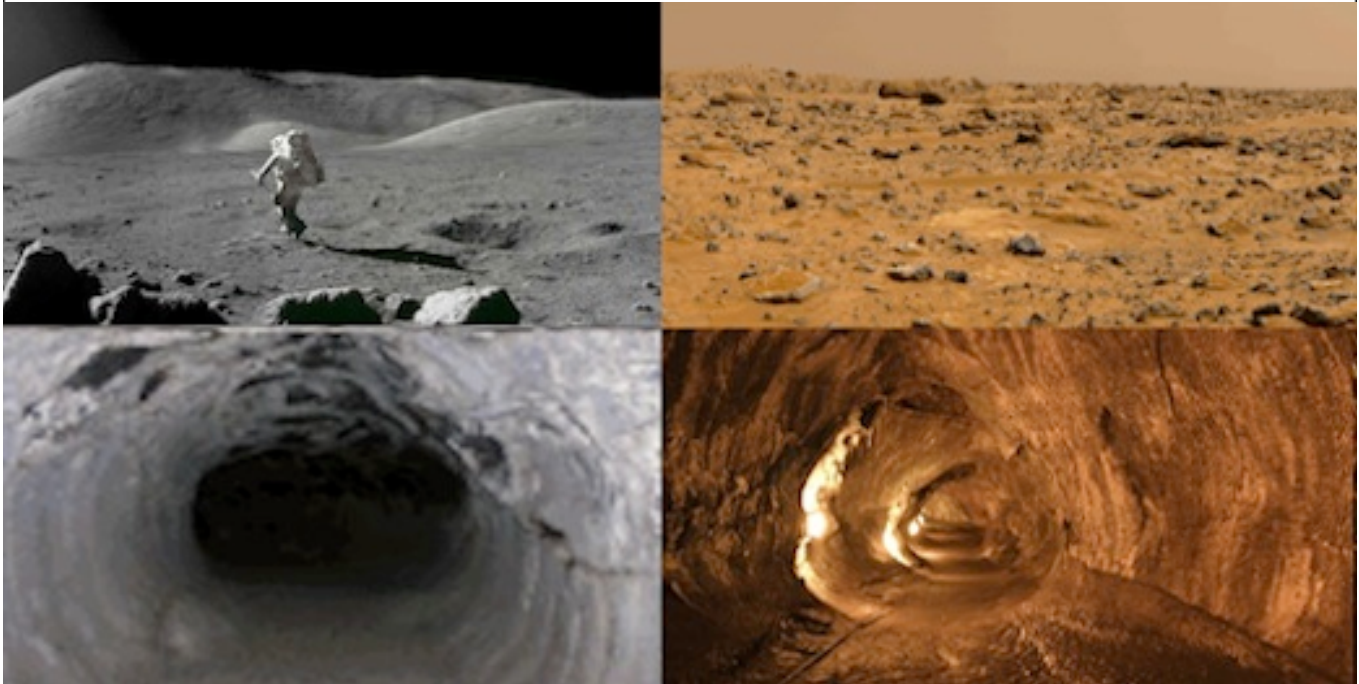


"Towards an Earth-Moon Economy - Developing Off-Planet Resources"

Moon Miners' Manifesto

& The Moon Society Journal

www.MoonMinersManifesto.info



We are familiar with the radiation-washed surfaces of Moon and Mars. But below the surfaces of the Moon's frozen lava seas (dark maria) and below the flanks of Mars' mighty shield volcanoes are large networks of safe lava tubes.

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Feature Articles:

- 2 In Focus: NASA eyes Mock Mars Mission on ISS
- 3 Marooned on Mars? We need to go "Prepared"
- 4 Mars' deepest Basin: Hellas is a very Special Place
- 6 Building Fictional "Ruins" on Mars as a "Culture Booster"
- 8 Mars' "Missing Colors"



L: an imaginary ruin on Mars - **R:** another example of what pioneers could construct for "cultural context" **See p. 6**

For past articles, Visit http://www.moonsociety.org/publications/mmm_classics/ or [mmm_themes/](http://www.moonsociety.org/publications/mmm_themes/)

About Moon Miners' Manifesto – *"The Moon - it's not Earth, but it's Earth's!"*

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Moon Miners' Manifesto, c/o Peter Kokh, 1630 N. 32nd Street, Milwaukee, WI 53208-2040

In Focus NASA eyes Mock Mars Mission on ISS

By Peter Kokh

Last year, March 20, 2012 there was a report that "NASA eyes Mock Mars Mission on ISS."

<http://www.space.com/14970-nasa-mock-mars-mission-space-station.html>

This is a logical idea, and not a new one. But we have two suggestions that, if adopted, would make such a simulation much more real to the participants, and thereby greatly enhance lessons learned.

1. **Gradually lengthen the communications time delay** to what would occur on an actual mission to Mars. The time delay would be negligible as the "craft" left low Earth orbit, but 3 seconds long by the time it got as far away as the Moon. By the time the craft "arrived at Mars." Responses would be delayed somewhere between 6 and 40 minutes depending on where Mars would be in relationship to Earth.
2. **Shutter all the windows**, replacing some with screens that showed Earth and Moon receding, then just the stars, finally Mars getting ever closer.

As the old saying goes, "Anything worth doing, is worth doing well." The cost of these measures is moot.

For more mission-enhancing ideas, read MMM #30 "Wanted: Split personality types for Mars Expedition" reprinted in the Mars Theme issue: http://www.moonsociety.org/publications/mmm_themes/mmm_Mars.pdf

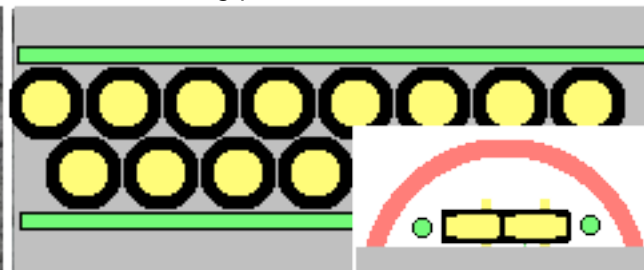
For past articles, Visit http://www.moonsociety.org/publications/mmm_classics/ or http://www.moonsociety.org/publications/mmm_themes/

A Better Idea for MarsOne – <http://mars-one.com/en/>

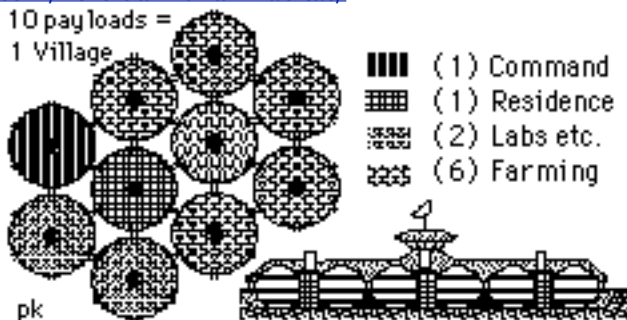
By Peter Kokh



MarsOne would ship identical modules to Mars to be ganged together. Connecting hallway runs **through** the units, eating up valuable floor space. **No thought is given to shielding**, condemning settlers to a high incidence of cancer and short lives. We give MarsOne an A for good intentions, an F for ignoring known risks and poor design. **Below:** Inflatable torus units from LDC Dover (now under contract to NASA) provide more volume, and much more floor space for the same structural weight, leaving room for more furnishings, for the same shipping weight allowance from Earth to Mars. Putting these units under a robotically pre-built contour-crafted extendable Quonset like hangar allows that structure to bear the weight of several meters of Marsdust shielding, allowing maintenance access to the exterior surfaces of both the toroid units and of the connecting pressurized corridors to either side.



Passage between units is via flanking corridors (so as not to eat into torus unit floor space) with corridors are lined on one side with living wall units producing food and cleaning air, realizing the “middoors” concept. Other side can have storage lockers, art made on Mars, etc. This design provides safety, easy expansion, abundant vegetation, and intermittent observation towers. <http://www.ilcdover.com/Toroidal-Lunar-Habitat/>



L: ILC Dover-built unit inflated at NASA JSC with hardware integrated **R: These units can be ganged together.**
We had proposed something very similar in our presentation at the 1991 ISDC in San Antonio.

The Lunar Hostel: An Alternate Concept for First Beachhead and Secondary Outposts © 1991
http://www.moonsociety.org/publications/mmm_papers/hostels_paper2.htm

Major advantages are (1) a **stable footprint**, (in comparison to a sphere or cylinder laid on its side), (2) **very low height per volume**, (3) an **outfitting-works-packed central core**. The central core was a feature of the discontinued TransHab technology for which Bigelow does not seem to have realized the advantages. The remaining design/architectural/engineering challenge is to design the core with pull-out features that will structure the interior: flooring supports for one or more floors, toilet/sink, kitchen core, lighting, etc. features. If the “donut” inflatable is to have more than one floor, it should contain a ladder to provide inter-floor and surface access. Toroid units are also ideal for automated agriculture, see: http://www.moonsociety.org/images/changing/torus_greenhouse.gif PK

For past articles, Visit http://www.moonsociety.org/publications/mmm_classics/ or http://www.moonsociety.org/publications/mmm_themes/

MAROONED ON MARS

Could the first Martians be Marooners?

