OUTBOUND #7 AUGUST, 2018 - "Mars in Antarctica"
Why Advocates of Mars Settlements should work to amend the Antarctic Treaty, up for review in 2019

"Failure to "responsibly modify" the current Antarctic Regime could very well result in a Treaty ban on "settlement" of the Moon and Mars, allowing scientist-explorers only."

The Antarctic Treaty Precedent

In 1959, Twelve nations, involved in Antarctic exploration, and with land claims frozen, established a treaty that would allow peaceful collaboration and coordination, signed the original Antarctic treaty. Since then 31 others nations who wish to conduct exploration and scientific research there have now "asceeded" to the extend the treaty another thirty years, that is in 2019 - next year as I write this. That gives us little time to marshal support for some key changes.

The most significant of recent protocols was signed in Madrid in 1991 therefore being known as the Madrid Protocol, though it's official title is, "***The Protocol on Environmental Protection to the Antarctic Treaty***" which came into force in 1998.

Most of the provisions are reasonable.

But some of the provisions create a precedent that must be rejected if we are going to open the Lunar and Martian frontiers to resource-using settlement.

Article 3 "Environmental Principles" is fine as it stands and is not the area of concern.

Article 7 states "***Any activity relating to mineral resources, other than scientific research, shall be prohibited."***

It is time for some key changes

it would be better to rate specific areas of the continent according to environmental risk, and to set standards for mining practices such as to protect the environment. ***If all mining operations were bad, we would still be in the stone age.***

Article 8 does make distinctions between activities with (a) less than a minor or transitory impact; (b) a minor or transitory impact; or (c) more than a minor or transitory impact. ***But the overall effect has been chilling.***

We certainly do not object to a rigorous review of all mining and commercial activity proposals. But the outright "ban" is counterproductive.

√ In effect, Antarctica is off-limits to settlement, that is, if settlers are to produce any percentage of their needs, specifically, building materials.

Not helpful, ***the treaty applies to areas poleward of 60° south***.

