

# Leagues and gravity

The Urth list — 8 messages, 7 voices, 11 Mar 2002

<https://urth.darkrealm.vip/thread/urth/3025>

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Jerry Friedman — 11 Mar 2002, 23:52

--- Michael Andre-Driussi <mantis at siriusfiction.com> wrote:

Assuming that Lune Diameter = 2160 miles, and Orbit = 150,000 miles . .

.

...

Where did you get 150,000 miles?

Anyway, you got me thinking about Green-Blue celestial mechanics. Stop me if this has all been done.

We're pretty sure Green is not a satellite but rather another planet with a slightly smaller orbit, so that it comes into conjunction every six years (if I remember correctly), right? Also, Green has higher gravity than the moon--otherwise the narrator would have told us at least once how the first thing he as Horn noticed was floating every time he tried to take a step. I can hardly imagine Green has less than half the gravity of Earth and the same density. Using those assumptions gives it 1/8 the Earth's mass. (Calculations available on request.)

Let's also believe Incanto quoting one Gagliardo when he says the closest approach of Green to Blue is 35,000 leagues. If these are the same leagues in the afterword to *The Sword of Lictor*, namely about three miles, then that's 105,000 miles. For comparison, somebody on the first visit to the Red Sun Whorl says a league is 7000 steps. If these are half the Roman pace of which the 5000-foot Roman mile was a thousand, then that's  $7000 \times 2.5 = 17,500$  feet  $\sim 3.31$  miles. Using that latter number, Green's closest approach is about  $1.87 \times 10^8$  meters.

We can now determine that the maximum force that Green exerts on Blue at conjunction is about  $8.5 \times 10^{21}$  N. For comparison, the force the sun exerts on the Earth is about  $35.3 \times 10^{21}$  N. In other words, Green is going to mess up Blue's orbit something fierce--and much more if it has more than half the Earth's gravity. Mere storms and tides are nothing. Blue is going to mess up Green's orbit even more. I doubt the system would be stable for more than one or two conjunctions.

So did I make a mistake? Are we supposed to infer something from this discrepancy? Or is this another case of Wolfe's not letting science get in the way of the story? The problem with the latter is that if he can get away with anything, the kind of deductions he apparently expects readers to make become problematic--which is the difficulty we're having with the Blue/Ushas conjecture.

Jerry Friedman

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Dan'l Danehy-Oakes — 12 Mar 2002, 00:10 · follows Jerry Friedman

Jerry Friedman wrote, and I'm going to snip and cut mercilessly to avoid a 90% quoted posting...

I can hardly imagine Green has less than half the gravity of Earth and the same density ... 1/8 the Earth's mass.

Let's also believe Incanto quoting one Gagliardo when he says the closest approach of Green to Blue is 35,000 leagues. ... that's 105,000 miles ... Green's closest approach is about  $1.87 \times 10^8$  m.

... the maximum force that Green exerts on Blue at conjunction is about  $8.5 \times 10^{21}$  N. Green is going to mess up Blue's orbit something fierce

I doubt the system would be stable for more than one or two conjunctions.

So did I make a mistake?

Not, so far as I can tell, in your math.

Are we supposed to infer something from this discrepancy?

Possibly. My immediate guess would be that Gagliardo was actually clueless about the actual distance between the two worlds at, uh, perigreen. (No falcon around about this.) It's probably safe to guess that the astronomy and astrophysics of the Short Sun colonists is pretty primitive.

Or is this another case of Wolfe's not letting science get in the way of the story?

This is probably heretical, given his engineering background and almost fanatical attention to detail, but ... I have never really thought of Wolfe as the kind of Clement-ish worldbuilder who sits down and calculates all the astrophysics of a system before he starts writing. In fact, I could be wrong, but I'm pretty sure that this is the first Lupine text where the actual mechanics of a star system really affected the plot in any significant way - certainly the mechanics of the St Croix system isn't very germane to the plot of Fifth Head!)