By Peter Kokh

Most humans to Mars scenarios envision a number of exploratory missions, followed, if all goes well, by planned settlement. But the chances of something going wrong are real and should not be ignored in "defining" a first or following "exploratory" missions. The number one risk is that exploration for exploration sake will not be followed by settlement.

Yet that it could happen that the first human crew to visit Mars would be marooned for whatever reason, however unlikely and unintended, is reason enough to prepare for the eventuality by the choice of

- **Crew male/female mix, age mix, gene mix, expertise mix, talent mix, personality mix, hobby mix**
- **Amount and variety of supplies and tools and equipment*** etc. to send with them.

* See 'Yolk Sac Logistics' article, MMM #113, March 1998, reprinted in

http://www.moonsociety.org/publications/mmm_themes/mmmt_Mars.pdf

If we do this, and get them back safely, this "just in case preparation" will shape and enrich Martian culture, lore, and history. **That it makes sense to prepare for the eventuality of marooning and forced settlement, makes it all the more logical to plan for settlement in the first place. In that light, any plan to explore only, makes no sense. Only "Mars to Stay" plans deserve our support.**

That is a big leap, but as we all know, "anything that is worth doing is worth doing well." And **to thoroughly explore a planet as old, as large, and as varied as Mars, is a task for endless generations.**

Just the facts:

The Moon is only **3 travel days** away, so we can build our presence there at the end of an "umbilical cord." Mars, in contrast, is **6-9 months** plus "remaining window time" before the next return opportunity or for resupply and rescue. And any emergency response could easily be delayed if a cosmic ray outburst or solar flare intervenes. But these are not the only eventualities which could force such a situation. Political or economic collapse or military conflict could result in postponement of resupplies and/or rescue. And a rescue mission could fail on the launch pad or en route. Once you take off from Earth, there is no guarantee you will ever return. It will be a gamble.

There are simply too many things that could go wrong given the interval between rescue and resupply windows and the many months-long travel times involved. But things could also go wrong on Earth with economic or natural catastrophes interfering with "timely" rescue, "timely" meaning not "soon," but as soon as possible, which could be from half a year to a couple of years, more if a solar outburst intervened during the next rescue window.

If the first crew does come back safely, their "just-in-case lode" will be of great use for the next crew. And that is all the more reason to send a new crew to the same location. (Contrary to the suggestion in Robert Zubrin's "Mars Direct" proposal.) That in turn is a significant reason to pick a site with all the plusses appropriate for the first major settlement. **That means not picking a site solely for its scientific interest.** In the end, we will do far more exploration of Mars if we go there to settle, than if we go only to satisfy our scientific curiosity.

Did Mars once harbor life? Are primitive life forms still present? Did Mars once have an ocean?...., and on and on. Exploration and Science are human activities of all societies. If we settle Mars there will be far more explorers and scientists doing far more research, than if we only send one, two, or a few sortie parties.

Thus, paradoxically, **science is best served if the primary reason for humans to go to Mars is not science but settlement.** The corollary is that the first crew must be prepared for the eventuality of being marooned. It is most likely that **"being marooned in new territory" is one of the ways humans spread across this planet.**

Marooned on Mars in Science Fiction

Being marooned, or almost marooned on Mars has been a frequent theme in movies (e.g. "Mission to Mars," "Red Planet") and novels about humans on Mars, and not just because it makes for a great story with drama and suspense, but also because there is a very real chance, that despite precautions, it could happen. The more complex something is, the more ways something can go wrong. And human Mars missions will be very complex, much more so than past or future Moon Missions, because of the very much greater (and ever changing) distance and time factors that make "timely" rescue or resupply all but impossible.

Only those volunteers should be selected who are emotionally and personally prepared for such an eventuality. We don't need a crew of bitter, angry, and depressed persons stranded on Mars. **We need to pick people who will be okay with such an eventuality.** Given all this, would **you** still volunteer? If all volunteers answer this up front question truthfully, any marooners will do okay. And we'll bet, some will choose to remain behind even if their flight home is assured. **These are the kind of volunteers we need in the first place.** PK

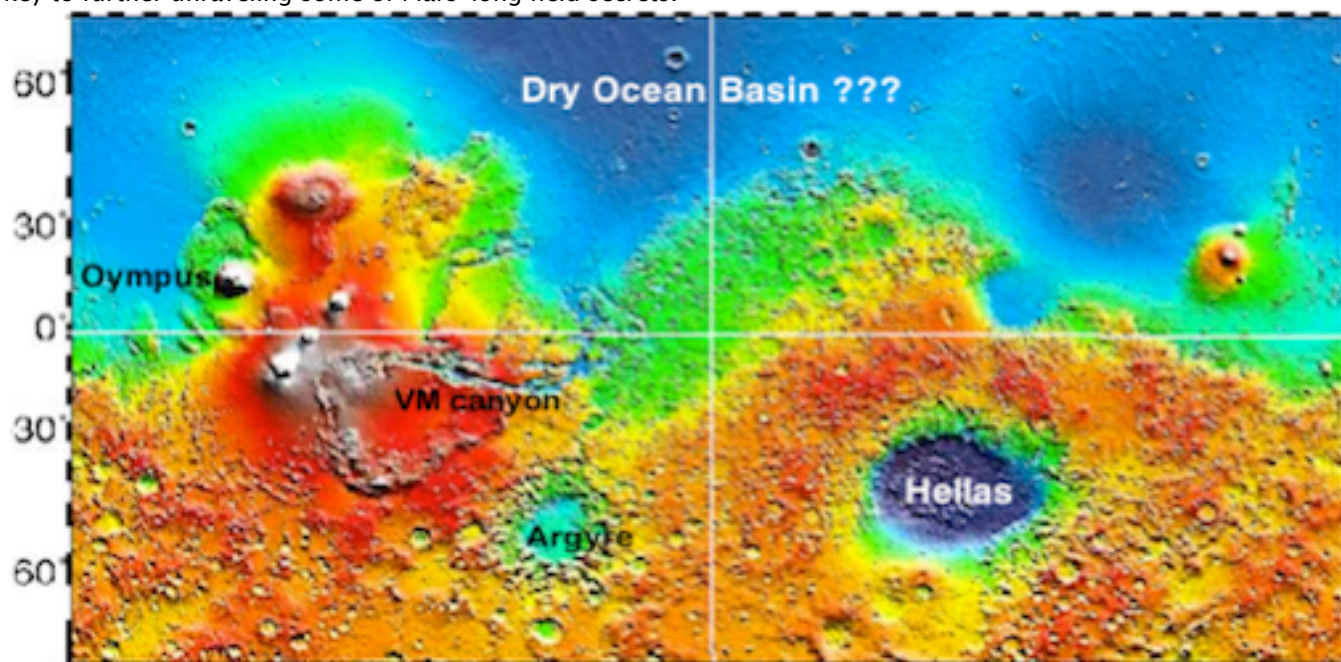
For past articles, Visit http://www.moonsociety.org/publications/mmm_classics/ or http://www.moonsociety.org/publications/mmm_themes/

Hellas: a glimpse of the past, a tease of Basoomian Mythology, and an Cornerstone of the Future of Mars

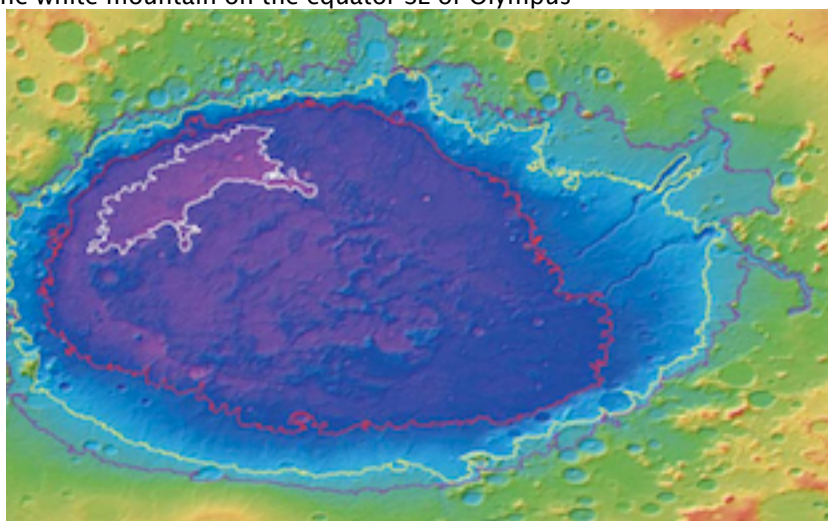
By Peter Kokh

http://www.marsdaily.com/reports/Mapping_Project_Consistent_With_Huge_Historic_Seas_On_Mars_999.html

The Hellas basin, more than 1,250 mi across and 26,000 feet deep, is the largest recognized impact structure on Mars, and once may have held a sea. "Fine-layered outcrops around the eastern rim of Hellas have been interpreted as a series of sedimentary deposits resulting from erosion and transport of highland rim materials into a basin-wide standing body of water." [see link above] The **circum-Hellas highlands** represent a significant percentage of the southern hemisphere of Mars and have served as a locus for volcanic and sedimentary activity throughout Martian geologic time. **Hellas Planitia** preserves the materials shed from these highlands and holds the key to further unraveling some of Mars' long held secrets.



