+ MARTIAN

HABITAT

+ MARTIAN HABITAT

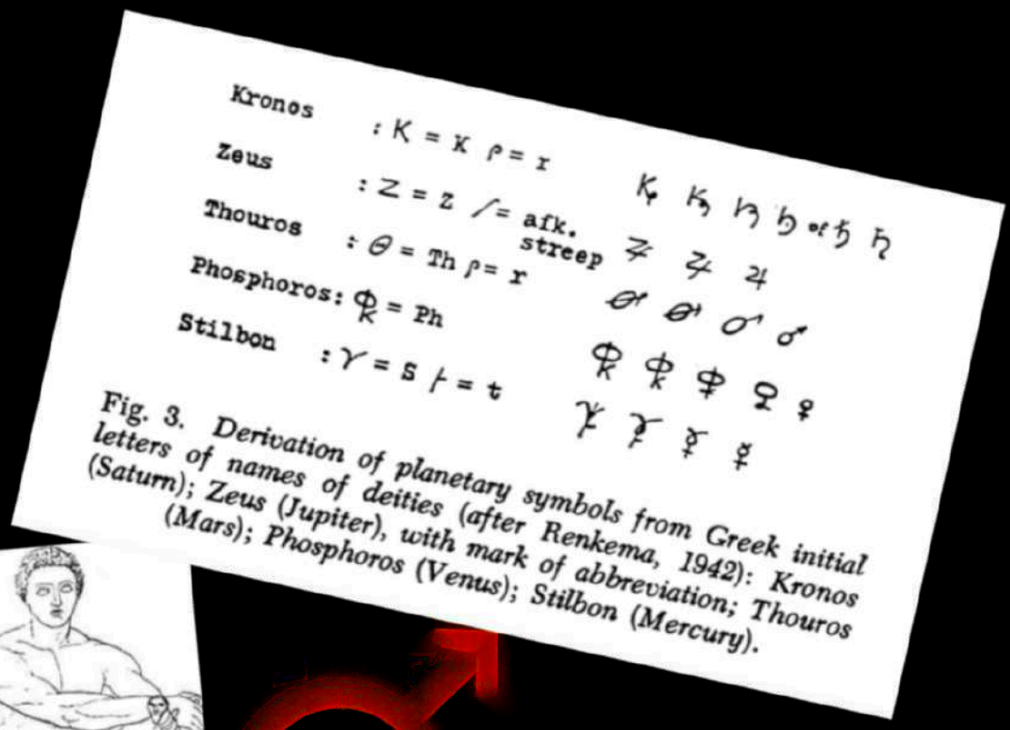
+ facts

Betül Peker 2021

+ Intro
+ Ancient
+ Requirements
+ Position
+ Fake News True Facts
+ Movie
+ Marsha
+ Planting

Betül Peker 2021

ANCIENT TIMES


Kronos : K = κ ρ = r

Zeus : Z = z /= afk. streep

Thouros : Θ = Th ρ = r

Phosphoros: Φ = Ph

Stilbon : Υ = S ƚ = t

Fig. 3. Derivation of planetary symbols from Greek initial letters of names of deities (after Renkema, 1942): Kronos (Saturn); Zeus (Jupiter), with mark of abbreviation; Thouros (Mars); Phosphoros (Venus); Stilbon (Mercury).

Mars originally the god of agriculture, later the god of war. Depicted here (as the god of Ares) on his chariot holding his spear.

'' There were few sculptures of the unpopular Ares. Most representations of him are found in vase paintings. Depiction of him ranged from a beard and heavily armoured warrior in earlier times to later appearances as young and nude except for a helmet and spear, indicative of a softening of his character in Greek religion.''

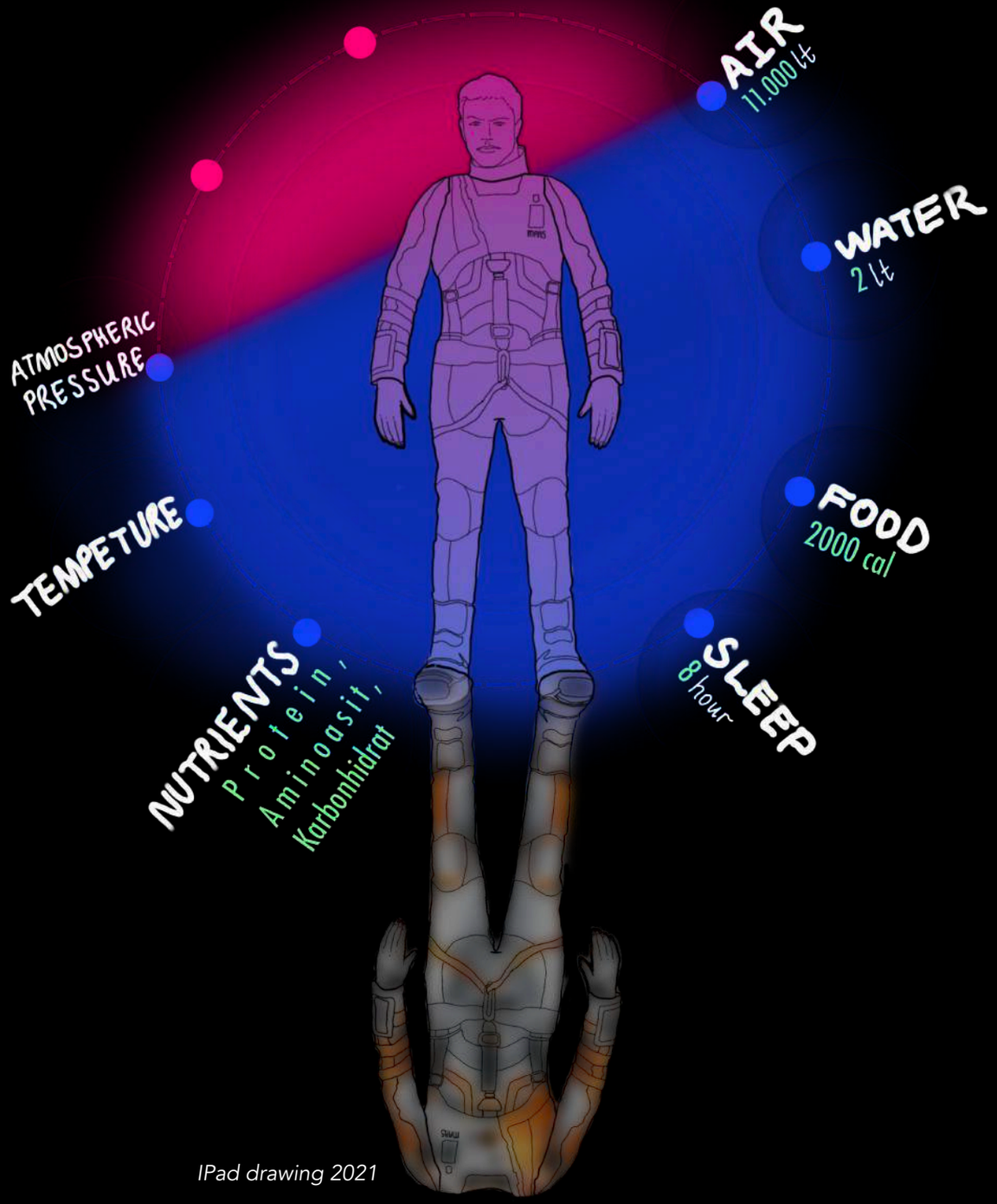
Thomas Gangale

The male symbol is thought to have originated from the god Mars, the spear and shield he was customary depicted with.

www.exploringmars.com

Betül Peker 2021

24 HOUR HUMAN SURVIVAL REQUIREMENTS



IPad drawing 2021

Mars is one of the most explored bodies in our solar system. Planet Mars is the fourth planet from the Sun and the second-smallest planet in the Solar System, being larger than only Mercury. Mars is a terrestrial planet with a thin atmosphere, with surface features reminiscent of the impact craters of the Moon and the valleys, deserts and polar ice caps of Earth.

Long term manned missions are to be sent onto an asteroid or planet in the near future (2040s-2050s), the crew is in need of a protective environmental equipment, habitat where they can work and live without being harmed by the harsh radiation, asteroids or planetary environment.

