not something that can be created in a single step. Yes, it's not a technologically perfect sound, but I would argue that no sound CAN be perfect, just crystalline and beautiful."

-Sung Markiel *Memoirs*

After learning of her 'disability' at age 14, Markiel's course selection took a decided turn towards genetic engineering and psychology courses in addition to her rigorous musical studies. She was very curious as to what had happened to her mind that people would label her 'disabled'. By this time in her life, she was already in classes that eighteen and nineteen year-old students found challenging, and she was taking in the information like she was drinking it.

"Was I a show off? Sure, as a performance artist, I learned that spectacle is almost always the best way, technique will come. I suppose I applied that thinking to my science classes as well, always trying to figure out what I could do with what I learned, and then learn why I could do it. I suppose that isn't the best way of going about things, but it's seemed to work so far."

-Sung Markiel *Interview with a Concert Scientist*

She came to the conclusion, at age 18, that there wasn't anything wrong with her at all. She published a paper on "Physio-Psychological Problems and the Perceptions of Science Today." In which she stated that some of the "problems" society has labeled as 'disabilities' should not be treated as such. That the problems only arise from perceived situations arising from a set societal standard . . . Of course, this is not true for ALL problems, but this supposed undetectable problems, such as Fawcett's Syndrome, are simply not disabilities, just another way of looking at the world." She goes on to cite statistics of children with Fawcett Syndrome and their

progress through classes and work, finding them to be above average in almost all areas.

"It's almost as if it's a new generation in evolution..."

-Sung Markiel *Physio-Psychological Problems and the Perceptions of Science Today*

Her paper was both ridiculed and praised. A rift separated the lines of thinking as professors and scientists took a look at their findings, wondering whether they had been looking for a scientific solution...or a societal one. Scientists were returning to the premise that science wasn't determined by societal rules and was a result of pure reasoning, and testing alone. 2856 saw the resurgence of illegal engineering. Pirate vessels were taking out supply ships to fund scientific body exchanges in their search for specimens to test their theories on. The morality of science was quickly dying.

Markiel was the target of interview after interview, all of them asking why she would condone this sort of scientific discovery. Her answer was always the same. "It was NOT as I meant it. No where did I state that science should move forward through the ransacking of society, I stated that scientific observations should not be made within the eye of society, that they should remain separate from it. Science is bound to the laws of society, which is understandable. Observation, however, is not bound to those laws, and shouldn't be made with those laws in mind."

Certain groups wanted to hold her responsible for the actions of scientists throughout the system, and criminal charges were cropping up from all directions. It could not have come at a worse time in her career. She had a tour of the concert halls on both Mars and Earth planned in 2857, the most prestigious of which had been her destination for years. Carnegie Hall had been preserved since the late 19th century and now stands as testament to the preservation of Art through centuries. She was also scheduled to perform at the Tanglewood Center for Musical Culture, a society that helped places like Carnegie Hall remain in place.

"Carnegie Hall was my dream ever since I heard about it in 20th Century Music History. Imagine playing in a place that carries the weight of millenia, imagine the energy that would be pouring through a place like that. I suppose if I had a regret, that would be it...that I never got a chance to

perform my dream.”

-Sung Markiel *Memoirs*

She never went on that tour. There were too many pressures from both the concert halls, and the scientific world, that she went blank. When her agent knocked on the door of her hotel room on March 30th, 2857, Markiel was gone. Her belongings had been gathered, and a single piece of paper (As was Markiel's style, she never used electronic notebooks. Simply paper and pen) that said, "I've gone home." Investigators quickly searched for traces of her departure and her parents were notified, but nothing turned up. It was like she had disappeared from the system entirely. Only a single entry on the Outbound Ship logs from the Dockmaster at the starport left a clue. A single unlicensed vessel departed the night before with no destination, and apparently, no one aboard.

The Eye of the Storm

The pressure had slowly been wearing Markiel down. Her constant social interaction ground against the person she was until something gave way. Her boyfriend, architect Paul Rachland opened the door to her hotel room and saw Markiel curled in a corner, just rocking back and forth. He tried to comfort her as best as he could as his mind raced to figure out what the next step should be. The best thing to do, he decided, was get her as far away from the spotlight as possible. They went out the window, Paul calling his hover car to perform above and beyond the call of duty.

He had planned on revealing his creation on her birthday in three weeks. He had planned on proposing to her, now Paul just wanted to keep her alive. He had called it 'The Eye of the Storm', and it was built upon the joy she had as a child. It was going to be his present and testament to her beauty. Now it was her only hope of survival.

"Weathering the storm was a testament to Paul's genius more than anything else. If it hadn't been for his decision to get me away from everything I probably would've taken my own life that night. I give thanks to him everyday of my life for that."