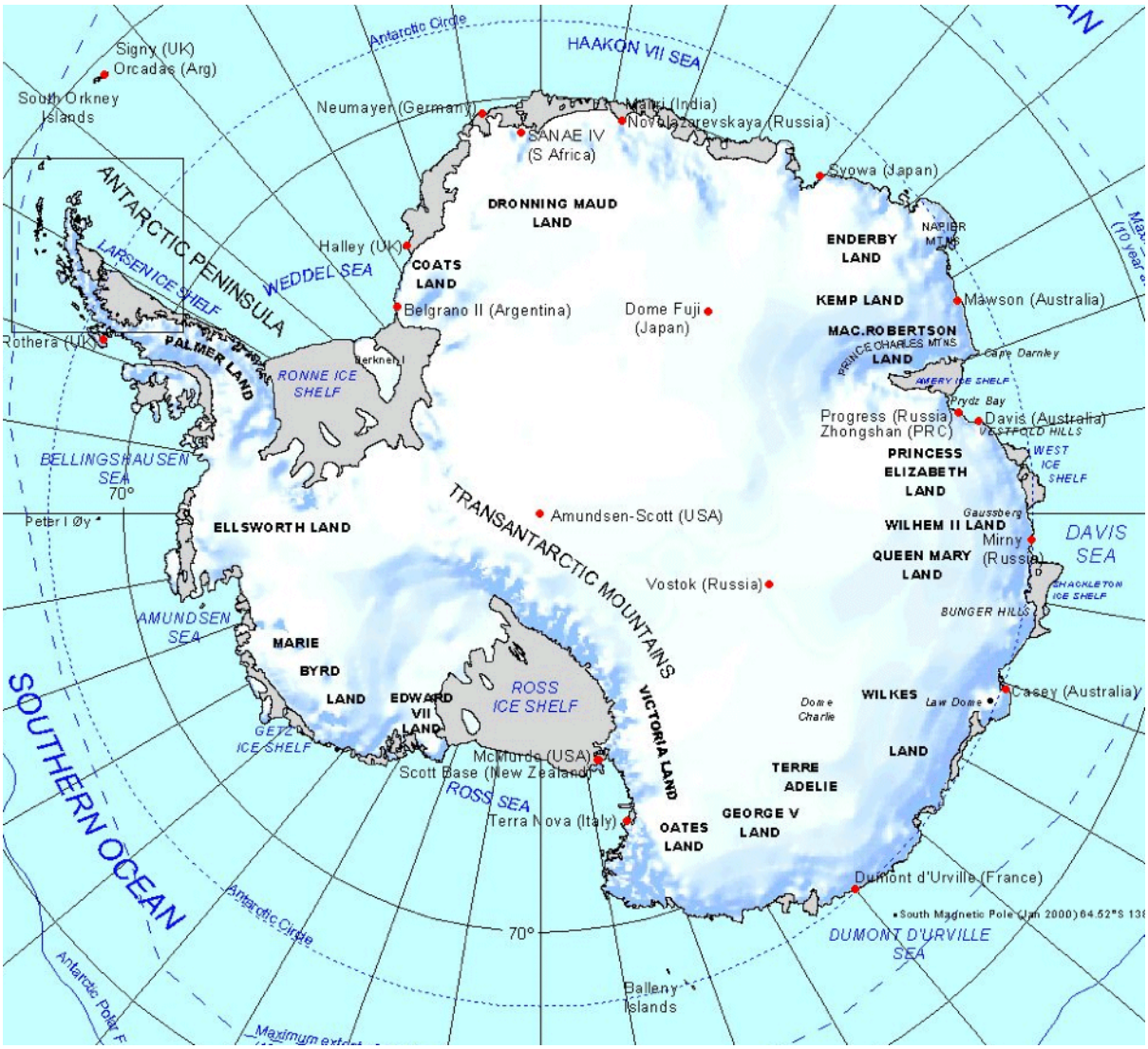
√ If instead the Antarctic Circle had been the "fence," about a third of the Antarctic coastlands (that portion south of Australia and the Indian Ocean) and much of the Antarctic Peninsula (below South America) would be excluded from this ban.

The principal base of both McMurdo Sound and ***the very unique Dry Valleys*** lie south of New Zealand. These valleys are environmentally unique in all the world, but even there some scientific research - ***(these valleys offer the best Mars analog facility site conditions anywhere)*** *- and even* ***some commercial operations such as "photos and footprints only" tightly-guided tourism - should be allowed.***

In our view, the Treaty notwithstanding, humanity has a right to settle and use the resources of both treaty-excluded and treaty-protected areas, but under strict safeguards and protocols.

The pro-space community sat on its hands when the Treaty was extended last time.

Hopefully we will rise to the challenge in 2019, but that will require a lot of careful and detailed preparation. Meanwhile the clock is ticking.



Note the Antarctic Circle in the map above

Antarctic Activities can Blaze the trail for Pioneers on Moon and Mars

Failure to "responsibly modify" the current Antarctic Regime could very well result in a Treaty ban on "settlement" on the Moon and Mars - allowing scientist-explorers only.

It is essential that we demonstrate here on Earth, in Antarctica, that ***development and settlement can be pursued in a way that respects and preserves nature.***

To do this, we need to set standards, something we have failed to do previously except retroactively, after damage done has become too significant to ignore.

In that light, ***not to set standards in advance*** would be to ***disrespect the gift that is Antarctica, and that is the Moon, and that is Mars***.

Put it this way: to win a broader base of public support, ***we need to earn the respect and support of the "Environmentalist" community*** (to which, by the way, we personally are personally proud to belong.)

We offer some suggestions in the article that follows.

1. First, we consider what we might be able to do within the limits of the present language.
2. Then we show how some simple modifications would allow more productive activities <u>without undue harm</u> to this magnificent natural frontier.

As on the Moon and Mars, the more people who settle these worlds, the more science and research will get done - by these people and their descendants on location.

Humankind is not a cancer on Earth-life.