<u>Martian habitat should protect the people from:</u>

Non existing atmosphere

Radiation

Extreme temperatures

Falling meteorites

Long term dust storms

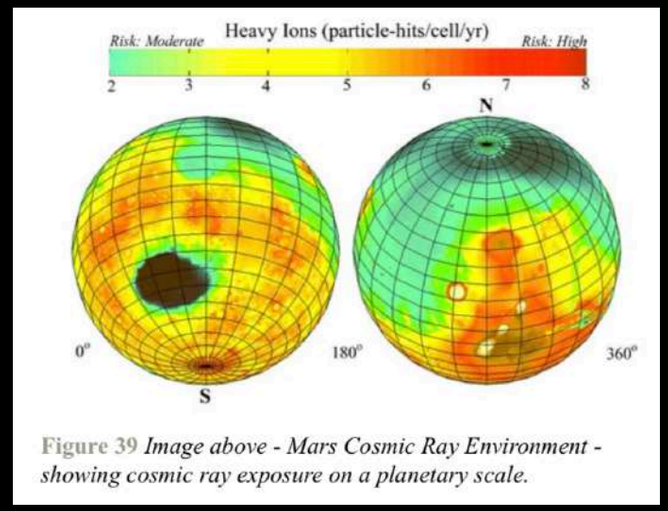


Figure 39 *Image above - Mars Cosmic Ray Environment - showing cosmic ray exposure on a planetary scale.*

Betül Peker 2021

Orbital Period:
The Martian year is nearly twice as long as the Earth year, measuring respectively 687.0 days and 365.2 days.

Temperature:
On average the Martian ground temperature is –23oC (250K) vs. a ground temperature on Earth of +22oC (295K). The ground temperature on Mars ranges from –143oC (130K) at the poles to 27oC (300K) at the tropics in the summer months. Because the Martian atmosphere is so thin it's 'air' temperature is much colder than it's ground temperature, so we would expect an average air temperature of -63oC (210K)

Surface pressure:
One of the most crucial differences is the surface pressure that is found on Mars, the pressure at sea level on Earth is 1013mb whereas the pressure on Mars is only 6mb. This is the same pressure we find on Earth at an altitude of 40km!

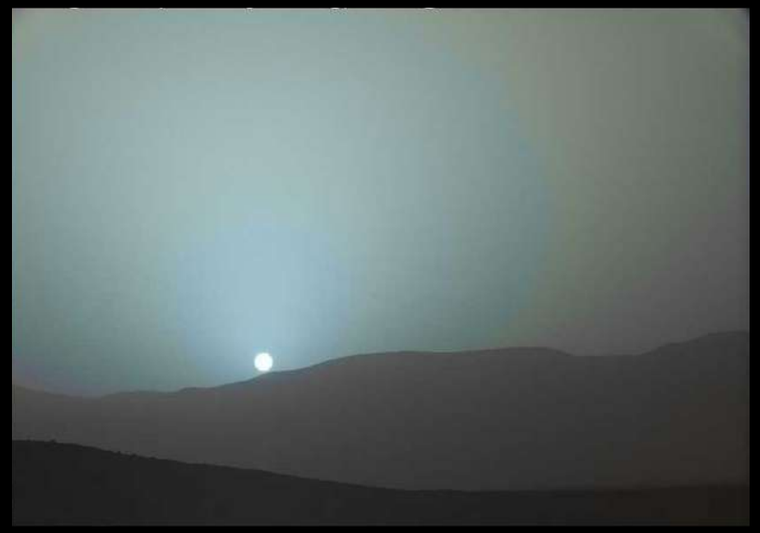
Atmosphere:
The Earth's atmosphere is composed of gasses that are hospitable to life; they include large amounts of oxygen and nitrogen. The Martian atmosphere contains nearly only Carbon Dioxide and very little water vapour.

Mars : Carbon Dioxide (CO_2) Nitrogen (N_2) Argon (Ar) Oxygen (O_2) Carbon Monoxide (CO)

Earth : Nitrogen (N_2) Oxygen (O_2) Argon (Ar) Neon (Ne) Helium (He)

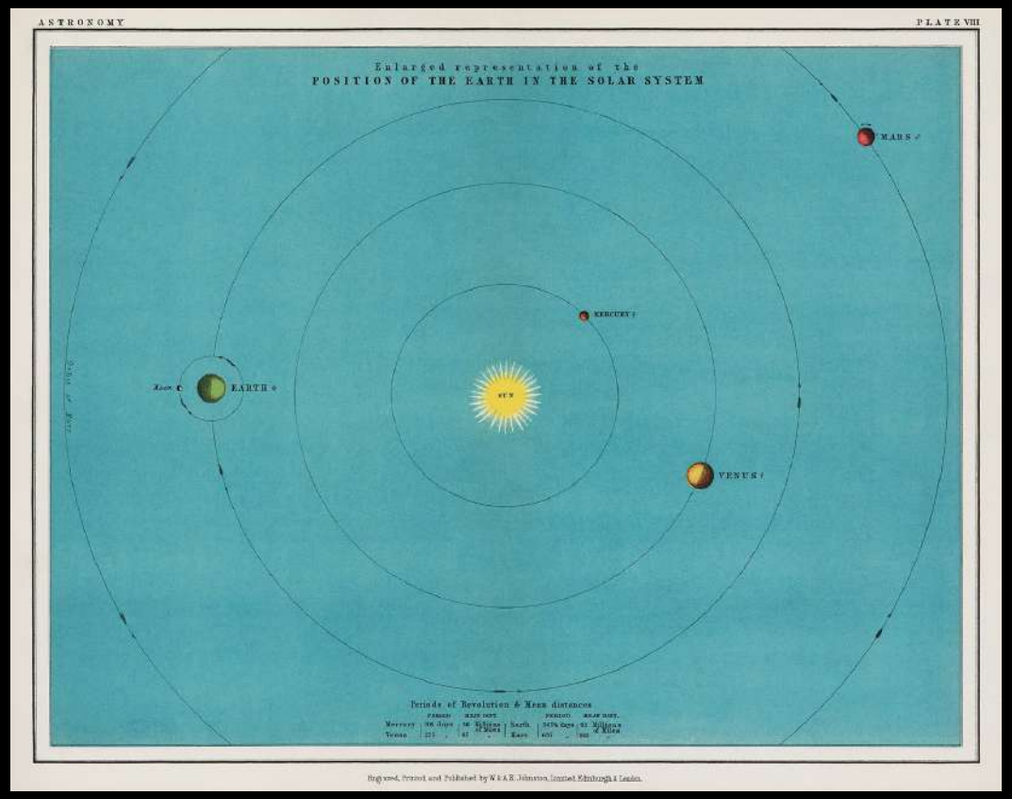
Water:
The Earth is covered by vast amounts of water. Mars has no surface water, a small polar cap in the north that consists of water ice and only minute amounts of water vapour in the atmosphere.

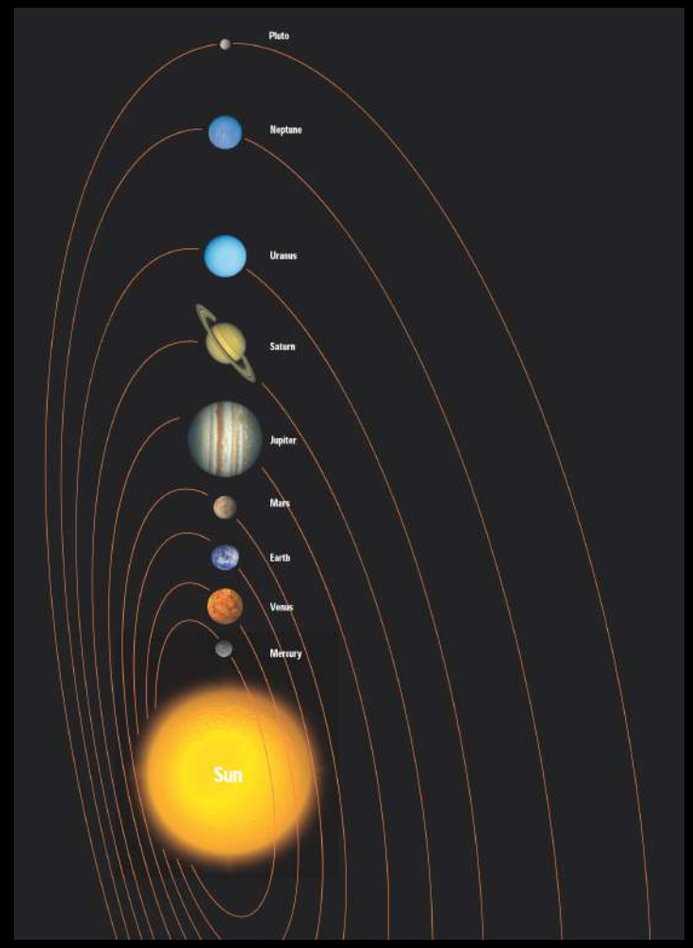
Magnetic area:
Mars has no magnetic field like that surrounding the Earth; this means that navigating by compass is not an option. The gravity filed that can be detected on Mars varies significantly.



https://solarsystem.nasa.gov/news/925/what-does-a-sunrise-sunset-look-like-on-mars/

Why Mars, and not another planet?





