

# Facts of Science Fiction

## in *Rolo the Pet Earthling*

by Hans Ness

*Rolo the Pet Earthling* takes place on a planet of big green aliens where earthlings are considered adorable pets. Much of this world may seem like comic goofiness, but there is an underlying truth about the science in this fiction.

**Earthlings on Alien Planet** — It's highly unlikely another planet would have air that humans could breath, *and* not be too hot or cold, *and* have tolerable air pressure, *and* have gravity similar to Earth, *and* have safe levels of solar radiation, *and* have a sun not too bright and not too far. But it's not impossible. So most sci-fi indulges in this highly unlikely coincidence.

**Alien Years** — It's unlikely an alien planet would revolve around its sun at the exact same rate as Earth. But to tell a story without a lot of math, it just so happens that 1 Blorx year = 1 Earth year.

**Yellow Skies, Purple Leaves** — Planets do have different colors. Venus has a yellow sky. Mars has reddish dirt. If we discovered alien plants, they might not be green.

**Daily Eclipse** — Planets Blorx and Blorza are described as “sister planets” orbiting around each other every day. This is like a planet and moon, except the moon is a planet, which is called a double planet. (Pluto's moon Charon is big enough that some consider them to be a double dwarf planet.) For them to orbit each other every day (77 hours), and for the eclipse to last so long they call it a “night”, the planets would need to be extremely close to each other. But at such closeness, their gravity would tear each other apart.

The only other way would be if Blorza is much bigger than Blorx, making Blorx more of a moon than a double planet. They would still need to be fairly close, which would make Blorx always face Blorza (tidally locked). The eclipse would last a fraction of the day, then, as Blorx turns away from the sun, it would be a regular night. This means during each 77-hour day, Blorx would have two nights and two periods of daylight. The length of each day and night would depend on your position on the planet. On parts of the planet, the eclipse and night would overlap, so they'd have only one day and night.

**Blorple and Blorange** — Blorple is a color that blorxlings can see but earthlings see it as gray. This is very real. Human eyes detect only three frequencies of light, and the different mixtures of these three are how we perceive colors. But dogs perceive different frequencies and only two of them, so they see red as gray. Birds perceive four frequencies, so they see colors our human brains cannot even imagine. So it's very realistic that aliens would see different colors than humans, possibly more, like the color blorange. There are no “real” colors—each species has different eyes and different brains with different perceptions of what we call color.

**Brain-Chips** — Blorxians have cybernetic implants to look up information, do calculations, and store their old memories. We are working on cybernetics and it may be possible eventually. (Although this raises the question: Why do they have cellphones if their brain-chips are on a wireless network and can do the same things, but that's for comedy. Or we might say they can't "see" images from their brain-chips the same way their eyeballs can, so they prefer physical screens for visual information.)

**Wormhole Subway** — Wormholes are a theory of folding space, where two distant points in space are somehow connected. But there is no supporting evidence for this yet. If it is true, there's no reason the ends need to be so far apart in open space. In theory, aliens could create thousands of wormholes around their planet for easy transportation. But they would not look like tubes like we see in so much sci-fi. Nor would they look like a subway or open and close at scheduled times—that's just for comedy.

**Hyperways** — Rolo travels along highways in space called hyperways. This is a variation of a wormhole, where there are tunnels of stretched space, so maybe one meter inside the tunnel equals one kilometer in normal space outside the tunnel, enabling you to travel a thousand times faster. But to reach other planets in months or years, you'd need to travel faster than the speed of light, which is impossible. This inconvenient fact ruins sci-fi, so we use warping and worming through space as a hack.

**Robot Personalities** — It's unclear why anyone would program robots with emotions. Also, these robots are rather slow and clumsy. And for some reason they use speech to communicate with each other instead of wireless transmissions. All of this is completely illogical, but it's much funnier and more interesting for stories.

**Only a Double Helix** — Human DNA is shaped like a twisted ladder, which is called a double helix because of the two sides of the ladder. The blorxling clerk said earthlings have "only" a double helix, implying their DNA is a triple helix or something more complex, which is certainly possible.

**Holograms** — Blorxlings post holographic posters that resemble paper. The illustration even shows tear-off pieces of such a poster. This is pure silliness. It's more likely people would post information online where they'd see it with their brain-chips. Also, while holograms are popular in sci-fi, we have no idea how it could be done in open air, and it might be impossible.

**Hovering Tanks** — The ACF tanks hover, as is popular in sci-fi. However, there is no known way to negate or reverse gravity, which may be impossible. Other forces like magnetism can be used for hovering, but this works only in controlled spaces like a maglev train track, so perhaps the blorxian roads use magnetism.