We humans are the only means, by which Earth-Life can be sown off-world, take root, and flower elsewhere on worlds where life cannot arise on its own.

We cannot leave the future of Antarctica, the Moon, Mars and other frontiers to those who understand neither the possibilities of opening these frontiers nor the consequences of not doing so.

How we can help:

- ***Suggest economic activities in Antarctica*** that could support permanent populations and at the same time, respect and preserve the environment at large.
- ***Suggest ways to open up more of Antarctica*** *while at the same time protecting its treasures.*
- ***Suggest ways permanent residents might adjust to very long daylight summers, and dark winters.***
- In Alaska, the extreme seasonal lighting variation from very long days and very short nights to very long nights and very short days may be a source of that state's high suicide rate.
- ***Some of the ideas we have suggested for future Lunans to adjust to long dayspans and nightspans by controlling lighting in indoor and middoor spaces should be applicable.*** *##*

Antarctic Cottage Industries based on "Found" Objects and Materials as a preview of early Home-based industries on the Moon and on Mars

"What is not expressly forbidden, is allowed" - an age old legal maxim

"Mining" implies **"excavation"** of some kind to provide access to minerals or materials below the surface. This includes "strip mining" or removing of a shallow surface layer to reveal mineral or substance (e.g. coal) just below.

What "mining" does not imply is "collecting" or "gathering" material lying loose on the surface.

√ Collecting ***meteorites from the surface of Antarctic glaciers*** is not mining.

√ Neither would be collecting ***driftwood from other continents tossed up on Antarctic shores*** by waves and storms.

√ Nor would be ***salvaging shipwrecks and plane wrecks****, or "****dumpster diving" the trash piles outside Antarctic stations.***

√ Neither would be ***collecting crystal rocks lying on the slopes of Mt. Erebus***, the continent's only active volcano, on Ross Island **overlooking McMurdo Station**. It is 3,794 m, 12,447 ft. high, currently.

"Mt. Erebus crystals are also known as ***anorthoclase feldspar***, a type of feldspar that consists of aluminum silicate. ... Rich in sodium, potassium and silicate, there is only one other place on the planet where these crystals can be found, Mt. Kenya, Africa.

Crystals grow in the magma beneath Erebus and get spit out of the mountain inside glassy volcanic bombs. The glass quickly weathers away leaving the mountainside covered in crystals. "While not an extraordinary mineral, these are extraordinarily large." "These crystals are embedded in these bombs and vary in size and shape, but all are of astonishing size for feldspar."

These crystals are coveted by almost everyone at McMurdo Station. ***Gathering these crystals has obviously been tolerated for some time,*** beginning with Shackleton's 2009 expedition which found "***lumps of lava, large feldspar crystals, from one to three inches in length***, and fragments of pumice; both feldspar' and pumice were in many cases coated with sulfur."

Fast forward to Moon and Mars: "earning the right to stay"

Might personnel hired for temporary service at an outpost on Moon and Mars, ***earn his/her right to stay by providing entrepreneurial services of this or any other kind that helps the outpost grow and thrive?***

This could be how permanent settlement starts*.*

Beyond arts and crafts produced furniture and furnishings that make it unnecessary to import equivalent items from Earth, ***entrepreneurs could undoubtedly find many other ways to make themselves useful.***

It may pay to import the tools and supplies they need to keep improving and adding to the services they offer. And if they stay behind, that saves the cost of a return home.

The various national space agencies or collaborations of them, may never recruit "settlers." In that case, ***it will be up to those hired to work at Lunar and Martian outposts to earn that right to stay, as settlers, in their spare time.***

Could this be how settlement starts? Those with side-talents hired to work at Antarctic stations could pave the way and establish a paradigm for the introduction of a "resident population." Could we do the same on the Moon, and Mars?