Mars is the fourth planet from the Sun.
After the Earth, Mars is the most habitable planet in our solar system due to some several reasons:
Martian soil contains water to extract.
There is enough sunlight to use solar panels
Gravity on Mars is 38% that of our Earth's, which is believed by many to be sufficient for the human body to adapt to It has an atmosphere (albeit a thin one) that offers protection from cosmic and the Sun's radiation
The day/night rhythm is very similar to ours here on Earth: a Mars day is 24 hours, 39 minutes and 35 seconds
The only other two celestial bodies in orbits near the Earth are our Moon and Venus. There are far fewer vital resources on the Moon, and a Moon day takes a month.
It also does not have an atmosphere to form a barrier against radiation.
Venus is a veritable purgatory.
The average temperature is over 400 degrees, the barometric pressure is that of 900 meters underwater on Earth, and the cherry on top comes in the form of occasional bouts of acid rain.
It also has nights that last for 120 days. Humans cannot live on Mars without the help of technology, but compared to Venus it's liveable.

The greatest challenge for the building of a habitat in outer space would be to build on the Earth's Moon or on the planet Mars. Especially Mars seems like a best option. Even though Mars has an environment that is harsh for life as we know it, it appears to be the most habitable planet in our solar system, besides Earth. Some companies focussing on Moon based explorations. On the other hand, the exploration and even ''colonisation'' of Mars has been the main focus of two large American companies like NASA and SpaceX

Too much efforts and experiments are made to be the first to land a human on Mars, with NASA focussing on building a Martian habitat by hosting a competition which is 3D Printed Habitat Challenge at the moment and while SpaceX is focussing on sending the first humans on Mars by 2022 to start a Martian colony.

Planet Mars and the Moon are two very different locations and building a habitat on either one of them will prove to be challenging and asks for a custom made design.

Mars is on an average distance of 225 million km from Earth with its shortest distance of about 54,6 million km and longest of about 401 million km. This huge variation is due to the planets' respective distance to the sun. These distances are of great influence for the properties of the planets but also for the relation between the two planets.

Although the planet is smaller than Earth and further away from the Sun, the Mars is comparable to our planet Earth regarding geological processes and land surface as both planets are within the habitable zone of our solar system. Both planets have volcanic formations, canyons.

SOME FAKE AND REAL NEWS

Giovanni Schiaparelli was an Italian astronomer who, upon observing Mars in 1877, claimed to see channels running over the planet's surface. In time, this would be recognized as an illusion, but "in time" was several decades. His word choice to describe the channels — "canali" — was mistranslated in English as canals. So when Percival Lowell (founder of the Lowell Observatory) read that there were canals on Mars, he ran with it, considering them actual irrigation systems after his initial observations of the planet in 1894.

https://fivethirtyeight.com/features/a-mistranslated-word-led-to-some-of-the-best-fake-news-of-the-20th-century/

https://en.wikipedia.org/wiki/A_Trip_to_Mars

Betül Peker 2021

Mariner 4, sends back the first pictures from Mars (NASA)

First close-up pictures sent back from Mars by the Mariner 4
https://mars.nasa.gov/resources/6800/first-close-up-image-of-mars-by-mariner-4/

National center for atmospheric research

A mature Martian base as envisioned by Tom Paine

If crew member is severely injured or part of the habitat fails the life of the crew may depend upon a good contingency plan.

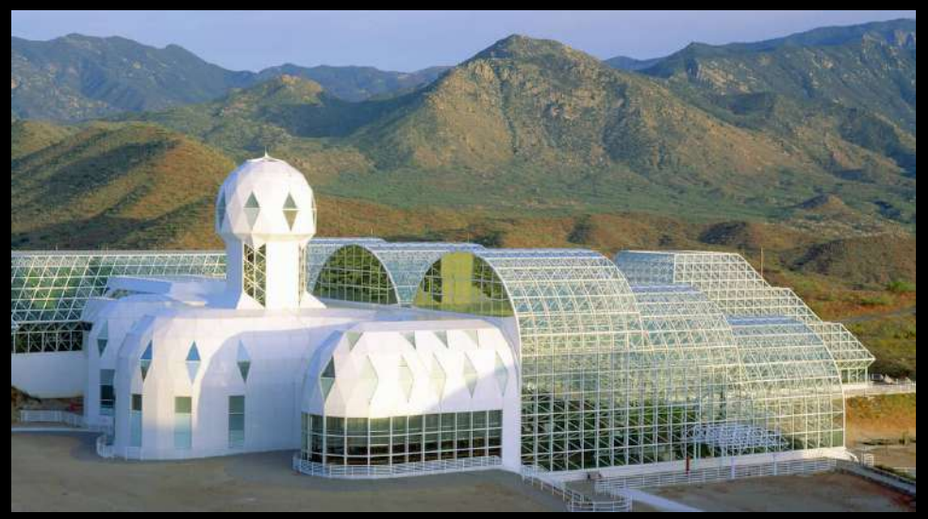
EXPERIMENTS ON EARTH FOR MARS

Antarctic: Human Psychology, remote, inaccessible location, designing for extreme conditions

Martian habitat and bases are now theory, but many practical information can be obtained from certain areas on Earth. These areas are in some ways similar to what we may expect to find and see on Martian habitat like climate, prolonged isolation period or self-sufficient-sustain environment. Like Antarctic, remote military installation or Biosphere 2

https://en.wikipedia.org/wiki/Biosphere_2

Biosphere 2: Closed Environment
Projects like Biosphere 2 might pave for the future microenvironment and habitats on other worlds.