Pavonis Mons is the white mountain on the equator SE of Olympus



Right: The size of Hellas basin in comparison to the US Western States

Left: Circular basin distorted by the angle of image (to see this image in false colors denoting elevation differences, purple deepest, see images at http://news.bbcimg.co.uk/media/images/48020000/jpg/_48020986_hellas.jpg

"This mapping [snip] constrains the timing of these putative lakes to the early-middle Noachian period on Mars, between 4.5 and 3.5 billion years ago." Link above.

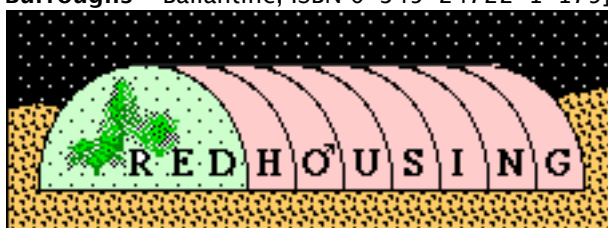
In the Hellas basin, where Mars' atmosphere is the most dense, early Mars aircraft will first be able to fly! That could make it a primary tourist mecca.

Even if Hellas Basin has always been dry, that does not diminish its capacity to hold water in the future. Surely in any Mars "terraforming" or "rejuvenation" program, Hellas will play **the starring role**. It is significantly lower in elevation than any other locale on Mars and as such will always be the area in which atmospheric pressure is the highest. Hellas will be the first place on Mars able to hold liquid water. It will be the first place where watered land can support vegetation. And this is so whether this "plain" as "Hellas Planitia" has been so inaptly and unimaginatively named, ever held water and life in the past. Its depth is everything.

Hellas north shore will be the warmest part of the basin, being closest to Mars equator. Surely this shore or beach, as you like it, deserves to be picked as one of the earliest settlement sites. Pavonis Mons, smack on the equator (think launch track, think space elevator) and, being a "shield volcano" laced with many cubic miles of lava tubes, surely should be picked as a major settlement site as well.

In Edgar Rice Burroughs map of Barsoom, as his fictional Mars inhabitants called their planet, it so happens on his map that roughly the same coordinates are those of the major Barsoomian cities of Greater and Lesser Helium. Helium and Hellas, what a coincidence. The word Helium is a derivative of the Greek word for the Sun, Helios, helium being an element first discovered in the Sun, long before it was found on Earth. Hellas is the Greek word for Greece. An interesting coincidence nonetheless. Also nearby was the Barsoomian seaport of Aanthor - an apt name for the first settlement along the north "shore" of Hellas basin.

[* For more colorful Edgar Rice Burroughs/Barsoomian tidbits, see John Flint Roy's 1976 **A Guide to Barsoom: The Mars of Edgar Rice Burroughs** - Ballantine, ISBN 0-345-24722-1-175]



"**Redhousing**" is a word we coined for developing "Mars-hardy plants" from high altitude desert and circumpolar Earth plants, in "redhouses" - greenhouses that contain lower pressure carbon dioxide atmosphere (with 3% nitrogen) gradually lowering the pressure as the plants become ever more tolerant of low pressure and Martian type atmosphere. See our article, "Redhousing" from MMM #93 in the MMM Mars Theme issue:

http://www.moonsociety.org/publications/mmm_themes/mmmt_Mars.pdf also in

http://www.moonsociety.org/publications/mmm_classics/mmmc10_Jan2006.pdf

Where "redhousing" meets a Mars in the process of rejuvenation or terraforming "halfway" will be near or on the "North Shore" of Hellas Basin. That is where such evolved terrestrial plants will first take hold, beginning the process of "greening Mars."

Yes, this event, if it comes to pass, will be a long way off. But while we are not in a position to start changing conditions on Mars, we are in a position to take the first steps with all kinds of candidate terrestrial plants, in the **Redhousing Project**. If we wait until we get to Mars, and then wait until we have a permanent presence on Mars to begin redhousing experiments, we will have lost decades. We owe it those pioneers to pave the way.

Redhousing experiments will take money and talent. This is best pursued at the university level. But it takes a P.I., a "principal investigator" to define and design the project and sell it to his university, hopefully with backing from experimental agriculture firms. This is something that a self-made billionaire with a passion for Mars, like Elon Musk, could launch and nourish. As a byproduct we may evolve plants that can reclaim our own deserts!

The Many Faces of Mars

To too many Mars enthusiasts, Mars is Mars, and their image of the planet is far more uniform than this very diverse planet deserves. They want to go to Mars. Where on Mars? Anywhere will do, because they are not aware of the great diversity of Martian terrains. The false color map above showcases that topographic and geological diversity.

To learn more about Mars many faces, we recommend the book, **A Traveler's Guide to Mars** [Paperback] by William K. Hartmann. Aug 21, 2003 | ISBN-10: 0761126066 | ISBN-13: 978-0761126065 | First Printing.

"In this extraordinary Baedeker—accessible, up-to-date, and prodigiously illustrated with photographs from Mariner 9, Viking, Pathfinder, the Hubble Space Telescope, and the ongoing Mars Global Surveyor spacecraft—visitors will encounter: **Olympus Mons**, the largest volcano in the solar system, rising three times as high as Mount Everest and covering an area the size of Missouri; **Tharsis Planitia**, the "high plains of Mars," with plains rising 29,000 feet—wide enough to cover Europe; **Valles Marineris**, an equatorial canyon so vast that America's Grand Canyon would be a mere tributary." – **Amazon.com**

When you finish this book, you will far better appreciate the diversity, beauty, and desolation of this still empty planet. You will no longer be able to comprehend a mission to Mars that goes "just anywhere" on Mars. And Hellas will be one of the many very special places on "your" Mars, a Mars revealed. **PK**

For past articles, Visit http://www.moonsociety.org/publications/mmm_classics/ or http://www.moonsociety.org/publications/mmm_themes/

Building Fictional "Ruins" on Mars as a "Culture Booster"



By Peter Kokh

Mars has both monotonous plains and "scenic" areas – all untouched by intelligent beings – save for the wheel tracks of **Pathfinder**, **Spirit**, **Opportunity**, and **Curiosity** Mars Rovers. In contrast, science fiction writers have populated the Mars of our imagination with ancient forts, castles, cities and other relics of intelligence now in ruins, plus now dry canals that "once" brought life-giving water from the polar caps to temperate and tropical areas.

Could we blame future human Martian settlers if they chose to "recreate" some of these fictional-mythical structures here and there along future Martian highways? The excuse would be to reduce boredom for travelers, create attractions for domestic tourists as well as for visitors from Earth or the Moon, all with monetary advantages.

Forts and castles, bridges and canals, statues of mythical Barsoomian wildlife, abandoned vehicles, crashed planes, ruins of ancient castles and more. Consider our Dinosaur gardens in South Dakota and Alberta!

On Earth, we have an abundance of actual ruins to provide this interest from Stonehenge to Mesa Verde to Teotihuacan to the Pyramids, and on and on. Our history is long and diverse. Mars, in contrast, will be a brand new untouched frontier. We will make its "history" over time. There are/ were no "natives" or "ancient ones." Mars is a tabula rasa, a blank slate, except for the imagination of fiction writers and movie producers.

The problem, however, is that while many a Mars novel has given us intellectual images of such things, actual illustrations come from artists who do the jacket covers, not from the fiction writers themselves. As a result, a novel that has been republished many times will have a diversity of illustrations, none of them blessed by the author. You can get a feel for the "cacophany" of images by doing a Google Image Search for

✓ Barsoom ✓ John Carter on Mars ✓ fictional cities on Mars ✓ canals on Mars ✓ etc.

Nonetheless, this is an interesting idea, and a far better way to add interest on long monotonous highway stretches on Mars, as vast as all 7 of our continents than, heaven forbid, billboards advertising consumer products.

Mars is without a real history, human or ancient Martian, and a bit of "borrowed creative mythology" might be welcome. Over time, Martians of human descent will create their own history, and forge their own culture(s), but who can blame the early settlers to want to "accelerate" the process with images from the diverse fictional mythologies of popular Mars/Barsoom novels of old? Here are some links:

http://en.wikipedia.org/wiki/Mars_in_fiction

http://en.wikipedia.org/wiki/Mars_trilogy

<http://www.irosf.com/q/zine/article/10021> – Mars sci-fi

Yet there are other more rational ways to introduce scenic interruptions. Waysides can have a variety of architectures and layouts. They can also host rock and sculpture gardens. Bridges over valleys can have a variety of architectural designs. Even a landlocked version of "lighthouses" of as varied designs as ours would help.

In time, with a policy of encouragement of creative designs and architectures for the purpose of "maintaining alertness and interest," this is a need that will take care of itself especially on more traveled routes. Commercial and government dollars will both play a part.

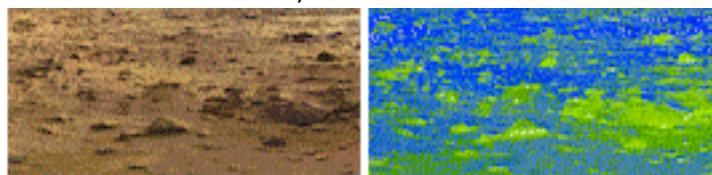
The result is that not just towns and urban areas, but the vast stretches in between, over time will proclaim ever more effectively, that Mars is becoming a human world. Meanwhile, we are always happy to get artwork and illustrations from readers that attempt to illustrate any of the many concepts and ideas brought up in various MMM issues through the years (now into year #27!)

