

Re: Colonizing the Galaxy in Eight Easy Steps

Source: <http://sci.tech-archive.net/Archive/sci.space.policy/2004-06/0869.html>

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Date: 06/11/04

Date: Fri, 11 Jun 2004 12:59:14 -0600

In article <k8ednX6rWIOKR1rdRVn-gg@comcast.com>, Reanimator_2000@yahoo.com says...

> *The Millennial Project: Colonizing the Galaxy in Eight Easy Steps* by Marshall T. Savage, 1994

There were some interesting things mixed in with a lot of elements that were obviously ridiculous. It was a fun read.

> *Aquarius solves today's problems in an inexpensive and ecologically sound way,*

No, actually this would be incredibly expensive. OTEC must be done on a massive scale and constructing huge floating structures is not cheap even via the methods Marshall Savage proposed. It may be ecologically neutral, or possibly even ecologically beneficial, but we'd need more research to be sure about the short and long term effects of OTEC on a wide scale.

> *and serves as a testbed for our later colonization efforts.*

>

> *The first and most important part of each aquarian colony is an OTEC (Ocean Thermal Energy Converter), a revolutionary form of solar power. Thanks to the sun, surface ocean waters are far warmer than in the depths, especially at the equator. An OTEC is a 3300 foot long pipe that sucks 40 degree (fahrenheit) water to the surface where it's 80 degrees.*

Open cycle systems have the potential to be a bit more efficient, but are still subject to biofouling and many other technical issues.

> *A single OTEC will be taken by ship to a spot in equatorial waters, where the water is warm and deep and hurricanes are rare (thanks to the Coriolis force). A magnesium wire mesh will be placed in the water and using the electricity from the OTEC the water will be electrolyzed, creating a "seament". The same minerals used by shellfish to create their shell will be deposited onto the wire from the sea water due to the electricity. After 6 months of electrolysis a 5.5 mile diameter structure capable of housing 100,000 people should be complete.*

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Yeah, that gave me a good chuckle too. I would have preferred that he stuck with the system of interlocking plastic pontoons and scaled it down considerably.

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- > *The OTEC will pay many dividends. Excess energy can be converted and stored, or*
- > *sold...water can be electrolyzed, separating the oxygen and hydrogen. Hydrogen*
- > *can then be transported via large balloons*

Yes, his balloon vehicles were pretty cool. Not that they'd work or anything, especially for transporting appreciable quantities of H₂, but that's just a detail, right?

- > *for use in fuel cells in other parts*
- > *of the world. More importantly, the water dredged from the depths of the sea will*
- > *be rich in nitrogen which will promote plant and algal growth,*

Which could in turn promote eutrophication and the killing off of fish. Actually, it's believed that OTEC could be beneficial, but we will certainly need to do more work with it before we are sure. In might be best to try to tap natural current, in any event, rather than trying to do all the work oneself.

- > *making sea farming*
- > *of fish and mollusks possible.*
- >
- > -----
- >
- > [2] *BIFROST – 21st Century Launch System*
- >
- > *Our bridge into space will be a revolutionary new system, far more economical*
- > *than NASA's shuttles. A kilogram of payload onboard a Space Shuttle costs about*
- > *\$8800 to send into orbit. The reason for this is that for every ton of payload*
- > *(the stuff you actually intend to put into orbit) you have to use 25 tons of fuel*
- > *and shuttle to get it there (20 tons of fuel, 5 of shuttle). Much of the fuel is*
- > *spent, not lifting the payload, but lifting the rest of the fuel.*
- >
- > *By contrast, Bifrost will be extremely cheap, perhaps as low as \$15 to \$20 per*
- > *kilogram over the long term. The reason for this is that the Bifrost shuttle will*
- > *carry almost none of its own fuel.*
- >
- > *Bifrost begins with a 250 kilometer tunnel drilled out of a mountain*

Yes, he only wants a couple hundred miles of tunnel around one of the worlds largest rift valleys. The reason that it's underground is for aesthetic reasons, so that it doesn't spoil the lovely landscape.

- > *The shuttle is a "wave-rider", a delta wing craft (triangular) that coasts on its*
- > *own shockwave and makes an excellent glider. The wave-rider will be accelerated*
- > *through the tunnel using superconducting rings in the walls – magnetism will drag*
- > *it along until it's attained much of the velocity necessary to launch it into*

> *orbit.*

The embellishments aside he just wants a large linear accelerator. Assuming that we can work the technical kinks out of such a system, the I'm sure we'll use it someday, albeit in a more practical setting.

>

> *The wave-rider carries only about 4 tons of fuel. Ice, to be precise. When the wave-rider bursts free of the tunnel, powerful lasers on the ground will vaporize the ice on the rear of the wave-rider, which will give it the extra boost it needs to get into space.*

Ice would probably not be the ideal fuel. Many people have explored similar schemes of using lasers to produce plasmas or thrust for a rocket exhaust. In principle, using beamed power to help a rocket generate the necessary acceleration is a good idea and I'm sure that we will investigate it more in the future.

> *Our next stepping stone will be a colony in geosynchronous orbit about the Earth. Much like Aquarius, Asgard will house about 100,000 people. Also, much like Aquarius, Asgard will be modular. Aquarius will be composed of many hexagons joined together to allow for easy expansion and provide stability against sinking; Asgard will be Aquarius taken to 3 dimensions.*

Yes, Asgard is fun. I like his elaborate discussion of soap bubbles and the like. I think that there are superior and imminently more practical techniques which might be used. However, stationkeeping could be difficult in geospace, not to mention the issue of crowding out communications satellites. Lagrange points would probably be better.

>

> *[4] AVALON – Ecospheres on the Moon*

Yippee! I wanna flap around like a bird inside the domes too. See the book for more details.

Remaining stuff was interesting, but a bit too speculative to be of much use. I will note that we could probably make far better use of solar system resources than Marshall envisions. Tethers and other large scale development projects would probably continue to give the edge to planetoid and sub-surface dwellings. Savage does include a lot of details about things like flavinoid embellished bacterial foodstocks and the possible use of electromuscular stimulation to stave off muscle wasting in low gravity. As I say, they're interesting, though hardly practical. For more practical planning, the Mars Institute and

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"It is fashionable to wax apocalyptic about the threat to humanity posed by the AIDS virus, 'mad cow' disease, and many others, but I think a case can be made that faith is one of the world's great evils,

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comparable to the smallpox virus but harder to
eradicate." -- Richard Dawkins