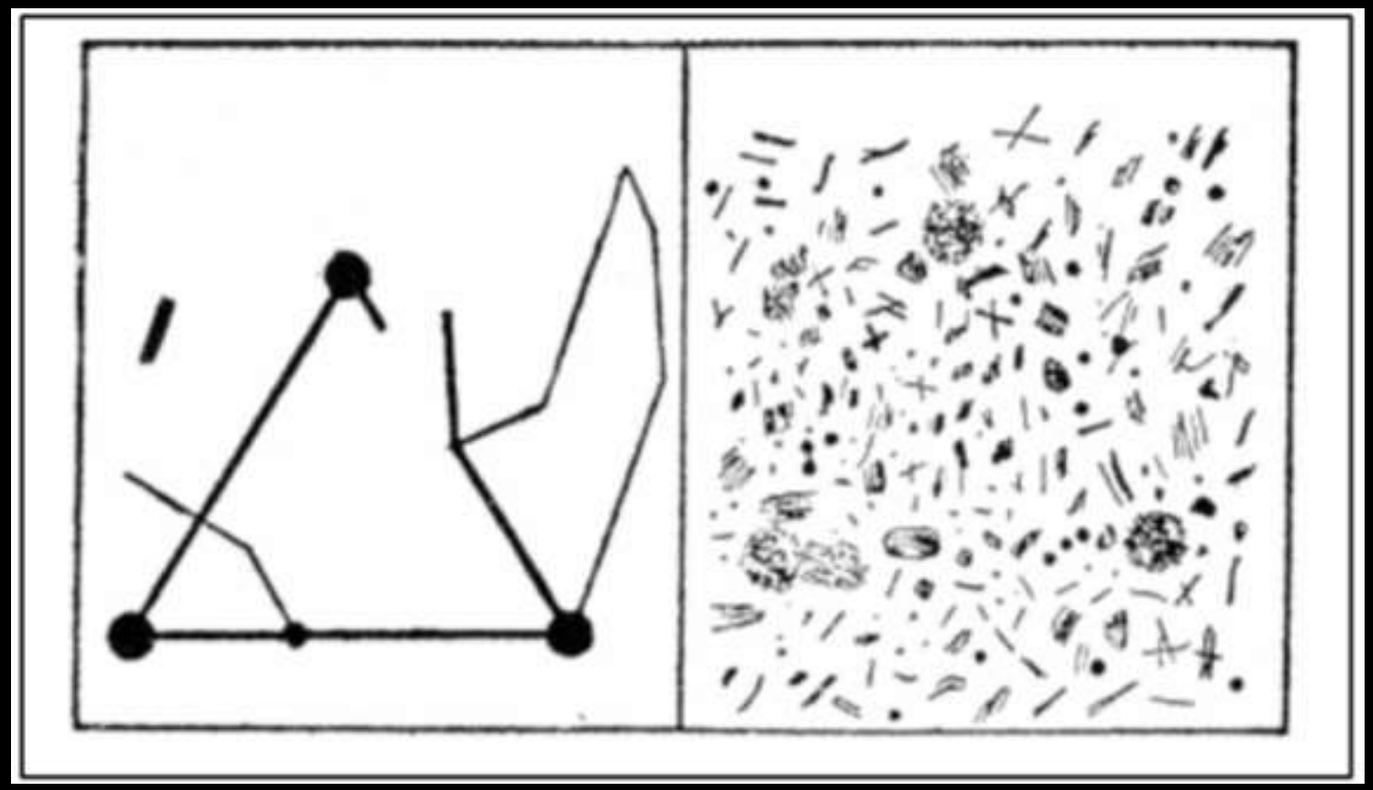


Betül Peker 2021

https://phys.org/news/2014-07-hi-seas-crew-mock-mission-pictures.html

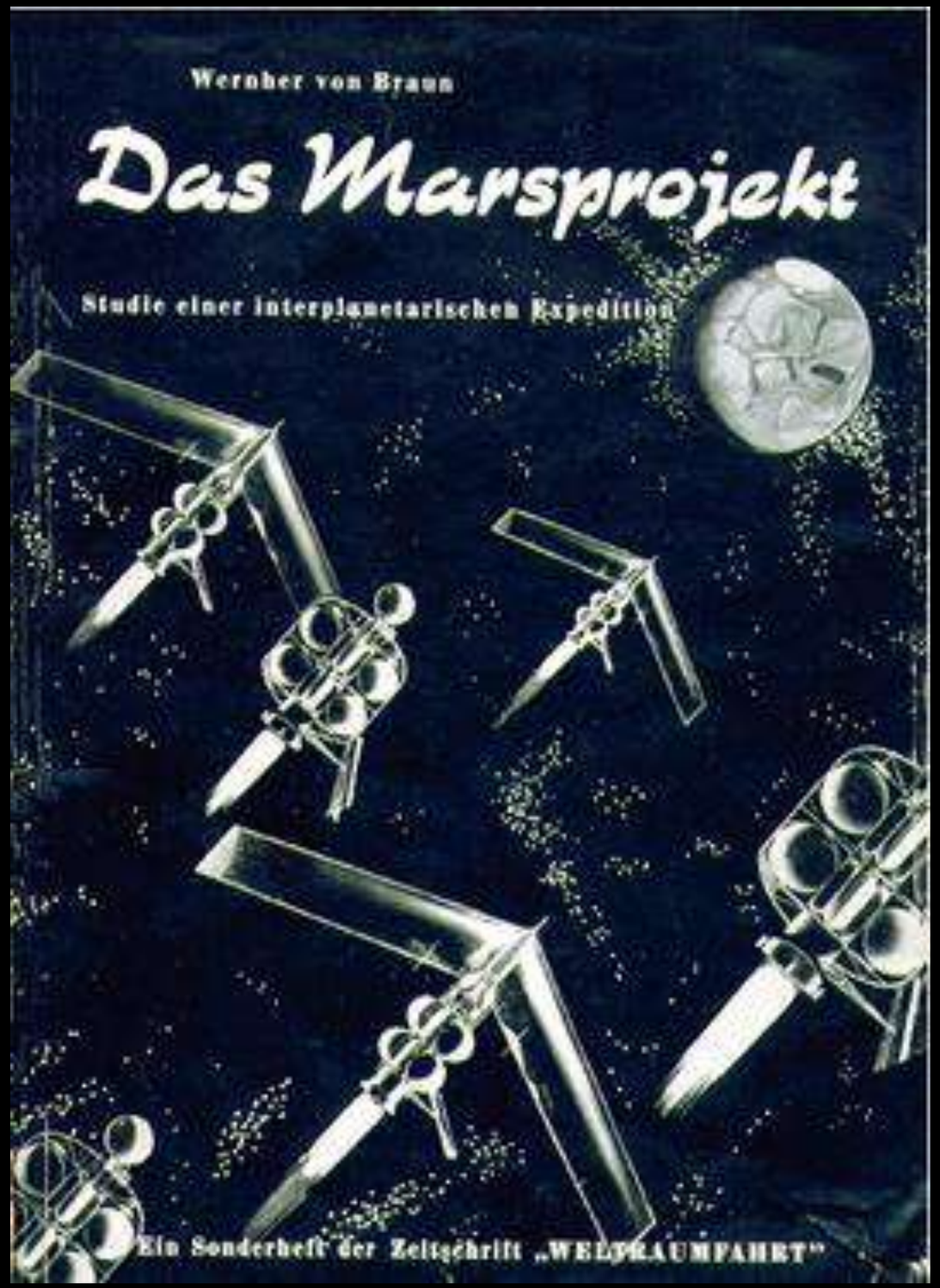
VIDEO LINK : https://vimeo.com/151514120

COMAS SOLA (CRATER)



He observed planets including Mars and Saturn, measuring the rotation period of the latter. J. Comas Solá thought that the canals seen by some astronomers were optical illusions. To check his theory he drew part of the Martian surface and added a number of random objects. To his surprise this map, when projected through a small screen looked very similar to a canal and oasis system. (See the picture above; both look similar from a distance of ten meters.) [Pickering, Mars]

https://en.wikipedia.org/wiki/Josep_Comas_i_Solà



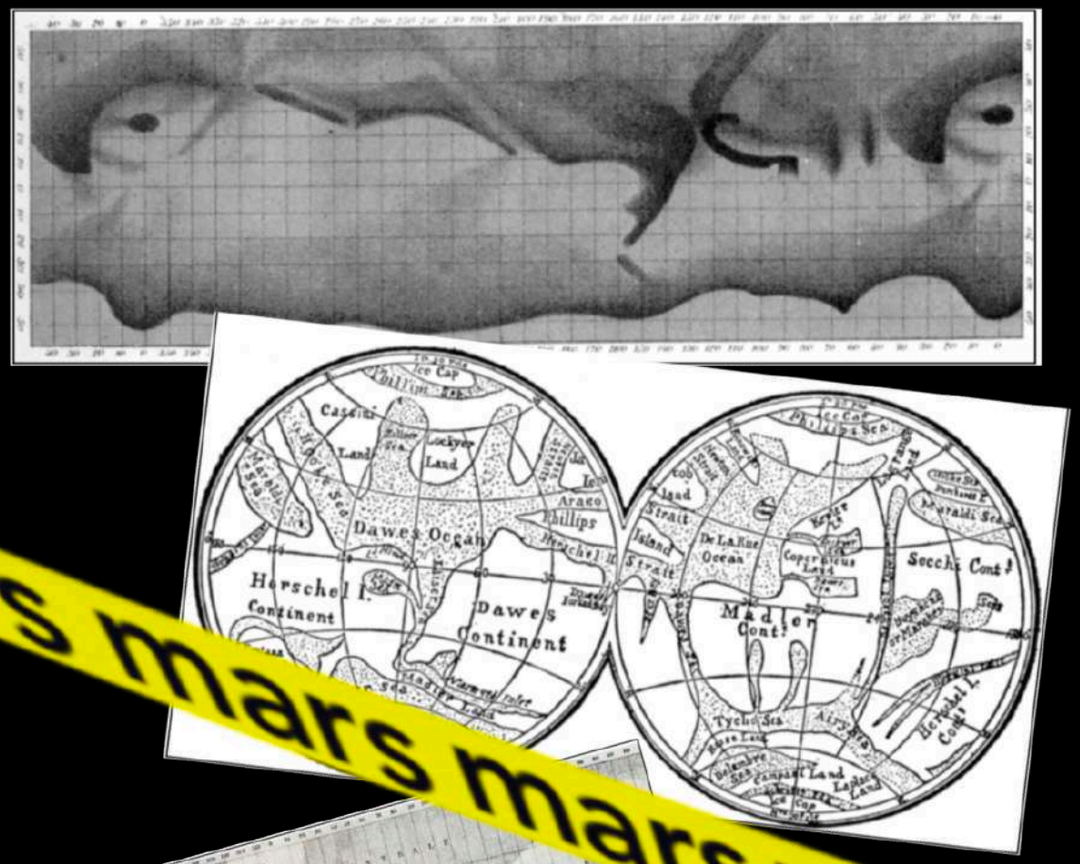
Wernher von Braun publishes his “Das Mars Projekt” in the magazine Weltraumfahrt in 1952 and this is later published as a book a year later. This project proposes the creation of “ten space vessels manned by not less than 70 men.”