PK

Dealing with the Color Monotony of Mars' Terrain

By Peter Kokh

Missing



Colors

Above: a typical Marscape (L) in natural color and (R) in a color inversion

The scattered “blue” rocks and “blueberry” nodules found here and there on Mars notwithstanding, marscapes seem to have as narrow a color range as the gray tones of the Moon. And just how “blue” those rocks and “berries” are is yet to be validated. Mars is not all monotonous plains of sand, gravel, and rocks. There are scenic craters, mountains and valleys to be sure. But shapes to the side, the color range appears to be restricted. To those who do not appreciate geological variation, the narrow range of coloration on Mars could be depressing.

It would appear from the above simple color inversion test that the biggest psychological boost would come from introducing blues and greens. Of course yellows, oranges, reds, purples would also help as accents, along with whites, blacks, and grays, but perhaps not as much as blues and greens. But here, our purpose is not to dictate but rather to suggest ways colors opposite or complementary to Marstones might be introduced.

#1 Interior decor & outfitting of habitat and activity modules brought from Earth

The interior surfaces and various outfitting items (including fabrics) can be in a wide range of colors, picked by the crew, and when it comes to individual quarters, by individual crew members, all at zero additional cost. Color has no weight! Electronic wide screens (TVs, monitors, etc.) could offer a wide selection of scenic colorful electronic wallpapers pre-selected by crew members. (Additional ones could be added at any time via the interplanetary internet.) All of these things, at no cost or extra import weight, can help counter the color monotony of the Martian outdoors, however beautiful.

If there are multiple modules, and interconnecting pressurized corridors, these can all provide a reassuring refuge of a full color palette. So could vehicles, such as Martian ATVs. Each having its own color scheme would be an aid in identification and location against the otherwise semi-monochromatic background. Road markers and signs could test various colors and then be standardized for maximum visibility against the background. Our personal experiments at the Mars Desert Research Station in 2005 showed that astrobright™ colors on items of regular shape best make a manmade object stand out against the narrower range of pixelated Mars tone hues.

#2 Projected colors

Assuming that we are going to have some peripheral lighting around the outpost from dusk through the night into dawn, some of bulbs (or LEDs) brought from Earth could be colored, spreading assorted color overlays on the landscape, perhaps more effective at dusk, night, and dawn.

Here on Earth, in urban areas, partially cloudy nighttime skies take on a fantasy coloration from street sulfur lamps – which can be beautiful even if at the penalty of rendering all but the very brightest stars invisible. Only experiment will tell if nighttime clouds on Mars would reflect lighting in such a way.

#3 Vegetation: greens and more

Assuming that the outpost is growing most of its food, at least salad stuffs and vegetables, herbs and spices; the greens and other colors of living plants should be a welcome boost. Herbs and spices and other useful plants can do double duty as decor. Homes, offices, workplaces, hallways etc. could be green with live vegetation.

#4 Simple manufactures – ceramics, glass, cast basalt

It should be at least a secondary priority to experiment with simple early manufactures. Ceramics (tiles, dishes, planters, statues) may not at first add much in the way of complementary colors until we are able to experiment with glazes. The same may be true of early glassware and cast basalt items. But even if they do not help diversify the color pallet, they will be a humble start on the road to self-reliance, along with production of bricks and blocks, and concrete. Without sample returns to more fully analyze in a laboratory, we cannot be as confident about what we can make on Mars as we are with respect to the Moon. But we will definitely find a variety of azoic soils from which we can produce a variety of glass colorants and ceramic glazes. Cast basalt will always be very dark gray to bluish black. But that too will be welcome.

Experimenting here on Earth at M.D.R.S. and elsewhere

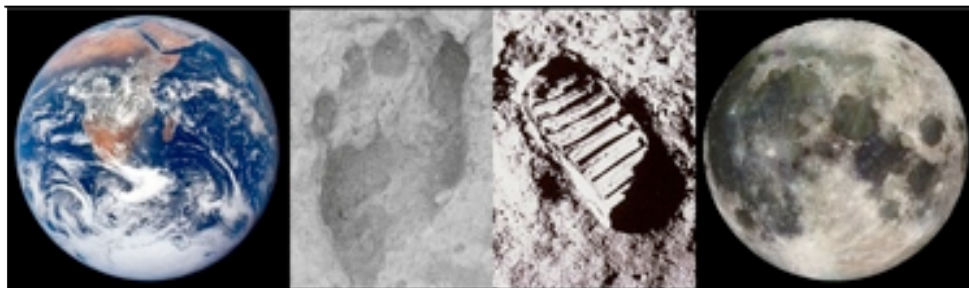
I suggest that future crew members at MDRS expand on the line of experimentation that I did on crew 34 (although I reported it as an activity on crew 45) See MMM #184 “Testing Colors for Survival on Mars”

http://www.moonsociety.org/publications/mmm_themes/mmmt_Mars.pdf

PK

NEWS FLASH: Mars red color is only skin deep: www.space.com/19932-mars-color-gray-curiosity-rover.html
Alas, gray is a neutral color, as are white and black of which gray is composed. It offers “some” relief.

From Africa
to the Moon,
the Human
Epic, told in
footprints,
Continues
to the Stars!



Our Goal is
Communities
on the Moon
involving
large scale
industrializa-
tion and
private
enterprise.

The Moon Society Journal Section (pages 9–12)

About the Moon Society

Objectives of the Moon Society include, but are not limited to:

- **Creation** of a spacefaring civilization, which will establish communities on the Moon involving large-scale industrialization and private enterprise.
- **Promotion** of interest in the exploration, research, development, and habitation of the Moon, through the media of conferences, the press, library and museum exhibits, and other literary and educational means
- **Support** by funding or otherwise, of scholarships, libraries, museums and other means of encouraging the study of the Moon and related technologies
- **Stimulation** of the advancement and development of applications of space and related technologies and encouragement their entrepreneurial development
- **Bringing together** persons from government, industry, educational institutions, the press, and other walks of life for the exchange of information about the Moon
- **Promoting** collaboration between various societies and groups interested in developing and utilizing the Moon.
- **Informing** the public on matters related to the Moon
- **Provision** of suitable recognition and honor to individuals and organizations that have contributed to the advancement of the exploration, research, development, and habitation of the Moon, as well as scientific and technological developments related thereto.

Our Vision says it all – “Who We Are and What We Do” – www.moonsociety.org/spreadtheword/whowhat.html

We envision a future in which the free enterprise human economy has expanded to include settlements on the Moon and elsewhere, contributing products and services that will foster a better life for all humanity on Earth and beyond, inspiring our youth, and fostering hope in an open-ended positive future for humankind.

Moon Society Mission

Our Mission is to inspire and involve people everywhere, from all walks of life, to create an expanded Earth–Moon economy that will contribute solutions to the major problems that continue to challenge our home world.

Moon Society Strategy

We seek to address these goals through education, outreach to young people and to people in general, competitions & contests, workshops, ground level research and technology experiments, private entrepreneurial ventures, moonbase simulation exercises, tourist centers, and other means.

Interested in having input? Any member may ask to join the Leadership Committee and attend our Management Committee meetings held twice monthly. You may even express opinions. Decisions are often made by consensus, so this input has value. Write president@moonsociety.org

From Moon Society President Ken Murphy

A STEM project from The Moon Society

Mooncrete: a STEM Chemistry problem prepared by The Moon Society

Problem: Water, while present on the Moon, is exceedingly rare. When engineers on the Moon need concrete, they may need to use something different to create a concrete-like substance for building purposes.

Hypothesis: Students can mix Sodium Silicate with Lunar Regolith Simulant to create a concrete-like substance.

Preparation: Have students do background research on:

- Sodium Silicate and why it might be useful as a binding agent for ‘Mooncrete’
- Lunar regolith simulant and its properties

Materials:

- Water, Silica gel beads, Sodium hydroxide (lye, or caustic soda) OR Prepared Sodium Silicate
- Lunar Regolith Simulant
- Forms
- Oven

For past articles, Visit http://www.moonsociety.org/publications/mmm_classics/ or [mmm_themes/](http://www.moonsociety.org/publications/mmm_themes/)

The Moon Society – Lunar Frontier Settlement – www.moonsociety.org p.2

Procedure:

Sodium Silicate can be prepared using methods found on the internet, in particular:

<http://chemistry.about.com/od/makechemicalsyourself/a/make-sodium-silicate.htm>

http://www.ehow.com/how_6550183_make-sodium-silicate-solution.html

Be sure to also watch the video at:

<http://www.youtube.com/watch?v=xltvwhogkll>

Once you have your aqueous Sodium Silicate solution, mix XX parts solution with YY parts Lunar regolith simulant and pour into form. Bake in oven at ZZZ (experiment!) degrees C for AA (experiment!) hours to drive off the water. Carefully remove result from form. Experiment as with concrete.