Antarctica poses a number of serious logistical problems to mining or prospecting activities;

- ***Antarctica experiences the most extreme cold on the planet.***
  But (Mars' fans take heed!) ***Mars' climactic temperature range is very similar:***.
- ***Mutual isolation of outposts in Antarctica is a preview of what it might be like on the Moon and Mars.*** Such isolation is ***an impediment to internal trade***. But ***a clustering of inter-trading settlements on the Antarctic Peninsula and its off-shore islands*** is an optimal place to start.
- ***On Moon and Mars both, some settlements will be very isolated,*** but for success, ***a cluster of neighboring settlements" at some "optimal locations"*** will be critical to the development of Moon 7 Mars economies. "All great things can be traced to humble beginnings!"

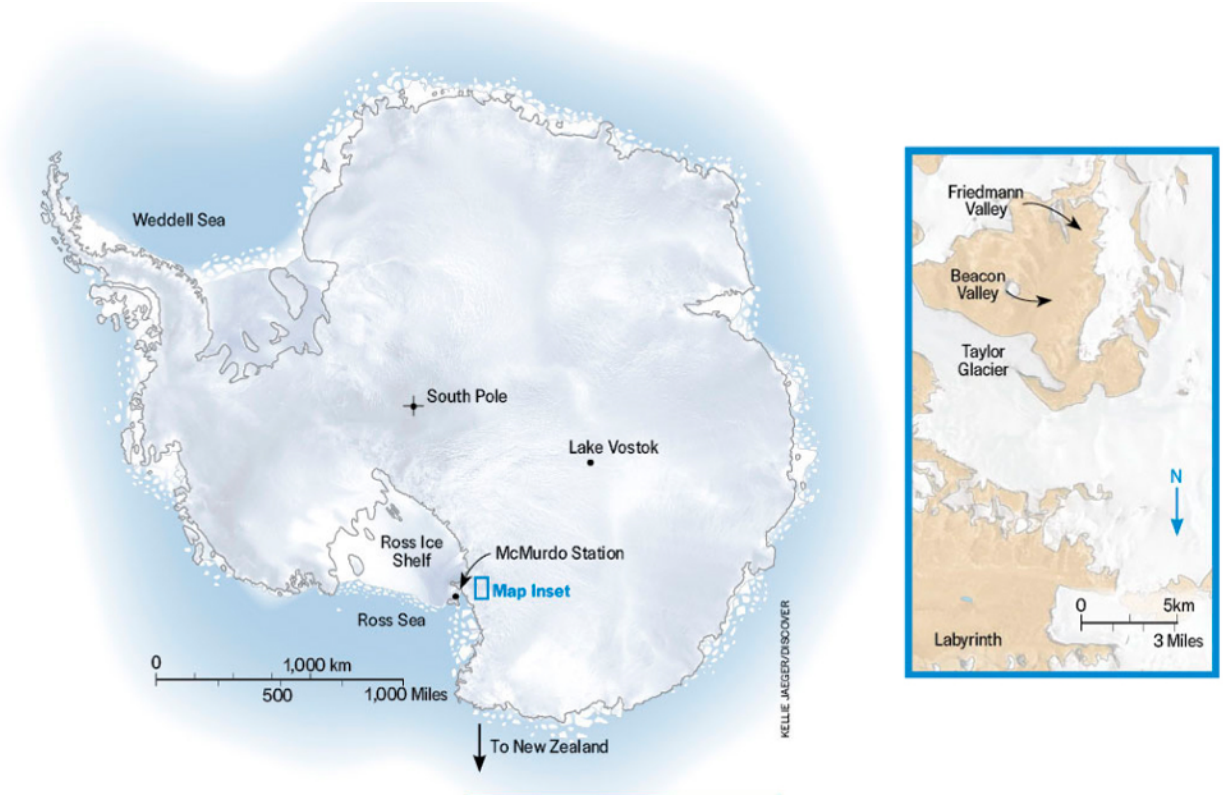
Many people, even some prominent space advocates, think settlers of the Moon are going to be "moles." Well **yes,** lunar habitats and facilities will be covered by 2-4 meters (6-13 feet) of lunar soil or "regolith." **But**, while such a shielding overburden is necessary for long-term protection from cosmic rays, solar flare outbursts, and the sun's ultraviolet rays, ***this does not mean that we "moon miners" can't take the glory and warmth of sunshine down below with us - and along with the views!***