When asked in 1962 how far away the realisation of the project is he replies that he thinks it will be possible to get the project up and running in fifteen to twenty years. This huge scale project never matures beyond the strictly theoretical.

In 1957 the USSR launches the sputnik making it the first object to leave Earth’s atmosphere. The space age has now made it’s official start; in the coming years it will deliver a multitude of probes and satellites to observe Mars from a distance and from close, touchingly close.

https://de.wikipedia.org/wiki/Das_Marsprojekt_(Roman)

Frederik Kaiser's Mars chart, created in Leiden (the Netherlands) between 1862 and 1864 [Het Mars Avontuur,1979 by Dr. A. J. M. Wanders]



Schiaparelli's map of Mars published in 1879

Schiaparelli's second map of Mars published in 1888, including observations between 1877

and 19

''Now, the world is a cold, barren desert with few signs of liquid water. But after decades of study using orbiters, landers, and rovers, scientists have revealed Mars as a dynamic, windblown landscape that could—just maybe—harbor microbial life beneath its rusty surface even today.''

''It seems that we're more likely to establish a base on the moon before Mars. While this has its own benefits, most would agree that the red planet is more interesting — even if it's harder to reach.''The

Red Planet is home to both the highest mountain and the deepest, longest valley in the solar system

Betül Peker 2021

Since the 1960s, humans have robotically explored Mars more than any other planet beyond Earth.
Recently, 8 missions from the U.S., European Union, Russia, and India are diligently orbiting Mars or roving across its surface. Of the 45 Mars missions launched since 1960, 26 have had some component fail to leave Earth, fall silent en route, miss orbit around Mars, burn up in the atmosphere, crash on the surface, or die prematurely.

Movie:
Trip to Mars
https://www.imdb.com/title/tt0008100/
https://www.chicagobotanic.org/blog/how_to/growing_plants_martian_soil

Betül Peker 2021

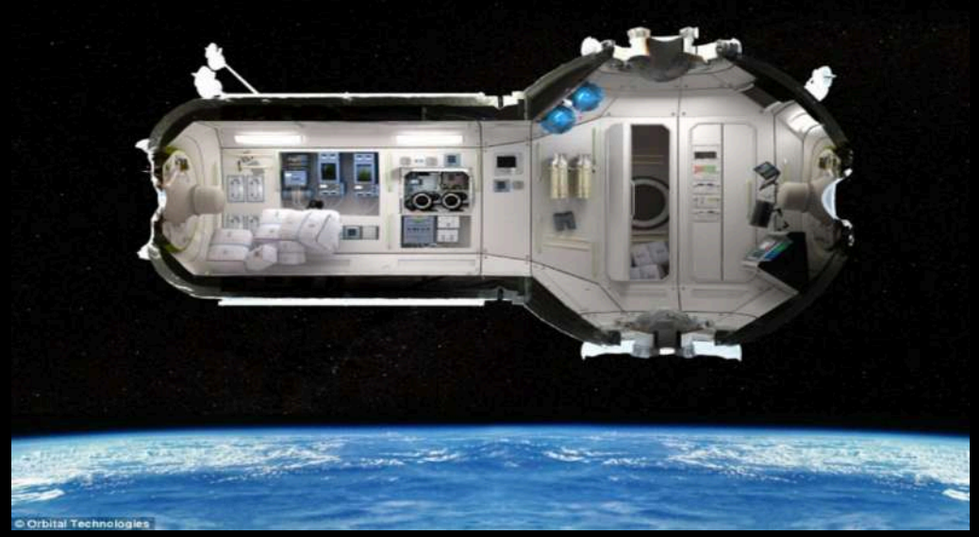
SCI-FI & FANTASY MOVIES ABOUT MARS Vol 1.

Though the main focus of the story is the daily lives of a small group of people during the post-war Soviet Union, the enduring importance of the film comes from its early science fiction elements. It primarily tells of an engineer Mstislav Sergeyevich Los (Russian: Лось) traveling to Mars in a rocket ship, where he leads a popular uprising against the ruling group of Elders, with the support of Queen Aelita who has fallen in love with him after watching him through a telescope. In its performances in the cinemas in Leningrad, Dmitri Shostakovich played on the piano the music he provided for the film. In the United States, Aelita was edited and titled by Benjamin De Casseres for release in 1929 as Aelita: Revolt of the Robots.

Betül Peker 2021

https://www.youtube.com/watch?v=YYflIj6QR-I
https://www.youtube.com/watch?v=yoROo4Ur49c

PLANTING ON MARS & OUTER SPACE



The atmosphere on Mars has about 95% carbon dioxide, which would make it impossible for humans to breathe. Mars is also much colder than Earth. This is mostly because the Red Planet is farther away from the sun than Earth. NASA's Viking mission, which landed on Mars in 1976, recorded average temperatures of –81 °F, which is colder than either the North or South poles here on Earth. If exposed to Mars's temperatures, plants, humans, and other living beings would freeze.

Mars's atmosphere is mostly carbon dioxide, and plants need this gas just as much as we need oxygen to breathe.

Also, studies suggest that watering plants on Mars could require less water than on Earth. That is because water would flow differently through the Martian soil, thanks to the Red Planet's gravity, which is approximately 38% that of Earth's. In other words, anything on Mars would feel about three times lighter than on Earth. Because of this, under Martian gravity, the soil can hold more water than on Earth, and water and nutrients within the soil would drain away more slowly. Some conditions would make it difficult for plants to grow on Mars. For example, Mars's extreme cold temperatures make life difficult to sustain. Sunlight and heat reaching that planet is much less than what the Earth gets. This is because Mars is about 50 million miles farther away from the sun. Also, the Martian atmosphere is not as thick as Earth's atmosphere, which keeps our planet warm.

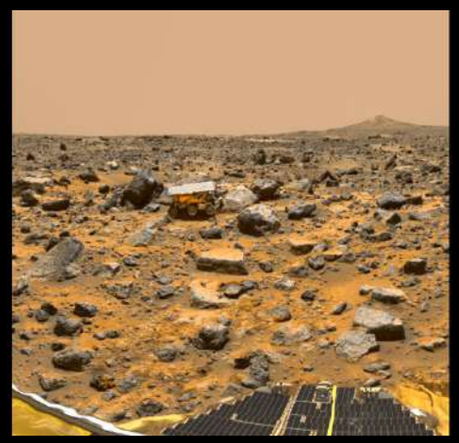
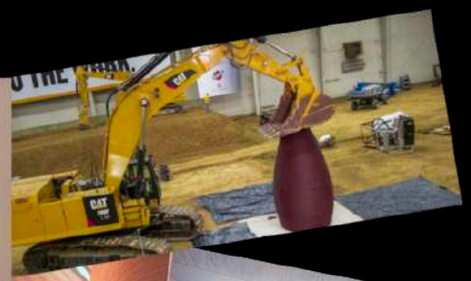
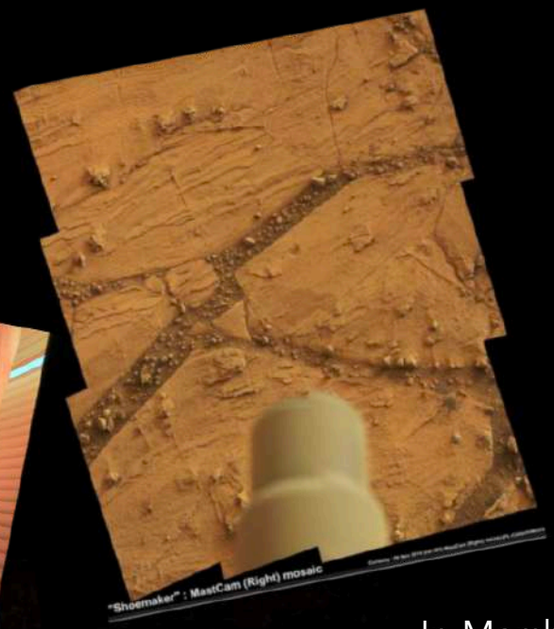


Image Credit: NASA/JP

Betül Peker 2021

AI SPACE FACTORY, MARSHA //NASA 3D printed habitat challenge





In Marsha project the soil of Mars is used after being treated with 3D printer.
Projects is a proposal for a habitat on the surface of Mars built autonomously using local and mission-generated materials.