INPUT WANTED: Send your suggestions for a STEM Project (Science, Technology, Engineering, and Mathematics) relevant to the Moon to president@moonsociety.org

Visit Moon Colony TV for 50 great short Educational Videos



The above image link appears near the top of our home page: www.moonsociety.org – click on it!

In the Spring of 2007, the Moon Society Leadership Council took on a major new project, production of video segments that would promote the Moon Society and its goals. With the help of member **Chip Proser**, retired Hollywood screenwriter and creator of the Gaia-Selene Documentary (“There are three ways to save the Earth and two and a half of them involve going back to the Moon”) [www.gaiaselene.com], we videotaped interviews of fifteen notable persons at the recent NSS International Space development Conference in Dallas, Texas.

Among those interviewed were **Dr. Paul Spudis**, **General Pete Worden** (head of NASA AMES), and **Rick Tumlinson**, founder of the Space Frontier Foundation. Moon Society Director of Project Development and then Board Member **James Gholston** asked the questions.

Since then, Chip Proser has continued to interview prominent persons and thus added to the collection.

<http://www.youtube.com/user/mooncolonytv>

“Moon Colony Videos” is the name chosen by Chip Proser. Let it be your multimedia gateway.

Moon Colony Videos cont.

Not all of us have the patience of interest in video material. Many of us may never have installed Flash, Quick Time, Windows Media Player or other video software. On the other hand, for perhaps most younger people, video is the best way to catch and hold their attention and to pique their curiosity. We have everything to gain and nothing to lose by “getting with it!”

As of early 2013, Moon Colony TV has 50 videos in this collection: Here is a partial list:

- The Moon Society
- Buzz Aldrin on China’s Moon plans
- Pete Worden (NASA Ames) 3 segments
- Dallas Bienhoff (Boeing) Orbital Refueling (Gasteroid) 4 segments
- Lunar Greenhouse 5 segments
- Rusty Schweickart 3 Asteroid danger segments
- Elon Musk at ISDC
- Harrison Schmidt
- Dennis Wingo Moonrush 2 segments
- Paul Spudis and others “Saving Earth” Lunar Resources
- Peter Garr etson – Space Solar Power
- Arthur C. Clarke – Space Elevator
- Moonhattan Project – 2 segments
- Crew Regolith Challenge – 3 segments

Opportunities: If you have a Moon Society chapter exhibit at a public outreach opportunity, a Monitor set to play – and repeat – these in succession, might grab the attention of passersby.

For past articles, Visit http://www.moonsociety.org/publications/mmm_classics/ or http://www.moonsociety.org/publications/mmm_themes/

Canadian Documentary “Lunarcy” (about people for whom the Moon is a passion)

By **Chris Carson** (one of those featured in the film): “It’s really a more than decent film, despite the deplorable title.” (Chris is an active member of NSS (Regional Director) and of the Moon Society)

“Yes, the TIFF writeup makes it sound like some kind of parody at first (although the subsequent paragraphs are better), but I almost feel that’s partly self-defense on the part of the blurb writer! Really the only person who comes off as unendurably strange, I think, is Dennis Hope -- I’m made (partly by clever editing) to seem a bit of a tragic figure, perhaps, but **Peter Kokh**, **Alan Bean**, and **Rick Tumlinson** are taken quite seriously. In fact the whole film is scored with steel drums, because of a remark of Peter’s, and the composer expressed to me, at the premiere, what a job that was. Make it like this temporary score (lots of mature Bach & Beethoven), but better! You have six weeks!”

“The premiere response was very positive. I was hauled up onto stage to assist Simon Ennis (the director), and he tells me that at subsequent showings he has attended, people have been very disappointed I wasn’t there.

- filmswelike (Distributor site) – <http://filmswelike.com/films/lunarcy/index.html>
- TIFF (where the premiere was) – <http://tiff.net/filmsandschedules/tiff/2012/lunarcy>
- Trailer #3 (Peter Kokh) <http://vimeo.com/47559033>

The US premiere will be at the “**South by Southwest**” **Music & Art Festival**, in **Austin**, Texas. The schedule has three showings. http://schedule.sxsw.com/2013/events/event_FS13795

- Friday, 8 March, 6.30 PM, Rollins Theatre at The Long Center (first night of the festival),
- Saturday, 9 March, 9.30 PM, Alamo Village • Thursday, 14 March, 11 AM, Alamo Ritz 2

If you don’t get to see it at the festival, it will be showing on the “**Epix**” **cable channel** sometime later in the year, but the schedule seems not to have been set. (Note: Time Warner Cable does not carry Epix)

Projects for Chapter Members unable to Meet in Person

In last month’s Moon Society Journal section, we had a page long list of “Reasons for Chapter Members to Meet in Person. It is likely, however, that most chapters will have members who for schedule or transportation reasons, are not able to attend meetings. That need not make them irrelevant. Such members may well have talents and abilities and interests and energies that can be put to work to promote the chapter’s goals.

All chapters have this problem. Meeting in person will be important for some members, not for others, but those members will be most of the movers and shakers. Yet, those who do not attend because of regular schedule or transportation problems, may well have talents and abilities suitable for project ideas that they can pursue without having to “meet” they might be valuable too. We need to blow the lid off of old conceptions of what a chapter can and/or should do.

Useful and helpful projects that talented and motivated individuals can do on their own.

Create exhibits and artwork
Write articles, reports, book reports
Maintain websites and blogs
Identify field trip opportunities
Monitor local newspapers and television stations

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Projects are the life force that sustains chapters. There are many chapter projects that can be pursued or contributed to by those who cannot attend chapter meetings (or for whom it is inconvenient to do so.) No NSS and/or TMS chapter nearby? Make results of your efforts available to out-of-area Moon Society.

A starter list of such projects for those who would nonetheless like to help, and thus be a part of a/the “team.”

- ✓ Maintain or contribute to a Chapter Website &/or Chapter Newsletter: reports, illustrations, videos, want ads
- ✓ Design and/or create chapter exhibits
- ✓ Serve as a Liaison to area Science-Fiction clubs & “cons,” Astronomy, geology, astrobiology, and other science clubs, campus organizations, amateur rocket clubs, even environmental groups etc
- ✓ Speakers Bureau Liaison: speaking opportunities scout
- ✓ Outings & Field trips opportunities scout and/or event organizer
- ✓ Outreach Exhibit Opportunities Scout
- ✓ Project Fundraiser/organizer
- ✓ Sidewalk astronomy organizer – put together a sidewalk astronomy kit

For past articles, Visit http://www.moonsociety.org/publications/mmm_classics/ or http://www.moonsociety.org/publications/mmm_themes/

March

Chapters & Outposts

2013

Bay Area Moon Society, CA Outpost – South San Francisco Bay – <http://www.moonsociety.org/chapters/bams/>Contact: Henry Cates hcate2@pacbell.net Meeting the 1st Tuesday of the Month at Henry's home**Moon Society Nashville Outpost** – Contact: Chuck Schlemm – cschlemm@comcast.net**Moon Society Knoxville Outpost** – Contact: Jason Tuttle – tuttlepc@gmail.com**Moon Society Milwaukee Outpost (MSMO)** – http://www.moonsociety.org/chapters/milwaukee/msmo_aboutus.htmContact: Peter Kokh kokhmmm@aol.com – http://www.moonsociety.org/chapters/milwaukee/msmo_output.htm>>>>>>>>>> **MOON SOCIETY CHAPTERS** <<<<<<<<<<<**Moon Society St. Louis Chapter** – <http://www.moonsociety.org/chapters/stlouis/>Contact: Robert Perry surfer_bob@charter.net – Meetings 3rd Wed monthly at Buder Branch Library, 4401 S. Hampton, in the basement conference room – Next meetings – APR 17 – MAY 15 – JUN 19

Space night will be held at Rockwood Valley Middle School on March 13. Chris Nobbe will man the Exploradome.

Greater Fort Worth Space Chapter c/o Patricia Ferguson tricia3718@gmail.com**Officers:** Patricia Ferguson, President, Heather Thompson, Treasurer, Patricia (Alleypat) Hauldren, Secretary/webmaster. All are MS members. We have several other members who are members of MS.

We have only been able to meet once. However, we printed and distributed poster for World Space Week. We plan to start working toward a larger celebration of World Space Week.

We have a venue to sponsor a Yuri's Night Celebration. We will be showing several movies about space exploration and holding other events in conjunction with it on Saturday, April 13, 2013. The schedule is approved. I am waiting on responses from the Fort worth Astronomical Society and others about their participation. We will be starting to reach out to other Space Geek organizations about their interest in having a display table. And of course, we will participate in Moon Day.