Meanwhile, take heed, all you would be Mars Pioneers

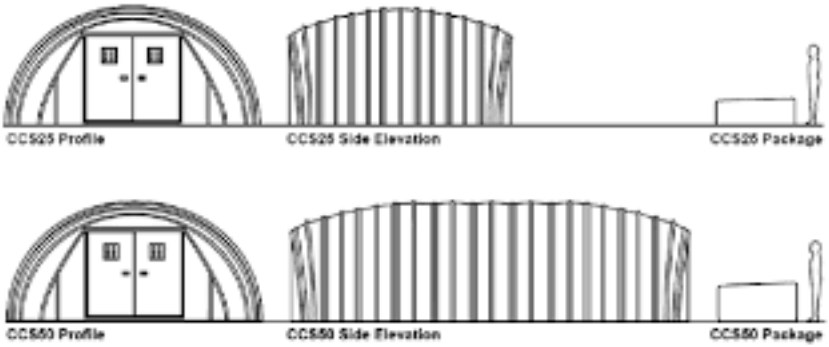
Antarctica's fairly ice-free "Dry Valleys" have a climate very similar to Mars as to Mars' warmest seasons and coldest seasons.

I have always found it curious that many a many a would-be pioneer has moved from a hometowns in the United States North Eastern states to settle in the much warmer South West.

The Dry Valleys of Antarctica would be a vastly better place for the Mars Society's next Analog Station. If you shudder at the suggestion, you need to look at yourself in the mirror and say over and over "who am I kidding!"



Insulated and cozy, this **inflatable Quonset** below could be moved from one site to another. This looks like it could be the next Mars Society's **M**ars **A**ntarctic **R**esearch **S**tation **M.A.R.S.** The M.A.R.S. Station could be comprised of 3 or more of these units with a similarly inflated and insulated "hallway" connecting them. A Major benefit of going "inflatable" (in addition to lighter weight) is that the units can be highly compressed for shipping to the chosen site.)



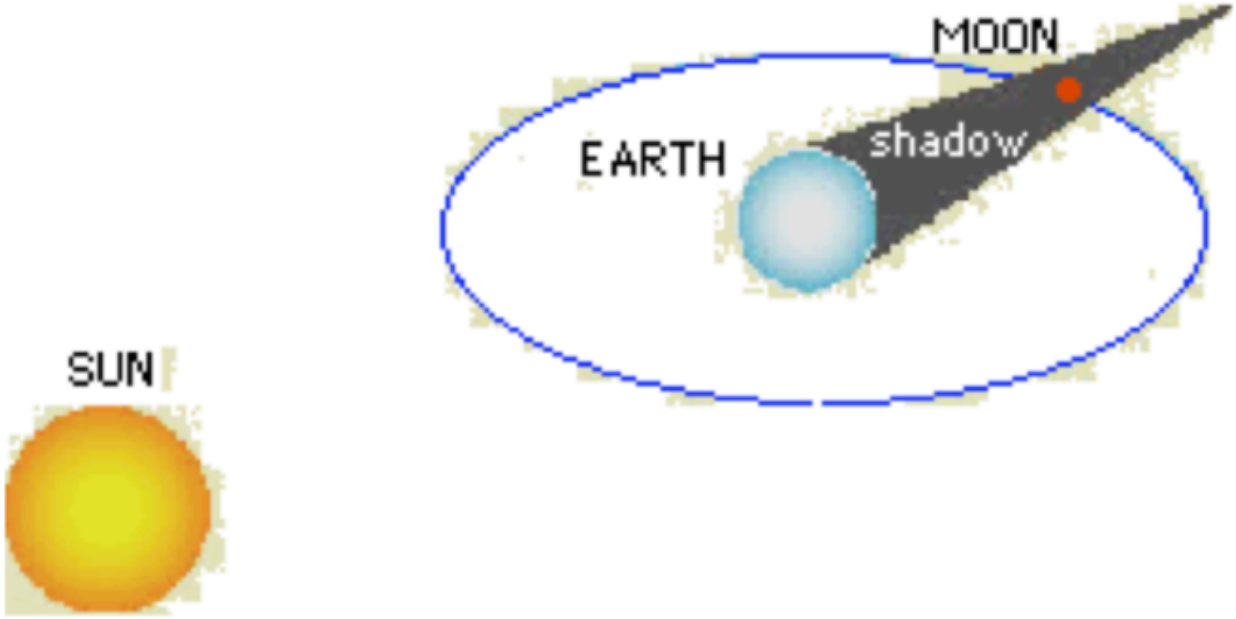
Yes, transportation costs would be higher than to the Society's other locations in Utah and on Canada's far north Devon Island. But if the Society is serious, we bet that the needed funds would pour in. The Dry Valleys are very Marslike except for the crystal clear blue skies and daylight that extends for nearly six months. Those of you who contribute heavily to the Society might give some serious thought to funding such an operation.