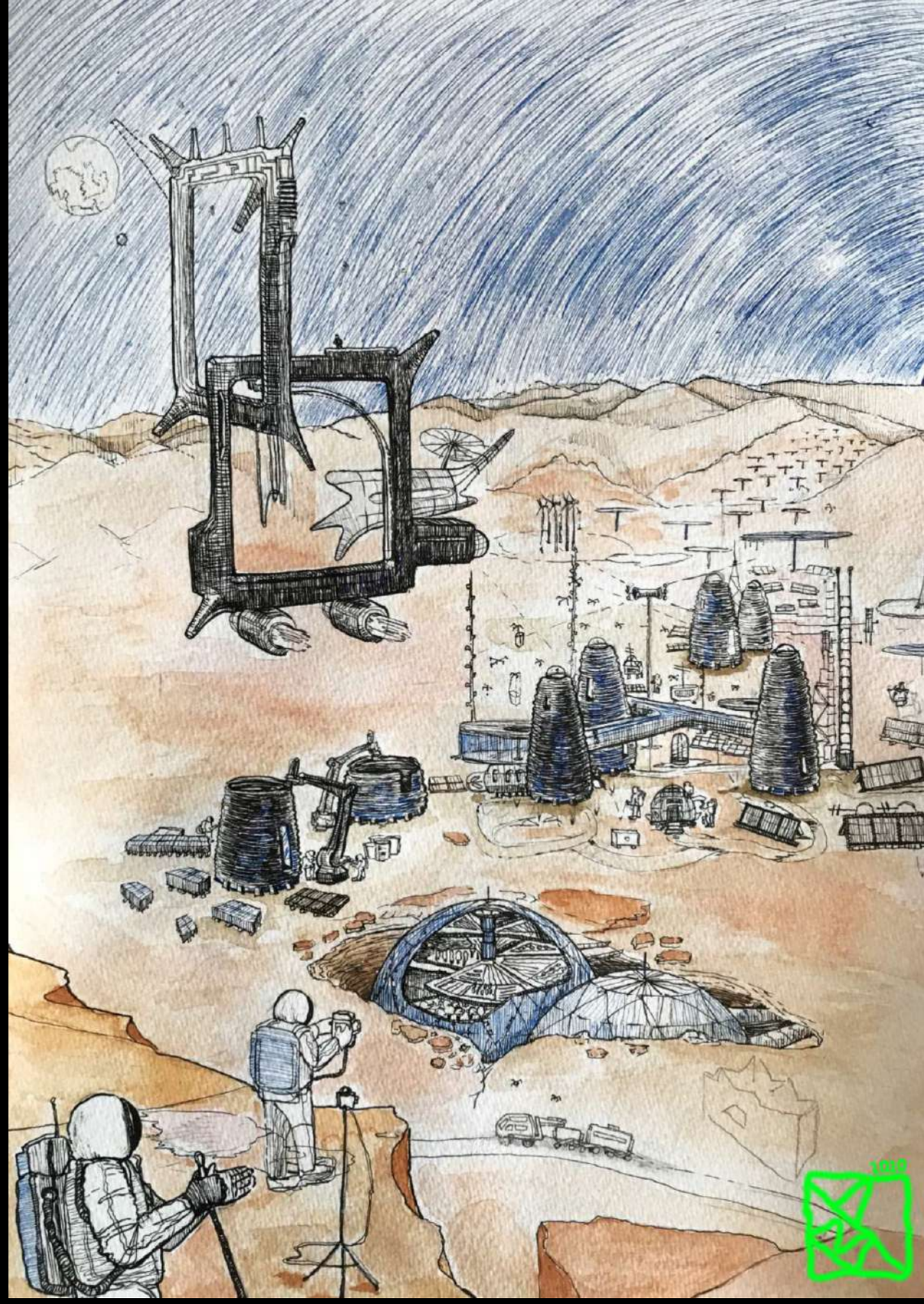
The Marsha project constructed on site so it means that solution can be produced by using local materials. The project which was 4.5 meters high and included 3 window, was built with 3d printer.

The Marsha project has been designed with high tech systems by imagining new life settlement on Martian Habitat. With the current high technology data used in construction and design.

https://www.aispacefactory.com
https://www.youtube.com/watch?v=XnrVV0w2jrE

Psychological Facts:
Psychological health and support of morale within a limited group and sometimes in confined environments or isolated conditions are vital for successful operations and productivity.

https://solarsystem.nasa.gov/resources/1038/mars-poster-version-c/



Ink on Paper, watercolour A3, Hand-drawing

Betül Peker 2021

Some notes about the project

Ekstrem Çevre Koşullarında mimari

Burning man

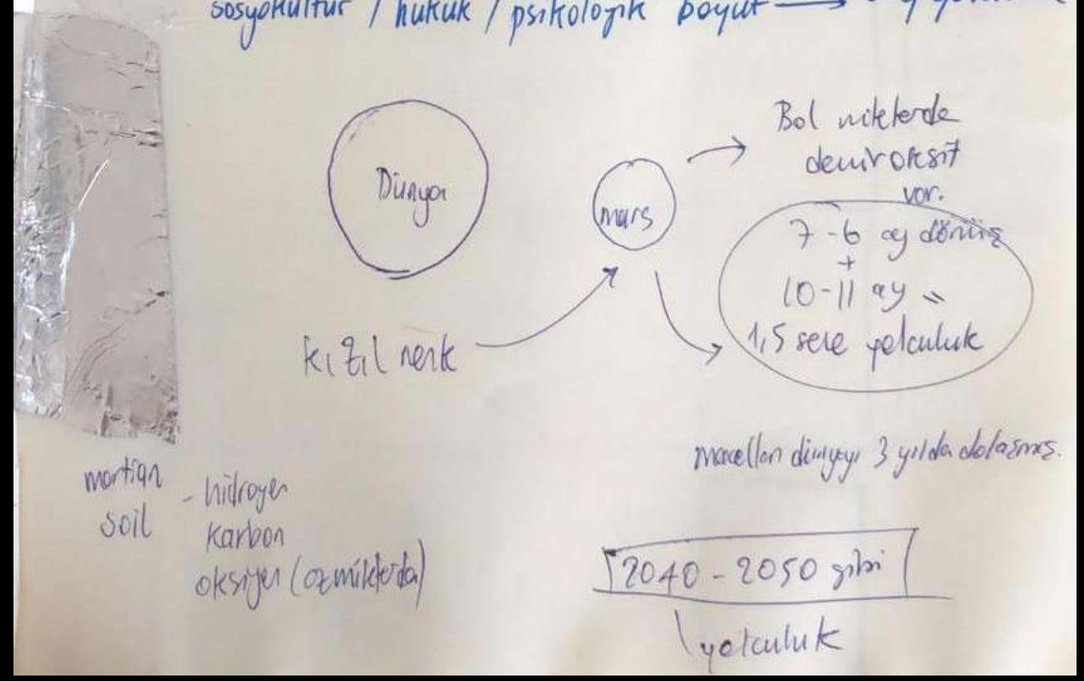
yüzen mimari

" architects face some of their most difficult challenges designing for extreme environments. Extreme archi. showcases 45 recent buildings designed for challenging environments, giving valuable insights into the extremes of architectural thinking. Projects range from a desert refuge in Southern Arizona to a floating marine research centre, an underground seed vault in northern Norway and a research station at the South Pole.