The problem with the latter is that if he can get away with anything, the kind of deductions he apparently expects readers to make become problematic--which is the difficulty we're having with the Blue/Ushas conjecture.

The problem we're having with the Blue/Ushas conjecture is that some people on this list, who shall go nameless, like the idea so much that they will hang on to it in the face of any amount of contradictory evidence. Heck, I like this theory. It would resolve a number of irritating problems in the Sun books. But in fact it simply does not work for eighty-'leven reasons.

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Andy Robertson — 11 Mar 2002, 20:08 · follows Dan'I Danehy-Oakes

----- Original Message -----

From: "Jerry Friedman" <jerry\_friedman at yahoo.com>

So did I make a mistake? Are we supposed to infer something from this discrepancy?

It is clearly signalled that Green causes massive tides on Blue.

You are right in saying that such an orbital system would be unstable.

Blue would have even more massive effects on Green, of course, sending it all over the place.

Is there a solution?

I favour the idea that Wolfe started off with Blue/Green just being two planets in an alien

system.

When his hero got to Blue, he started to play with the idea that Blue/Green just *\*might\** be Ushas/Lune.

It is only at this point that we learn that Green comes even closer to Blue than the moon does to the Earth today - something which may signal that Green is a torn-away moon.

I think Blue/Green are in such unstable, temporary, orbits because they are a young configuration - one which was formed when Lune was torn away from Ushas by the White Fountain.

hartshorn

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Grant Peacock — 12 Mar 2002, 00:49 · follows Andy Robertson

Anyway, you got me thinking about Green-Blue celestial mechanics. Stop me if this has all been done.

Yeah I once posted some similar thoughts, although I didn't do any math.

Have you considered the possibility that the narrator is accustomed to gravity less than 1 g? I'm assuming the whorl was designed to prepare people for Blue. The fliers in the whorl are perhaps more realistic in a .5g environment.

Our moon exerts a stronger force on Earth than our Sun does. I say this because tides are only a bit more extreme during a full moon. (I forget the terminology. What are neap tides??) So I would guess there must be something wrong in your calculations.

I think you are surely right that the orbits are unstable, even if the force exerted by Green on Blue is a small percentage of that exerted on Earth by the moon. This means that the arrangement is a new one. For those who believe the Blue=Ushas theory, what must have happened was that the white fountain grabbed Lune out of orbit as it came lumbering in and made into a planet.

Does the white fountain literally move through space into the system, or does it just magically appear?

We're pretty sure Green is not a satellite but rather another planet with a slightly smaller orbit, so that it comes into conjunction every six years (if I remember correctly), right? Also, Green has higher gravity than the moon--otherwise the narrator would have told us at least once how the first thing he as Horn noticed was floating every time he tried to take a step. I can hardly imagine Green has less than half the gravity of Earth and the same density. Using those assumptions gives it 1/8 the Earth's mass. (Calculations available on request.)

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1.87 x 10<sup>8</sup> meters.

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Jerry Friedman

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Roy C. Lackey — 12 Mar 2002, 06:26 · follows Grant Peacock

Andy Robertson opined:

[snip]

When his hero got to Blue, he started to play with the idea that Blue/Green just *\*might\** be Ushas/Lune.

It is only at this point that we learn that Green comes even closer to Blue than the moon does to the Earth today - something which may signal that Green is a torn-away moon.

I think Blue/Green are in such unstable, temporary, orbits because they are a young configuration - one which was formed when Lune was torn away from Ushas by the White Fountain.

And Grant Peacock added:

I think you are surely right that the orbits are unstable, even if the force exerted by Green on Blue is a small percentage of that exerted on Earth by the moon. This means that the arrangement is a new one. For those who believe the Blue=Ushas theory, what must have happened was that the white fountain grabbed Lune out of orbit as it came lumbering in and made into a planet.

I don't want to get into the Blue=Ushas debate, but Lune didn't go anywhere. It came up as usual--only much brighter--the first night after the flood, and seemed to behave itself in its customary manner thereafter. See the last paragraph of Chapter XLV of UPTH.