>>>>>>>>>> **JOINT NSS/MOON SOCIETY CHAPTERS** <<<<<<<<<<<**Clear Lake NSS/Moon Society Chapter (Houston)** – <http://www.moonsociety.org/chapters/houston/>Contact: Eric Bowen eric@streamlinerschedules.com – Meeting 7 pm in the conference room of the Bay Area Community Center at Clear Lake Park – Next meetings: Mondays MAR 11 – MAY 6 – JUL 1**NSS/Moon Society Phoenix Chapter** – www.msphx.org – c/o Mike Mackowski

Meeting the 3rd Saturdays of the month at Next meetings MAR 16 – APR 21 – MAY 19 – JUN 15

FEB 16th joint meeting with the Phoenix Space Society (NSS) We have confirmed we will have access to the meeting room at the Humanist Center this Saturday for a joint meeting of the Phoenix Moon Society and National Space Society chapters. The location is the Humanist Community Center at 627 W. 8th St in Mesa. That meeting time is 10 am. **The agenda will be discussions on three topics:**

1. Future direction for these clubs. Few people seem to be interested in coming to meetings. On line meetings are not much better attended and (to me at least) less effective at building a local community. What are the alternatives? Tours, social outings, more on line meetings, special events? Need ideas and input.
2. As an example of a special event, we will have a Yuri's Night function on Friday evening April 12 at the Space Access conference (at InnPlace Hotel Phoenix North). AIAA will pay for a room to have a social function. We could have a short presentation if we wanted, or just do fun things. Ideas are welcome.
3. With Dave Fischer's passing, I have picked up the local NSS web blog. I could use some help generating content and figuring out how to use Wordpress. Volunteers? Also could discuss ideas on what the website should be. Dave had it as sort of a news feed. I won't have time for that, and I was thinking of a place to post commentary and discussion on space related topics, hopefully featuring topics relevant to Arizona. Suggestions?

I will be out of town for this meeting but Chuck Leshner will be there and hopefully many others. Please show up and support your local space enthusiast organizations. – Mike Mackowski, joint President

Tucson L5 Space Society – www.tucsonspacesociety.org c/o Al Anzaldúa alanzaldua706@yahoo.com**Meetings: 2nd Saturdays, 6:30 pm Note:** The chapter president is also a Moon Society Board member. The chapter, already having 3 members in common with the Moon Society, has voted to serve as a joint chapter of the National Space Society and of the Moon Society, following the example of the joint Clear Lake Houston chapter.===== **What about Your Town?** =====For help in starting a Moon Society Chapter or Outpost or a Joint NSS/TMS chapter, contact chapters-coordinator@moonsociety.orgFor past articles, Visit http://www.moonsociety.org/publications/mmm_classics/ or [mmm_themes/](http://www.moonsociety.org/publications/mmm_themes/)



By Allen Steele

Review by Ken Murphy

Published in 2012 by Pyr/Prometheus it weighs in at 311 pages all-in. A handful of spelling and editing errors noted throughout. Currently available in the Teen Adventure section of your local bookstore.

The year is 2097. Jamey Barlowe is your average kid-in-a-wheelchair, the result of a happenstance birth on the Moon. He enjoys swimming, but will never walk on Earth, the only home he's ever known. His dad works for the International Space Consortium (ISC), responsible for the extraction of He3 on the Moon for use in fusion reactors on Earth. His Dad took a Moon post and his wife went along. She found out that she was pregnant too late to return to Earth, and so carried Jamey to term on the Moon. Shortly thereafter she was killed in a tragic accident, and his widowed father returned to Earth with the remains of the family.

For his 16th birthday, Jamey is awoken at oh-dark-thirty and hustled with his two sisters into the family van for a late night run to Wallops Island. Turns out the President was dead and the VP was executing a palace coup, and rounding up the dangerous independent thinkers like those at ISC. The Barlowes arrive with several other families, and Jamey and the other kids quickly learn they are being sent, by themselves, to refuge on the Moon until the situation settles down. And not a moment too soon, as one of the passengers proves particularly valuable, so much so that they're better off dead than at-large in the eyes of the new government. With good reason.

And so begins Jamey's odyssey to the Moon. As with other space juveniles, Jamey has a variety of traditional challenges through which to work, after which he will understand himself better as an individual. There's the girl he likes whose affections are for another, the girl who likes him but doesn't evoke a like sentiment, the bully with his number, the awkwardness of a new body, and so forth, all set in a hostile and dangerous Lunar environment.

To prove himself, Jamey strives to be one of the Lunar Search & Rescue team, or Rangers as they call themselves. A combination of survival Scouts, local militia, paramedics and peacekeepers, the Rangers are the best of the best, because on the Moon they need to be. As events on Earth continue to spiral out of control, Jamey is increasingly forced to tap his leadership capabilities, but when Earth takes the fight to the Moon, will he have the courage to confront the terrestrial threat?

Author Allen Steele has a significant oeuvre of near-Earth/near-Future stories, many of which merit reconsideration given recent changes in the space industry. Given this background, his presentation of Jamey in the new environments of micro-gravity during the trip to the Moon and 1/6th gravity once there is consistently accurate from a science perspective. As has often been the case in Lunar literature, the setting of the Moon base is a chance for a compare-n-contrast of an idealized Lunar culture with the slovenly mess of Earth's cultures.

Here, everyone does civic service. It might be sweeping pathways and collecting litter. It might be tending plants in the gardens and parks. It might be processing bio-waste. Everyone works; no one quits. Only by working and living together will they be able to survive on the Moon.

The pacing is tight, keeping things moving from challenge to challenge as Jamey grows in his individual identity. Opportunities abound to explain various aspects of life in space and on the Moon, and the author's been doing this long enough to get most all the details right. The near future setting makes the technology recognizable, and the political situation is not too far removed from where we are now.

A fun read, perfect for any Spring Break trips coming up, "Apollo's Outcasts" gets a waxing three-quarter Moon rating. If you're looking for other Juvenile space fiction of recent vintage (<5 years old) you should check out:

For Younger Readers-

- "Choose Your Own Adventure #26: Moon Quest" – Anson Montgomery
- "Cosmic" – Frank Cottrell Boyce
- "Crater" – Homer Hickam
- "Laddertop" – Orson Scott & Emily Janice Card
- "Lunar Pioneers" – Robert Black
- "Space" – Roger Reid
- "Thea Stilton and the Star Castaways" – Geronimo Stilton
- "Tumbler" – Brand Gamblin

For Older Readers -

- "Back to the Moon" – Travis S. Taylor & Les Johnson (Rescue mission to the Moon)
- "Doctor Who: Apollo 23" – Justin Richards (Dr. Who vs. Talerians on Moon)
- "The Highest Frontier" – Joan Slonczewski (L-5 colony is locus of strange new technologies)
- "The Moon Maze Game" – Larry Niven & Steven Barnes (LARPing on the Moon)
- "The Next Continent" – Issui Ogawa (Industrialist's daughter builds tourist site on Moon)
- "Pax Britannia: Dark Side" – Jonathan Green (Steampunk Moon)
- "Rocket Girls" – Housuke Nojiri (High School student becomes commercial astronaut)
- "Spin the Sky" – Katy Stauber ('The Odyssey' retold in cislunar space)
- "Up Against It" – M.J. Locke (Asteroid miners fight The Man)
- "172 Hours on the Moon" – Johan Harstad (Reality show becomes existentialist horror-fest on Moon) ###

GREAT BROWSING LINKS

SPACE STATIONS + COMMERCIAL SPACE+ TOURISM

<http://www.space.com/72-iss-module-russian-mrm-1-rassvet.html>

www.space.com/73-orion-capsule - www.space.com/73-orion-capsule-emergency-escape-system-test.html

<http://www.space.com/19017-space-tourism-medical-standards.html>

MOON

<http://news.discovery.com/space/print-me-a-moon-base-130201.htm>

<http://www.planetary.org/explore/projects/microrovers/microrovers-catalog.html>

www.fastcodesign.com/1668962/no-joke-these-guys-created-a-machine-for-printing-houses-on-the-moon#1

Microrovers for assisting humans: <http://www.planetary.org/explore/projects/microrovers/>

MARS

<http://www.planetary.org/blogs/guest-blogs/20120516-mcs-three-mars-years.html>

http://www.planetary.org/blogs/guest-blogs/update_20111025.html

<http://www.space.com/16575-mars-exploration-robot-red-planet-missions-infographic.html>

<http://www.space.com/19342-space-hedgehogs-mars-moon-phobos.html>

<http://www.space.com/16851-most-audacious-mars-missions-ever.html>

<http://www.space.com/19451-nuclear-thermal-rocket-petition.html>

<http://www.space.com/19689-mars-rover-curiosity-first-drill.html>

<http://www.space.com/19875-mars-rover-curiosity-drill-discoveries.html>

<http://www.space.com/19932-mars-color-gray-curiosity-rover.html>

Mars water map coming: <http://www.space.com/19507-mars-moon-flyby-europe-space.html>

<http://planetfour.org> - a Zooniverse Project (<https://www.zooniverse.org>)

ASTEROIDS + COMETS + OTHER PLANETS + MOONS

http://www.huffingtonpost.com/phil-plait/defending-earth-from-asteroids_b_2341804.html (& Video)

<http://news.discovery.com/space/asteroids-meteors-meteorites/could-asteroid-mining-drive-21st-century-space-industry-130204.html>

<http://www.space.com/19933-asteroid-deflection-mission-aida-didymos.html>

<http://www.space.com/19767-asteroid-vesta-violent-collision-history.html> - see video in section below

<http://www.space.com/19799-can-earth-trigger-an-asteroid-quake-video.html>

<http://www.space.com/19864-asteroid-threat-atlas-warning-system.html>

Comet Ison could rival full moon in brilliance in November

<http://www.space.com/19656-comet-ison-nasa-spacecraft-photos.html>

<http://www.space.com/18924-how-big-is-neptune.html> - with links to much more about Neptune

<http://www.space.com/19630-saturn-moon-titan-smog.html>

ASTRONOMY + ASTROBOTICS

<http://www.space.com/18916-telescope-buying-advice-binoculars.html>

<http://www.space.com/19703-intelligent-alien-life-exoplanets-seti.html>

<http://www.space.com/19874-smallest-alien-planet-moon-size.html>

Earth-like planets are right "next door!" - <http://www.cfa.harvard.edu/news/2013/pr201305.html>

GREAT SPACE VIDEOS

<http://www.space.com/10405-hunting-alien-earths-kepler-stares-stars.html>

<http://www.space.com/19499-american-space-program-revitalized-by-private-firms-video.html>

<http://www.space.com/19041-jewel-in-the-night-astronauts-1st-song-in-space-video.html>

<http://www.space.com/19692-canadas-mars-rover-may-hunt-for-martian-methane-video.html>

<http://www.space.com/19680-canada-building-first-satellite-designed-to-track-asteroids-video.html>

<http://www.space.com/19677-captain-kirk-calls-space-station-video.html> (must watch! Marvelous@!)