Note: these same inflatable quonset huts could also be shipped to the Society's Devon Island station to create larger more realistic Martian Outposts of multiple units with multiple functions. The existing habitats in Utah and on Devon Island

are quite unrealistic in both crew size and in various exploration and science missions.

Using inflatable quonset hut units, would also allow simulation exercises to be conducted in any number of Moon-like or Mars-like settings here on Earth, with considerable publicity in local newspapers, helping to find volunteers and applicants, etc. ##

Back to the Moon: Eclipses: the Lunar Experience July 28, 2018.



The recent lunar eclipse "painted" the Moon a dull Mars-like orange. (The Sun slipped behind the atmospheric ring around Earth, painting the Moon with sunrise/sunset colors.)

When such an event reoccurs after pioneers have begun to settle here and there on the Moon, the Moonscape's sudden and brief "**Mars-like**" look (at least in color) will be quite an event for them to experience.

Should some lunar settlers, after experiencing such an event, consider signing up for a stint on Mars, their experiences on the Moon should be helpful. To seasoned Lunans, Mars will be "a walk in the park."

Some lunar tours will be timed so that visitors from Earth can experience this "touch of Mars" effect on the Moon. The demand will be high enough to raise prices on trips to the Moon timed to take in such an event. ##

Book 1 is out!

A Pioneer's Guide to Living on the Moon (by Peter Kokh)
https://www.amazon.com/Pioneers-Guide-Living-Moon-Book-ebook/dp/B07DYRV47Y
The above link is for the Kindle (electronic reader) version
As of July 31, 2018 the paper version had not yet been released. (Should be soon.)

(We are working on Book 2 "**A Pioneer's Guide to Living on Mars**" to be followed by Book 3 "**Beyond Moon & Mars, a Pioneer's Guide to the Rest of the Solar System**")

LOCAL MILWAUKEE CHAPTER NEWS

Milwaukee **Lunar** Reclamation Society (M**L**RS) (National Space Society)
As of our scheduled Saturday, September 8th Meeting
1-3 pm Mayfair Mall, Community Room 110 (lower level)

will ***meet conjointly*** with the new local Mars Society Outpost
Milwaukee **Mars** Reclamation Society (M**M**RS) (Mars Society)

("**Reclamation**" *in the sense of taking useless land such as a bog or swamp and making it useful*. In the Netherlands, polders were built to hold back the sea, and thus "reclaim" livable and farmable land out of what was once a shallow sea bed.)

Topics will include both Moon-related and Mars-related news
With emphasis on Moon and Mars alternating monthly,
1-4 pm on the **2nd Saturdays** of these months: ***Mark your Calendars (2018, 2019)***

Mars <- September 8, November 10, January 12, March 9, May 11 -> Mars
the Moon <- October 13, December 14, February 6, April 3, June 9 -> the Moon

We hope that this collaboration will boost our membership considerably, as it has dropped quite a bit in recent years. We have asked the Mars Society to spread the word among their members in Wisconsin.