Does the white fountain literally move through space into the system, or does it just magically appear?

It moved through space--Sev watched it get brighter as it came nearer.

-Roy

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Michael Straight — 12 Mar 2002, 15:48 · follows Roy C. Lackey

On Mon, 11 Mar 2002, Grant Peacock wrote:

I think you are surely right that the orbits are unstable, even if the force exerted by Green on Blue is a small percentage of that exerted on Earth by the moon. This means that the arrangement is a new one. For those who believe the Blue=Ushas theory, what must have happened was that the white fountain grabbed Lune out of orbit as it came lumbering in and made into a planet.

But every version of the Blue=Ushas theory I've seen at least admits a very long time between Severian and the Short Sun Books (long enough for Neighbor civilization to rise and fall), which is probably too long for such unstable orbits.

-Rostrum

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matthew.malthouse — 12 Mar 2002, 17:58 · follows Michael Straight

On 12/03/2002 15:48:42 Michael Straight wrote:

On Mon, 11 Mar 2002, Grant Peacock wrote:

I think you are surely right that the orbits are unstable, even if the force exerted by Green on Blue is a small percentage of that exerted on Earth by the moon. This means that the arrangement is a new one. For those who believe the Blue=Ushas theory, what must have happened was that the white fountain grabbed Lune out of orbit as it came lumbering in and made into a planet.

But every version of the Blue=Ushas theory I've seen at least admits a very long time between Severian and the Short Sun Books (long enough for Neighbor civilization to rise and fall), which is probably too long for such unstable orbits.

For this it doesn't matter if Blue=Ushas or not: any of the explanations requires a system stable enough for the history of the Neighbours etc and so far I don;t think we've come up with a mechanical solution that would be.

Matthew

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Jerry Friedman — 12 Mar 2002, 18:13 · follows matthew.malthouse

Mantis: thanks for answering my distance-to-Lune question so unequivocally!

--- Grant Peacock <grantpeacock at yahoo.com> wrote:  
[I wrote]

Anyway, you got me thinking about Green-Blue celestial mechanics.

Stop

me if this has all been done.

Yeah I once posted some similar thoughts, although I didn't do any math.

Have you considered the possibility that the narrator is accustomed to gravity

less than 1 g? I'm assuming the whorl was designed to prepare people for Blue.

The fliers in the whorl are perhaps more realistic in a .5g environment.

Reasonable, though we can hang-glide on Earth and the Fliers' propulsion modules could easily be far in advance of our technology. Anyway, wouldn't the narrator or Hoof say something about how heavy they felt on the Red Sun Whorl? Maybe you don't feel the local gravity in astral projection, but if so, they should notice that the Urth folk walk as if they were nailed to the ground (if nothing else).

Our moon exerts a stronger force on Earth than our Sun does. I say this because

tides are only a bit more extreme during a full moon. (I forget the terminology.

What are neap tides??) So I would guess there must be something wrong in your calculations.

Tidal force decreases as the cube of the distance, not the square, so the gravitational force of the sun on us is almost 200 times that of the moon, even though the tidal force of the moon is something like three or four times stronger than that of the sun.

(Spring tides, at the full and new moon, are the strongest; neap tides, at the quarters, are the weakest.)

I think you are surely right that the orbits are unstable, even if the force

exerted by Green on Blue is a small percentage of that exerted on Earth by the moon.

It's got to be \*more\*--Green comes much closer to Blue than the moon does to Earth, and it's surely more massive. Anyway, we agree on the instability.

This means that the arrangement is a new one. For those who believe the

Blue=Ushas theory, what must have happened was that the white fountain grabbed

Lune out of orbit as it came lumbering in and made into a planet.

Rostrum (I think) answered that point.

...

Let's also believe Incanto quoting one Gagliardo when he says the

...

Oops. I meant Inclito, of course.

Jerry Friedman