-Sung Markiel *Memoirs*

The Eye of the Storm was one of the most ingenious creations this century. Paul Rachland, had somehow managed to calculate exactly what was necessary to create a habitat *within* the Storm of Jupiter. The

construction had taken three years off site, and was delayed even further by accidents caused within the turbulent winds of Jupiter. He persevered, and on March 28th, the habitat was finished, save the final touches that were to be put in place in the three weeks before Markiel's birthday.

It's an amazingly beautiful habitat. Blah blah blah More to come here, when I think of how to best describe it.

I had never seen something like the interior of the Storm of Jupiter, the brutal fury of nature shaping the colors into the most splendid patterns. It was perhaps the best representation of my life at the time. The most beautiful thing I'd ever seen, and the most raw and savage. I remember one night where I stayed at the promenade viewing window for seven hours watching the reds fade to browns to reds to oranges to browns every minute of the hour. It was soothing, and fantastic.

-Sung Markiel *Memoirs*

It took Markiel three years to fully recover from the nervous breakdown that had nearly taken her life. For the first few days at *The Eye of the Storm* she did nothing more than sit in a chair in her room staring out at the swirling winds. Paul left her food at meal times, doing his best to get her to eat, but on the most part he just left her alone. In a week she was moving about the habitat, though still not speaking with anyone. She explored the artistic wing the most, losing herself in the beauty of Paul's drawings. (He had decorated the wing with his best works, hoping to get other artists in the future) Within 6 weeks she was playing the violin again, making use of the superb acoustics of the habitat's recital hall. While she stumbled at first, her muscles quickly remembered the proper techniques and her virtuosic abilities came back several months later. Everyday you could find her in the recital hall, practicing away. She played anything and everything, focusing particularly on the repertoire from the 2nd millennium.

The first year was the most trying for Paul. Markiel did not speak a single word to anyone and did not even respond with emotion towards anything she was shown. He could tell, somehow, that she was grateful. There was something in the way she would take her violin every day and play, or the way she would fill up a canvas with a painting of the gasses of Jupiter in the visual studios. He did not leave the habitat for anything and the small maintenance crew

that he had hired on began to question both of their sanity. But then it happened.

It had been 15 months since she'd come to *The Eye of the Storm* and she hadn't, to Paul's knowledge, set foot in the science wing. He hadn't been there in two months either, figuring it was better to leave the place alone than cause any accidents. One evening he noticed that the door to the wing had been left open and the lights inside were on. He cautiously entered, fearing foul play, but sitting in one of the observation rooms was Markiel, surrounded by hordes of scientific papers and journals. She was sleeping soundly, two printouts of brain scans clutched like a security blanket in her arms. She stirred as Paul approached, saying "I found it, Paul, I know why we're different." The pictures were of Paul's brain and her own. In the middle of each was a small circle of silver pen, with an arrow that said, "migrated cells." She collapsed in his arms and he brought her to her quarters.

"That day I returned to the world of the living, to use an ancient cliché. Paul's love was enough to sustain my existence, but what I found in those four frames made my life leap back to understanding. It was like my purpose returned. Not to say that I didn't love Paul, I loved him with all of my heart, and I loved everything he did for me and every moment we spent together, but my mind was in other things, and it needed its own purpose."

-Sung Markiel *Memoirs*

She spent more and more of her time in the science lab, still not saying much, but much more aware of her surroundings. She was constantly poring over science journals, recent ones, old ones, from all corners of the system. They were always about the same topic, Fawcett's Syndrome, and whenever Paul looked over her shoulder; the page was open to some picture of the subject's brain, and they were color coded to show which parts of the brain were showing activity. One morning at breakfast, three journals spread out in front of her, she looked over at Paul and grinned. She waved him over and showed him the three different pictures. "These are all from the same subject, performing different times in their life. The article themselves was looking to see which parts of the brain were used. The later ones discuss the same subject by confirming sources. If you look carefully at them you'll notice that the areas of coloration are of different sizes in every place. Between the first and second showing, for instance, the red splotch (on the frontal lobe) seems to have

shrunk. Now that usually happens as people get older, decreased activity and all that. This gentleman was 35 in the first, 40 in the second, however look at the third, about age 50, the red splotch has grown to twice the size." Paul looked at her, mystified at what she was saying. For each journal she showed to him, his confusion grew.

"All I did is aid what evolution we were going through already. I did not make radical changes, I did not reattach limbs and regrow joints; I simply sped up the evolutionary process a couple thousand years. I'm pretty sure that nature was trying to make us even more adaptable, and I felt this to be the best way. People are going to disagree with me, I expect that, but everyone is entitled to their opinion."
- Sung Markiel *Interview with a Concert Scientist*

"All I'm saying is that the cells in the subject's brain are not remaining solely with their function. See, this set of cells is primarily associated with the speech pathways, and here they are operating with the visual areas. I'm going to have to run more tests, but I think that our brains are adaptable. Yes, of course WE can adapt to any situation, I'm saying that our brain's cellular make-up is altering to help us out. That's something science hasn't encountered before."