The Lunar Base Race http://www.youtube.com/watch?v=B-6GF_uVhA4&feature=player_embedded

<http://www.space.com/19799-can-earth-trigger-an-asteroid-quake-video.html>

<http://www.space.com/19872-skylon-space-plane-human-spaceflight.html>

Rocket Science explained for non-rocket scientists <http://youtu.be/XwaGW-x7hS0>

Charli Robot Gangman Style http://www.youtube.com/watch?v=kmeJvkN4ntI&feature=player_embedded



Marshall Mike Moondust and the Sinister Selenian Subterfuge

[MMM Fiction by George von Mond]

Chapter VI:

"Oh, Mike!" he heard through the clatter of the traction table on overdrive and the pain coursing through his body as his muscles were shredded. In his last moments of consciousness he saw a figure move to the control panel and the whine of the table's motors began to fade with his awareness.

Floating, weightless, Mike slowly came to. Something was on his face! He tried to move his arms to remove the mask but nothing happened. What was wrong? "Mike, relax" came the calm and stentorian voice of his CO, Marshall John Murphy of the Lunar Guard.

As his eyes adjusted to the dim surroundings he realized he was floating in a BACTA tank. Biological And Chemical Therapeutic Analgesic. He must be in really bad shape if he was in here. "What, what happened?" he stammered.

"Someone must have decided that you were getting too close for comfort" replied Marshall Murphy. "The systems guys found traces of alerts triggered when you accessed certain items in the data pools. They looked for other flags and found them all over the place, probably as cover, but clearly you were looking at particularly important info"

"I was just checking out the terrain around the Archaea mines" mused Mike "perhaps there's something I overlooked there?"

"Perhaps, but for the moment you're off the case" replied John. "As far as the malefactors are concerned they succeeded and you're dead. The funeral was two days ago, and the wake has been spectacular" There was a hint of a smile in the Marshall's voice. "There's a movement to erect a statue, name a major street after you, and even a formally recognized holiday. One of the Ag settlements wants to rename itself Moondust Meadows. All very over the top, which has been encouraged by leadership as a way of relieving stress and giving the people a folk hero.

"The only real difficulty has been Deputy Selenesdottir. She was the one who found you, and watched you die in her arms. She's been inconsolable, and thoroughly worthless at work. I'm too scared to let her go on the walkabout she wants for fear she'll do something emotional and stupid. You really need to do something about her Mike. She's my best administrator and I need her stable and happy, and your constant standoffishness leaves her flustered and confused. Frankly, I'm confounded that you gifted types still show up in the gene pool given how difficult it seems to be for you to breed. Seriously.

"In any event, your death gives us cover to deploy you without their knowledge once we get your body back together. That traction table had had its safety systems overridden, and we're taking a closer look at Nurse Ratched's background"

"I feel dead" replied Mike, "Why can't I move my arms or legs?"

"Just a safety precaution. We're using an advanced nanotech methodology in the repair, and they need you calm and motionless to do their work. If everything works right you won't just be healed, you'll be better, with stronger bones and muscles, and faster reaction times"

Mike peered through his mask at the bubbling fluid around him, picturing in his mind the molecular machines crawling throughout his body and busily repairing his cells at a level only barely comprehensible. Nanotechnology had made great strides once isolated to the Moon, away from the fears of the groundworms and their grey goo nonsense.

"So who knows that I'm still alive?" asked Mike?

"You and me, and a couple of doctors. You're in a secret section of the medical facility that was added after initial construction and doesn't show up on the plans. We've already prepared a new cover identity ready for you, and you'll have a few minor alterations to your features. Nothing too significant, but enough to fool software.

"It is evident that there's something going on, and you had somehow stumbled too close for their comfort. The forensics guys decided to take a closer look at the remains of the Merlins, and discovered minute traces of explosives residue near what was thought to be the impact zone. Once we figure out who's behind this we've got a clear case of murder"

"So how much longer am I stuck in this muck?" asked Mike. "I can't get much done in here"

"Except for thinking," replied his CO. "The clues are there. What are the motivations? What objective is worth the risk of taking out a very popular member of the Lunar Guard? Someone is up to something, and while they've clearly gone to great lengths to hide their activities they nevertheless will have left traces somewhere."

"You've got a week left in the tank, and then it's a strict regime of physical therapy. It's going to be a month at least before you can actually deploy to fieldwork"

"I can't wait," said Mike. "It's about time we start getting some answers"

Wearied by the interaction, Mike started to drift off to sleep. Maps of the mine area, inventories of equipment, personnel files, logistics manifests, and spreadsheets of data filled his head.

"One month," he thought, "and I can start searching for my killer and bring him to justice. Something sinister is going on, and the people of the Moon may be in danger, far more than Mike could possibly realize!"

MISSED PREVIOUS INSTALLMENTS? The whole series is now online, up to the latest issue at:
<http://www.moonsociety.org/publications/fiction/MMMSSS.pdf>

NSS' 32nd annual International Space Development Conference

ISDC 2013 – San Diego, California

Thursday–Monday, May 23–27th (Memorial Day Weekend)

"Global Collaboration in the 21st Century Space"

Hyatt Regency La Jolla at Aventine

3777 La Jolla Village Drive, San Diego, CA 92122 - Phone: 402-592-6464 / 888-421-1442

Registration: [https://www.nss.org/cgi-bin/register/tdregister?\\$Origin=ISDC13](https://www.nss.org/cgi-bin/register/tdregister?$Origin=ISDC13)



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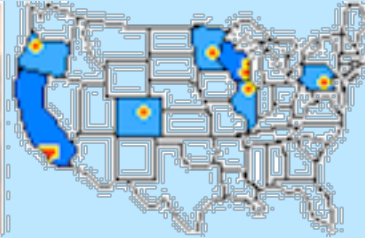
A Must–Watch Presentation: "INSPIRATION MARS"

"...On February 27th, 2013 Dennis Tito and his team discussed the newly formed Inspiration Mars non-profit organization and its plan for the first human mission to Mars. Learn more about this ground breaking inspiring mission. "A unique window of opportunity for humankind will open in January 2018, and the Inspiration Mars Foundation intends to seize it, announcing plans today to pursue a challenging manned mission to Mars and back. This historic 501-day journey around the Red Planet is made possible by a rare planetary alignment that occurs five years from now. Two professional crew members – one man, one woman – flying as private citizens will embark on what is known as a "fast, free–return" mission, passing within 100 miles of Mars before swinging back and safely returning to Earth. Target launch date is Jan. 5, 2018..."

https://www.youtube.com/watch?v=qc_RycDf6hU

For past articles, Visit http://www.moonsociety.org/publications/mmm_classics/ or [mmm_themes/](http://www.moonsociety.org/publications/mmm_themes/)

NSS Chapters that share Moon Miners' Manifesto



Space Chapter HUB Website: <http://nsschapters.org/hub/>
 Feature Page: Project Menus Unlimited <http://nsschapters.org/hub/projects.htm>

WISCONSIN



MLRS – Milwaukee Lunar Reclamation Society

PO Box 2101, Milwaukee, WI 53201 – www.moonsociety.org/chapters/milwaukee/

Ad Astra per Ardua Nostra = To the Stars through our own hard work!

2013 LRS OFFICERS & (•) **BOARD MEMBERS** Contact Information

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TREASURER/Database – • Robert Bialecki (414) 372-9613 – bobriverwest@yahoo.com

Meeting place changes for some dates: For some dates this year only, our regular meeting place (Mayfair Mall Garden Suites East G110) will be unavailable. So on February 9, March 9, October 12, and November 9 we will meet down the hall in room **G150**. This is because of a temporary problem, and will not be the case in following years.

Special April 13th Meeting; our 2nd Sat. meeting date falls on April 13th, the afternoon after the official celebration of **Yuri's Night** (52nd anniversary of first human in orbit) we will throw a small party to celebrate that night the next afternoon. As Charlotte and Gene will be at an astronomy convention, this may be a small event. We'll show the video on **Inspiration Mars** and discuss this bold proposed adventure.