We will be advertising our events more widely, locally. How to do this will be topic #1 at the upcoming September meeting. **In what news media, print or online, might we advertise on for little or no cost? We have asked the Mars Society to spread the word among their members in Wisconsin.**

The new Mars Society "Outpost" (less members than needed for a "chapter") began with two, Peter and an (unofficially) adopted "granddaughter" of his, Sarah Redwings.

We hope that publicity of our new Outpost in Mars Society publications will help bring in more new members, as well as guest speakers, and in turn, more opportunities for us to speak at various events, as we used to do in years past.

Monthly topics will include relevant space news, plus discussion of major topics in Peter's new books on the Moon (to be published any day now) and Mars (under construction.) The publisher is Amazon.

There are two (apparently defunct) Mars Society Chapters in the Greater Chicago Area
~~√ The Schaumburg Illinois Chapter~~. ~~√ The North Shore Chicago Illinois Chapter~~
We are trying to find out if there has since been a fresh start in Chicagoland.

To our readers everywhere:

Did you know that the Mars Society was founded here in Milwaukee?

It was at the International Space Development Conference held in Milwaukee, in 1998, when, as Conference chair, I gave Robert Zubrin a plenary session at which to announce the formation of the Mars Society.

It's about time, 20 years later, that we start a Mars Society chapter here! Given that there may be substantial trade between the Moon and Mars (far less fuel & shipping costs than needed for Earth><Mars trade) enthusiasts of both worlds ought to take interest in each other.

Mars Society membership rates: http://www.marssociety.org/home/join_us/

Sept 8th Mars Meeting topics: Low altitude/highest air pressure areas and Redhousing
Leaving Bad Habits back on Earth √ combining inseparables
√ trashification - new hills of plastics and inseparables √ follow lunar plans

Challenges of Settling Mars

Mars has a thin atmosphere, but an unbreathable one. This makes settlement constraints very much like those on the Moon: living in interconnected regolith shielded habitats both to conserve heat and to shield against occasional "hits"

Agriculture will for the most part be sub-surface and shielded as on the Moon
With the possibility to be determined that some Earth plants can be bred to take root on the surface in low basins (higher air pressure) (i.e. **the "Redhousing" Project**)

Water is available as polar ice caps and may be "squeezed" out of subsurface "wet layers" but will have to be reused constantly. Aviation may be possible with **dirigibles**

Mars looks more inviting, but much of that is superficial and to date, most sci-fi Mars films are not realistic.

Here on Earth we are disrespecting the atmosphere and hydrosphere, **polluting the planet to the point that it will slowly become less livable.**

Humans in general are not the kind of intelligent beings that will be able to make themselves at home on Mars long term. We need to "school" Mars fans on the facts.

Mars' North hemisphere's advantage:
√ longer springs summers, shorter falls and winters,
√ lower altitudes/higher air pressure
Disadvantages: √ higher winds, √ dust storms

Basalt out of which so many useful things can be made is widespread
√ Lava tubes, √ Mars great volcanoes, √ other basalt areas - those closest to warmest and wettest areas will determine where settlements will be built.

Settler tests: Double torus Moon/Mars Space Hotel in Earth Orbit
√ gravity levels, √ day-night cycles, √ vegetation, √ colors etc.
(Mars more attractive but separation from relatives and friends on Earth)
(Moon more near term, Earth in view and in reach)
√ Mars' 24**.6** hr days (great for "night people," rough on "morning people")

October 13th MLRS Meeting - What a Moon Setlement would be like
November 10th MMRS meeting - Mars Analog Activities are not realistic

√√ **An enlarging remake of the Mars Society's analog facilities in southern Utah (MDRS) and on Canada's sub-arctic Devon Island FMARS facilities: greater realization**
√√ (Once on Mars), **stacked but separable "tuna can Floors" can be separated and set next to each other on the same level** (Once on Mars), **much easier to shield)**
√√ **Brains and hands will be more important than build and muscles**
√√ **Possibility of an analog facility in Antarctica's "Dry Valleys"** (closest match to Mars temperature swings)
√ "Morning People" will have trouble adjusting to Mars 37 minute longer day.