**A Star Named Sol** — Our sun is named Sol, hence the word "solar".

**Sailing on the Stratosphere** — Blarzenhook tells a tale of his ship being attacked by a creature in the atmosphere of a planet, then sinking and getting crushed in a "gaseous grave". This is possible. Jupiter, Saturn, Uranus, and Neptune are gas giants, meaning they're gaseous. Any ship sinking into their atmosphere gets crushed by the pressure.

Venus also has an atmosphere so dense that a special ship could float on the air, and the pressure gets intense closer to the ground (deeper). Giant creatures could in theory “swim” in such a dense atmosphere.

**Solar Storm** — Blarzenhook says a spaceship was damaged in a storm of solar winds and blown off course. This is realistic. Stars do emit a solar wind of charged particles, which does lightly push whatever it hits. And stars do have “weather” on their surface, causing sun spots and solar flares. A spaceship too close to a turbulent star could be damaged and pushed away by sudden solar winds.

**Domesticated Humans** — Blarzenhook’s tale mentions earthlings like their “domestic breed” of earthlings. Domestication is when animals became tamer over generations to be more useful to people, like dogs, cows, and chickens, which are different from their wild ancestors. Just like we breed dogs and cats as pets, aliens might breed humans as pets. Blarzenhook also says that during an ice age, humans visited alien camps to stay warm by the fire, then they grew fond of each other. We believe this is how wolves became dogs: wolves visited human campfires, but only the friendly ones were allowed to stay. Blarzenhook also says the aliens herded earthlings in flocks, which is what humans do with domesticated sheep, goats, cows, etc. Of course, this isn’t actual human history, but scientifically it would be possible.

**Blorxian Ark** — Blarzenhook says a spaceship appeared in the night with a flash and a boom, then it started raining. A meteor or large object entering the atmosphere does glow brightly and create a sonic boom. A shock like that might trigger rainfall.

**Space Tether** — The large moon is colonized, with a tether connecting the moon to the planet. This is based on the very real idea of a “space elevator”, which is a cable stretched between the ground and a satellite or space station orbiting the planet at the same speed as the planet’s rotation. It’s like swinging a ball on a rope around your head. An elevator car would climb the cable to bring people and cargo to space much more efficiently than flying in rockets. But in this story, the cable is attached to the moon, which would work as long as the moon and planet are tidally locked, always facing each other (unlike Earth).

**Charged Water** — When Rolo dips his feet in the ocean, he feels an electric tingle. This can happen if the water is charged—either more or less electrons than the dry land—causing an electric current to flow through his feet. But this would happen only if something prevents the electrons from flowing through the shore and pylons, so the ongoing contact must cause a chemical reaction that blocks any more electrons from passing—a natural insulation.

**Glowing Ocean** — The blorxian ocean water glows when waves crash or ripples bounce off the pylons. On earth, some plankton glows when the water is disturbed, so that’s one possibility. Triboluminescence is a phenomenon of emitting light from friction. It might also be a chemical reaction of blorxian ocean water, or something related to the electric charge, like how auroras glow from charges in the atmosphere.

**Glowing Woods** — The tree seeds glow when they fall. On earth, some animals have bioluminescence, like fireflies. In theory, plants could evolve bioluminescence too (like *Avatar*).

**Changing Size** — *[Spoiler Alert]* The toy rocket expands into a full-size rocket. If it just expands the space between the molecules, then it would still be as light as the toy and blow away in the wind, which would not make a durable ship for space travel. Somehow it would need to create mass or absorb mass from the air. This is probably impossible. (Sorry, Ant-Man.)

**Plastic Worm-gear** — The Colonel says, “I’ve got about as much confidence in those two as a plastic worm-gear,” meaning they’re unreliable. A worm-gear is spiraled like a drill-bit, and plastic ones wear out quickly, so they are unreliable.

**Science Lyrics** — The song that Zira sings has many metaphors about science:

It compares the atomic bonds of electrons and the nucleus with the bonds of family. “Elementally” is a reference to the Periodic Table of Elements.

Growing a spine is like the evolution of vertebrates, and getting unstuck from the mud is like evolving to crawl out of the water onto land.

It refers to the Big Bang, then the hot matter (tempers sounds like temperature) cooled and formed stars. Constellations are patterns of stars, which sailors used to find their way.

It says time is an illusion and suggests thinking forward and backward in time. The theory of relativity shows time and space are related, so our perception of time is indeed an illusion. Time-traveling forward is possible by traveling near the speed of light (time dilation). But there is no known science for traveling back in time.

It mentions anti-gravity. There is no known way to negate or reverse the pull of gravity, so this is purely sci-fi.