WISCONSIN



SSS – Sheboygan Space Society

728 Center St. Kiel, WI 54042-1034 – www.sheboyganspacesociety.org

c/o Will Foerster 920-894-1344 (h) astrowill@frontier.com

SSS Sec./Tres. c/o B. Pat Knier dcnpatknier@gmail.org

DUES: "SSS" c/o B. P. Knier, 22608 County Line Rd, Elkhart Lake WI 53020

Meetings are at The Stoelting House, 309 Indian Hill, Kiel WI 53042 - 3rd Thurs even # months

NEXT MEETINGS: FEB 21 - APR 18 - JUN 20 - AUG 15 - OCT 17 - DEC 14 (SAT in Milwaukee for the annual MLRS anniversary and holiday party)

CALIFORNIA



SSDS – San Diego Space Society

8690 Aero Drive, Suite 115, #77, San Diego, CA 92123 – <http://sandiegospace.org>

Members will soon be getting our new Membership Packets.

We are planning for our biggest annual event – Yuri's Night Thursday April 12th

CALIFORNIA



OASIS: Organization for the Advancement of Space Industrialization & Settlement
Greater Los Angeles Chapter of the National Space Society
 PO Box 1231, Redondo Beach, CA 90278

Events Hotline/Answering Machine: 310-364-2290 – Odyssey Ed: Kat Tanaka odyssey_editor@yahoo.com
<http://www.oasis-nss.org/wordpress/> - oasis@oasis-nss.org – Odyssey Newsletter www.oasis-nss.org/articles.html

Regular Meeting 3 pm 3rd SAT monthly – MAR 16 – APR 20 – MAY 18 – JUN 15 – JUL 20

Sat., March 16, 3 pm. OASIS Board Meeting. Home of Craig and Karin Ward. 1914 Condon Ave., Redondo Beach,

Sat., March 23, 3:30 pm. OASIS Lecture Series, Space Tourism. John Spencer will discuss the growing field of space tourism El Dorado Library, 2900 Studebaker Road, Long Beach, CA 90815 (562) 570-3136

Sat., April 6, 9:00 am to 4:00 pm. Riverside Air Show 6951 Flight Road Riverside, CA 92504 We will have a boot

Sat., April 20, 3:00 pm. OASIS Board Meeting. Home of Lisa Kaspin and Gareth Powell. 3206 Summertime Lane, Culver City, CA 90230.

COLORADO



DSS: Denver Space Society fka Front Range L5

1 Cerry Hills Farm Drive, Englewood, CO 80133

Eric Boethin 303-781-0800 eric@boethin.com – Monthly Meetings 6:00 PM on 1st Thursdays
 Englewood Public Library, Englewood, CO 80110 – 1000 Englewood Parkway, First Floor Civic Center
 NEXT MEETINGS: APR 4 – MAY 2 – JUN 6 – JUL ? – AUG 1 – SEP 5 – OCT 3 – NOV 7 – DEC 5

ILLINOIS



CSFL5: Chicago Space Frontier L5 – 610 West 47th Place, Chicago, IL 60609

MINNESOTA



MSFS: Minnesota Space Frontier Society – <http://www.mnsfs.org>

c/o Dave Buth, 433 South 7th St. #1808, Minneapolis, MN 55415

Mars Con March 1-3: Peter Kokh, Editor of Moon Miners' Manifesto was our guest and gave a talk on the Moon on Friday night, and another on Mars, Saturday Night

OREGON



ORL5 – Oregon L5 Society – <http://www.OregonL5.org>

PO Box 86, Oregon City, OR 97045

(LBRT – Oregon Moonbase) moonbase@comcast.net

Meetings 3rd Sat. each month at 2 p.m. – Bourne Plaza, 1441 SE 122nd, Portland, downstairs

Regular Meeting 3 pm 3rd SAT monthly – FEB 16 – MAR 16 – APR 20 – MAY 18 – JUN 15 – JUL 20

PENNSYLVANIA

For past articles, Visit http://www.moonsociety.org/publications/mmm_classics/ or [mmm_themes/](http://www.mmm_themes/)



NSS-PASA: NSS Philadelphia Area Space Alliance – 928 Clinton Street, Philadelphia, PA, 19107

c/o Earl Bennett, Earlisat@verizon.net - 856/261-8032 (h), 215/698-2600 (w)

<http://pasa01.tripod.com/> - <http://phillypasa.blogspot.com>

Meeting times and locations: our regular location is at the Liberty One Food Court on the second level of Liberty One. We gather on the west side of the Court from 1–3 p.m. unless we have an event meeting. In March we will meet on the ninth. In April we will meet at a booth on The Benjamin Franklin Parkway, as part of the Science Carnival, on the 20th. This is also Astronomy Day and we will aim our outreach toward astronomy in space.

Main meeting: We had a large amount of talk on the recent meteor strikes in Russia. The main body had not been found at this writing. Also: Rich Bowers mention a Kick Starter financed film that he had seen, and, we discussed the new film, being financed via the same system, about space exploration with NSS promoting getting this done.

Dotty brought much material on museum activity in the next few months including: The Franklin Institutes' I-Max film "Space Junk", The Air and Space Museums' talk series that includes March 2nd "Robots and Humans Unite", and "Time and Navigation" which is a new exhibit opening in March. These are at the Smithsonian (check the site for locations). Then there is the NASA facility in Maryland: The Goddard Visitors Center with a number of special and family events, and The Maryland Science Center. Each of these groups have a number of interesting and varied events including those for children and families. The Smithsonian has such events at the Washington and Chantilly, Virginia location, Goddard in Greenbelt, and, The Science Center in Baltimore. Google/ search!

Larry brought web statistics for our site and the Friends that we have. We had hoped for a visit from Emory Stagmer but he said he was unable to attend. Larry pointed out that he has been our webmaster since 2001! And he reminded us of our May Super Science event and that we have tables. Hank Smith told us that he will be on Social Security soon and this will allow him to do more conventions in the Science Fiction arena. He says the local convention, Philcon, to be held in Cherry Hill, New Jersey. Since the area has poor public transportation, an important consideration for many publicly oriented events, and he thinks this limits participation by urban residents.

Mitch reported on the Science Carnival event in April: we have a registration form, but, they event planners may require us to put money out to be part of the event. He later said he could put some money towards this. As we are about to renew our yearly NSSPAS memberships I think that we should pay any bills we may owe to Lunar Reclamation for Moon Miners. Onward: Mitch brought "The Futurist" for Feb./March with "Asimov's' Embarrassing Robots" by Irving H. Buchen. If you have to match Asimov's' Law abiding robots it could be embarrassing if you can,t! Tough job! And more: the Futurist annual meeting in July will emphasize biologic nano technology Hilton in Chicago). He also brought Adrian Barry's' "The Next Ten Thousand Years" on what Man might achieve. Written in the 1970s I believe. We also talk on the paperwork for NSS to remain a chapter in good standing.

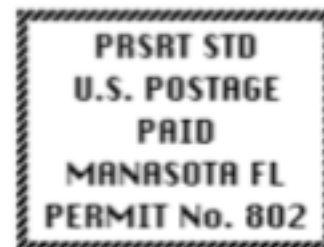
Earl brought material from Wired Magazine, Feb. issue, on the thoughts of Larry Paige: "If Your not doing something crazy, your doing the wrong things". There is some new material that Larry talks about in the interview (with Steven Levy) and a time line of What Larry was doing before and after co-founding Google. There are seven "Big Ideas" mentioned in the article, each with a multi paragraph description: "Make Airplanes Rechargeable" which is nice (an actual craft is available now), "Fuel the Planet with Micro Machines" applied nanotechnology, and two space, and usable in space, ideas: "Declare War on Incoming Asteroids" with information on an idea by Bong Wei. He is director of the Asteroid Deflection Research Center at Iowa State University. The technique outlined is to boost the warhead to hyper velocity and drive the explosive deep into the incoming body. I suspect that putting a rail gun in space is part of the plan. The other, and last, Big Idea: "Build Skyscrapers out of Diamond." Again we have basic technology, like growing diamonds in sheaths for some applications, or, for semiconductor or optical window uses, as discs. The method mentioned here is fusing small particles together using a Buckminster Fullerene derived source of carbon vapor. Stephen Bates is the researcher here. And, from the Feb. ninth issue of Science News "Life Could Survive on Exo-Moons" by Andrew Grant. We are seeing light variations of moons around exo planets that might be where life exists even if the primary is too large. The researchers spot a possible planet, then look at "frequent" cyclic variations of intensity in the same data. The original source is Astrobiology for January. Closer to home (or next door): "Sleep may suffer on Mars mission" by Laura Sanders on what has been learned by the recent experimental "flight" in Russia. This simulation, with a crew of six, lasted 520 days and is more fully reported in "Proceedings of the National Academy of Sciences" for January 7. The report is available online. It appears that crew members will have possible problems with sleep deprivation or excessive sleeping as seen in the study (a very crude interpretation).

Much more, but, The Carver Science Fair is here! This year's Elementary level winner of the James H. Chestek Award is: Amatu-Allah Lewis for her project: "Deep, Enormous Craters. Wow, that made a dent!" She used marbles and flour to simulate meteor impacts and even had an image of the Russian fireball as part of her display.

Submitted by Earl Bennett.

Moon Miners' MANIFESTO
Milwaukee Lunar Reclamation Society, Inc.
PO Box 2102, Milwaukee, WI 53201-2102

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