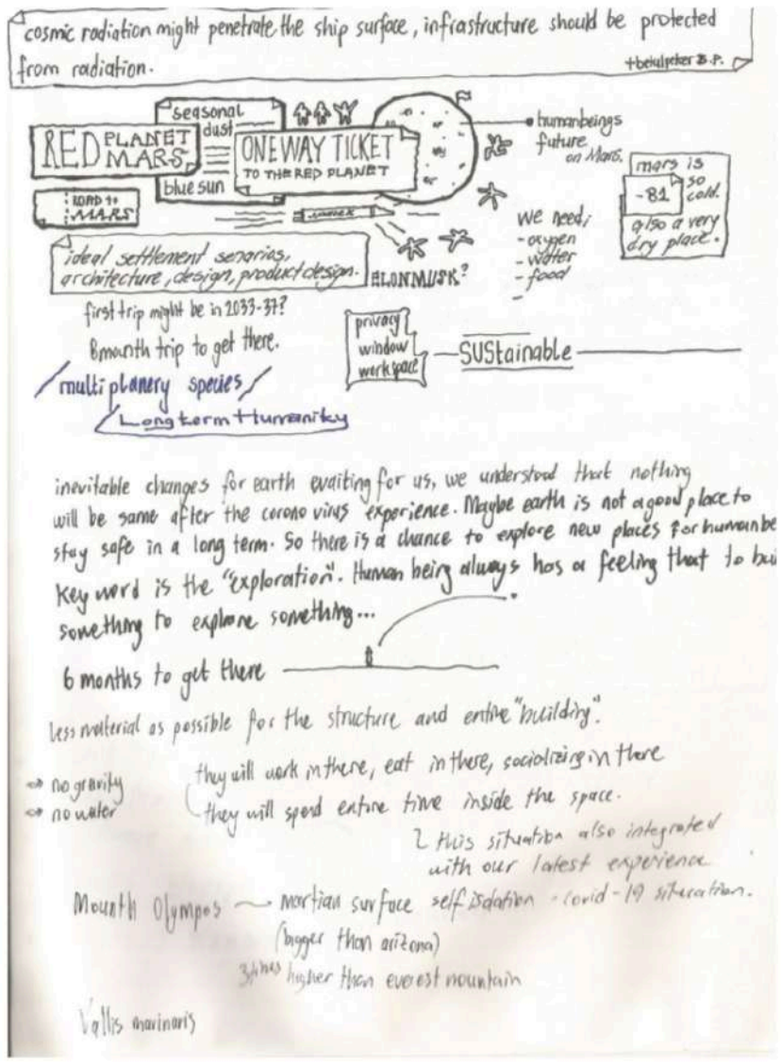
Five chapters: Hot / Cold / High / Wet / Space → moon
↘ mars

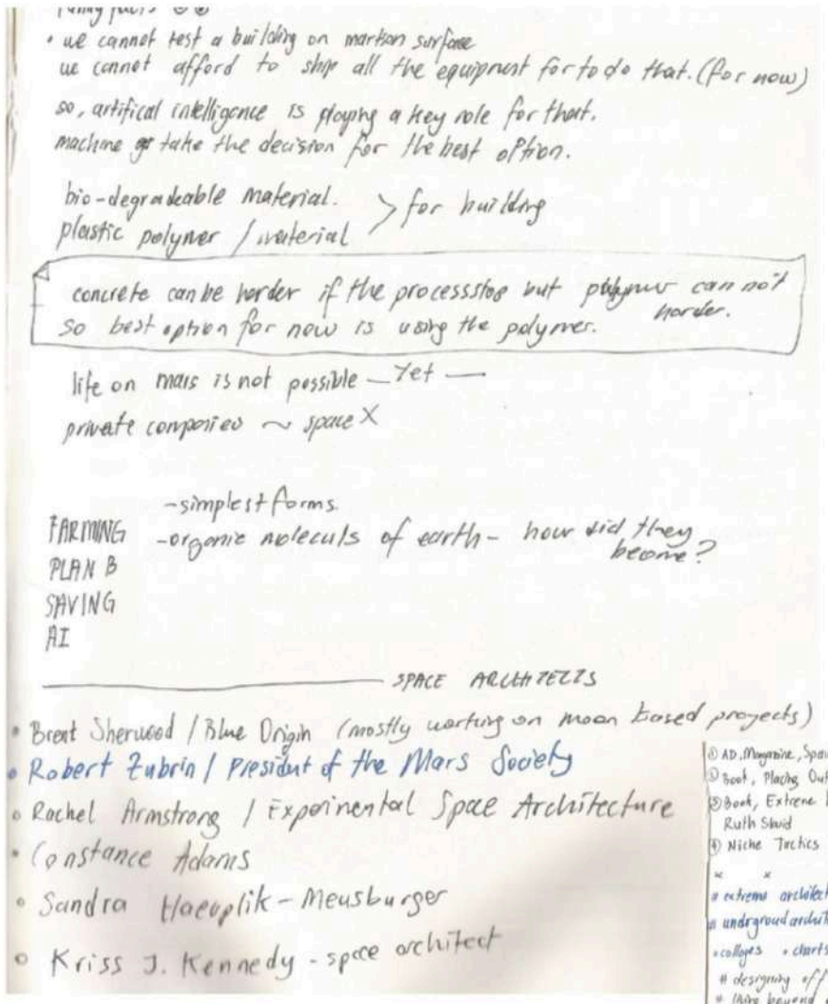
① AD, Magazine, Space Architecture
② Book, Placing Outer Space, Lisa Messeri
③ Book, Extreme Architecture, Building for Challenging Environments Ruth Slavid
④ Niche Tactics ——————→ ***

extreme architecture, # space # space travel
undergroud architecture # cone rock formations # coppodocia
• collages • charts • comics • diagrams • tech. drawings
designing off world habitats
living beyond earth
Lunar base design
#living quaters yaşam alanları
#ötegezegen #kozmoloji
sosyokültür / hukuk / psikolojik boyut → 6 ay yolculuk



Some notes about the project





REQUIREMENTS

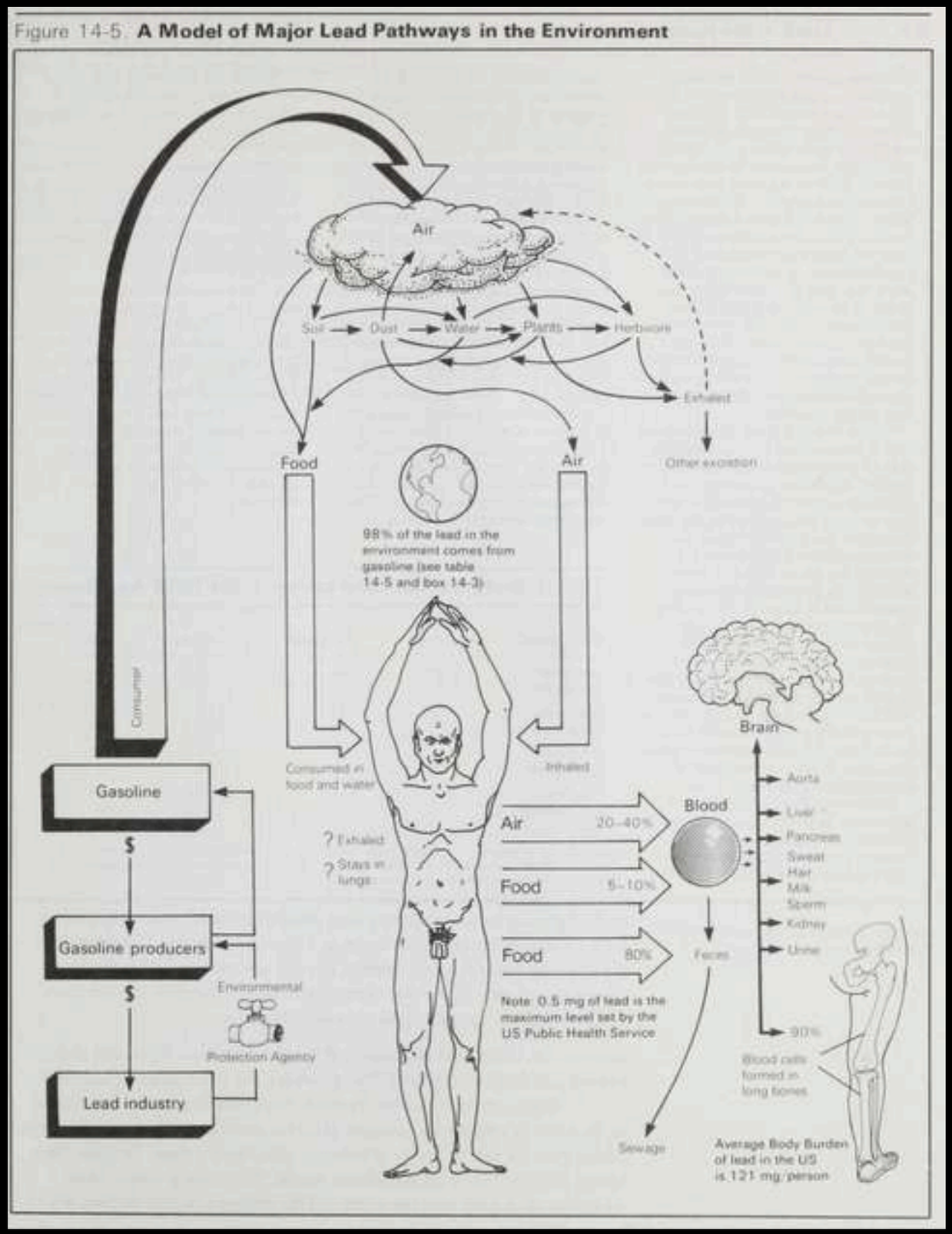


Diagram shows a human at the center of an ecosystem of inputs and outputs. To the left side, toxic lead enters the system via gasoline production and use. The lead then enters ecological processes like air and food production, which feed and nourish the man. However, the lead begins to enter and accumulate in the man's body, leading to a slow spread of the metal to other parts of his body. It presents the dangers of modern industrial production upon the human body, and how it is an inescapable fate for many living in the world. It sets up the new ways of food production and thinking coming from the Integral