-Sung Markiel *Scientific Committee Hearings June 2, 2862*

She began her investigation at once, poring over the journals and texts. She ate up every scrap of every study she could. If she hadn't known the information before, she knew it now and with a new sense of perspective. She put herself under the scanners and monitoring equipment, then Paul. Nothing invasive, she simply wanted to see what was going on, and observe the patterns and behaviors. She sent out invitations to her friends and associates with Fawcett's Syndrome, inviting them to come see the station, and marvel at both Paul's work and her own.

She still played the violin, and three hours out of the day would find her in the practice areas and the recital hall, developing her talents there as well as in the laboratory. The invitees were treated to the sounds of her playing as well as the opportunity to make use of the other facilities. Word began to spread about Paul's fantastic achievement, and Markiel's.

"The look on Paul's face when the first letters came in requesting an opportunity to stay in *The Eye of*

the Storm was priceless. He couldn't believe that people were that interested in staying there. To him it was another habitat, and if he wanted he was sure he could have created more."

-Sung Markiel *Memoirs*

Those that came were asked by Markiel to undergo the same tests that she and Paul had gone through. Almost all agreed and soon Markiel was compiling the data of twenty individuals. All with Fawcett's Syndrome, and all exhibiting the same characteristics that she and Paul had. She worked faster now, compiling the data into charts and lists and began writing up papers to submit to the Sol Scientific Committee. She also began her letters requesting the use of cadavers from the Earthen based Morgues, something that also needed the permission of the SSC.

Begin Stream of Consciousness

The Sung

The Sung are a relatively new creation in the realm of God's Dice, being now only in their second generation. (This allows the GM to come up with all sorts of nasty side effects)

All Sung have a tinge of violet in their skin pigment, a personal touch that Markiel left with her creations. All Sung have a diffuse nervous system, and their brain cells have the ability to regroup dependant upon function. (Yes, they still have some sections that are dedicated to select abilities, the mass of cells around those areas are migratory) What was once a spinal nervous system is just a continuation of the subject's brain, and is able to connect directly back to the main 'thinking' sections depending on the task at hand. All Sung can willingly alter their brain structure, it's like another muscle they can flex, it is learned in the same manner as speech and learning how to walk...by use.

The Sung have found that they are much more aware of their surroundings, due partly to their ability to enhance their perceptive characteristics. As such they're communications are much more subtle. A slight change in inflection becomes as important as the natural human voice rising at the end of a question. Their posture and gestures are also taken to mean different things. Rumors have also circulated that they have developed their own form of silent communication, akin to Sign Language, but on the whole much different.

The Eye of the Storm has become a school for the Sung, helping them develop their talents and in borne physical abilities.

They are a new race, but they are not their own people. Just as they were with Fawcett's Syndrome, so are they with their new traits. They do not actively seek out independence, content in observing those around them. They hold the ideals of science and art above everything else, and seek to integrate art and science as much as possible. It is their belief that each is the same, without science there wouldn't be art, and without art, there would not be science. They believe that the individual is unique, and that they should be nurtured and cherish.

They also only number several hundred at the moment...

End Stream of Consciousness

It's not that we will live forever, no one can create the immortal, and I'm positive that I haven't. The reason that most people die, as far as I've been able to determine, is that something gives out, or breaks. Sometimes, that destruction manifests itself physically, such as the problem of heart attacks, or bone destruction. Other times, however, people simply die of 'old age'. Their brains cease to function.

Fortunately for us, we have ways of circumventing this problem. As studies have shown, we use far more of our brain potential than the human species. This allows us to shut down areas of our brains at different times, saving it for when it is more needed. Basically, we can put parts of ourselves to sleep while other parts remain awake. It allows us to both function longer, and sleep more 'thoroughly'.

We achieve a meditative state more than anything else, when we 'sleep'. We are simply giving the synapses a chance to rest themselves, and be ready again when they are able. If we must, we can put half of our body to sleep while the other remains aware and active, or the legs could be active while the torso and arms rested. I'm sure it would look strange to the human perception to see someone working, half of their body laying limp while the other furiously working on some construct. I'm sure it is equally odd that we have violet skin.

To answer the fears that a 'sleeping' Sung is a

*danger to society, I assure you, they are not. 'What if they lose their bearings while half sleeps?' you say, and you are wrong. The half that is awake is **fully** awake. Remember, we are able to split the thoughts of our brain, if you want to put it that simplistically. We can move our control centers around if we wish. We can operate things actively. If you don't believe me, you can put me through the tests. I'll pass them. I passed my own.*

- Sung Markiel Speaking on the projected life span and sleep cycles of the Sung