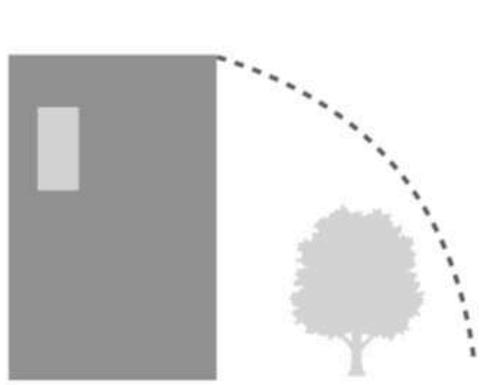
https://revolution.berkeley.edu/beginnings-integral-urban-house/

https://www.space.com/mars-colonists-fuel-oxygen-production

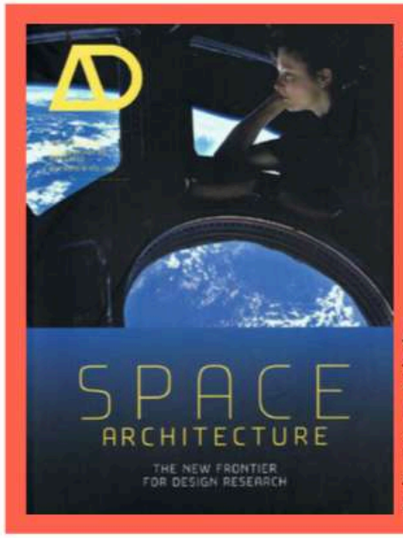
Betül Peker 2021

+ Relationship Between Nature and Home

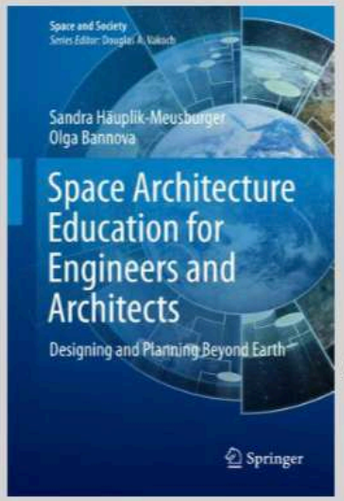
Earth Nature Approach



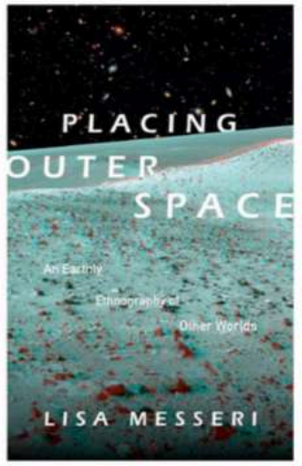
Martian Habitat Nature Approach

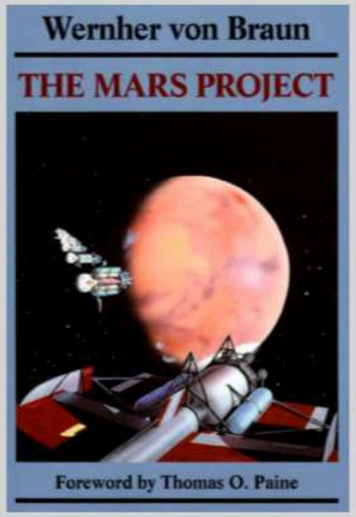


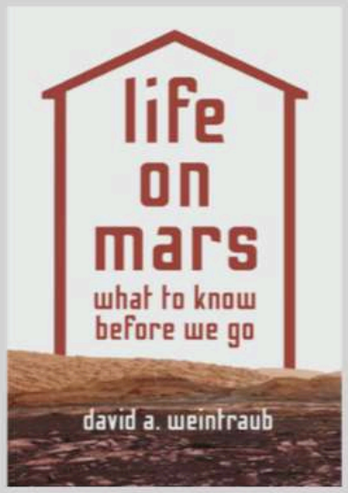
AD Space Architecture 2014 //Howe, A. S. (2014). Architecture For Other Planets, Architectural Design(232), 36-39.



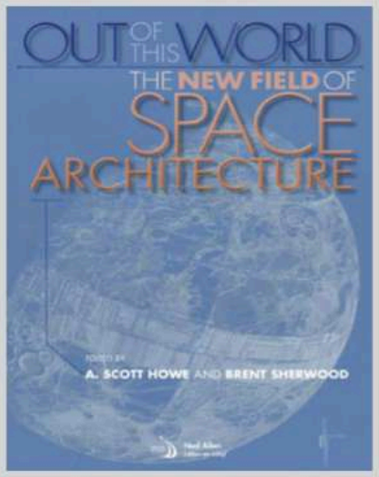
Bannova , O., & Meusburger, S. H. (2016). Space Architecture Education for Engineers and Architects. Aargau: Springer.

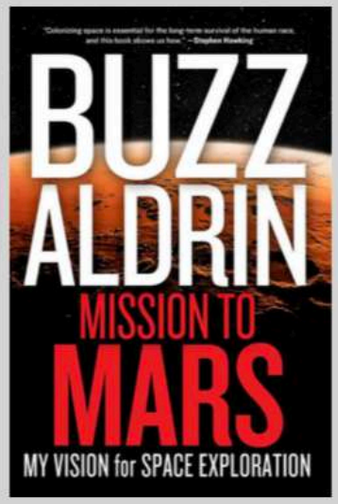


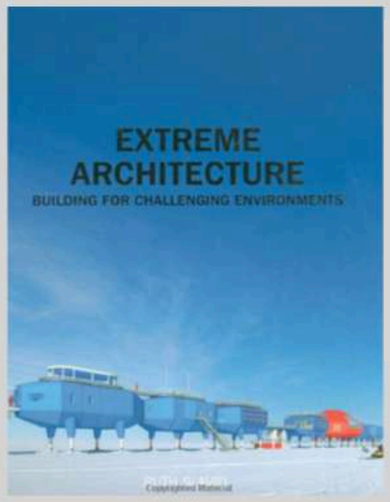




Life on Mars : What to Know Before We Go, 2018







Wenher von Braun
Space Architect

https://
en.wikipedia.org/wiki/
Wernher_von_Braun

Buckminster Fuller
Architect, Designer

https://en.wikipedia.org/wiki/Operating_Manual_for_Spaceship_Earth

Galina Balashova
Space Architect

https://tr.wikipedia.org/wiki/Galina_Balaşova

Constance Adams
Space Architect

"Constance Adams, architect who designed space stations and Mars colonies"

Adams left behind a lifetime of research on human-machine interface, sustainable systems, and **biomimetic design in interior architecture.** Her inventive space habitats, currently being iterated in new designs at NASA, will help impact the future of living on Earth and beyond."

https://
en.wikipedia.org/wiki/
Constance_Adams

Kriss J. Kennedy
Space Architect

https://ntrs.nasa.gov/citations/20050182969

Olga Bannova
Space Architecture Graduate Program

Planning analyses for a broad range of space vehicles, habitats and systems; inflatable hydroponics laboratory and logistic modules; special design influences and requirements for different gravity conditions in space; and habitat concepts for extreme environments on Earth.

http://www.me.uh.edu/faculty/bannova

Sandra Haeuplik-Meusburger
Space Architect

https://spacearchitect.org/sandra-hauplik-meusburger/

1911?

https://www.reddit.com/r/OldSchoolCool/comments/gcqfj5/trip_to_mars_only_10_1911/

THANK YOU

Betül Peker 2021