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Architecture for humans in space: design, engineering, concepts and mission planning (1)

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LIBATIONS IN SPACE

Abstract

As inspiring as the concept of colonizing Mars, the Moon, and building O'Neill Colonies is, when the settlers arrive, they're inevitably going to say, "Boy, could I use a drink!" While most space agencies around the world maintain a policy of prohibition in space, if humanity truly is to start permanent settlements and colonization of faraway worlds, consumption of alcoholic beverages will swiftly become as common as it is on Earth. Initially, these beverages are likely to be imported from Earth at great cost and in limited supply, but indigenous production of spirits, beer, and even wine will certainly arise.

The question is, how feasible is it to manufacture consumable alcoholic beverages on Mars or on the Moon or in microgravity? This paper/presentation will examine historical examples of alcohol consumption and production during exploration and settlement endeavors, as well as the scientific, agricultural, health, and other issues of producing alcoholic beverages in various locations in space. In doing so, the following categories of alcohol will be specifically examined:

- **Spirits:** In the novel and movie, *The Martian*, the protagonist grew potatoes on Mars. Most experts agree that potatoes and other crops probably could be grown in Martian soil. As such, spirits may be the logical initial type of alcoholic beverages in space. Some work has already begun on this concept. In (year), single malt "scotch" whisky producer, Ardbeg, sent samples up to the International Space Station to determine whether micro-gravity altered the ageing process of scotch – it did.

- **Beer:** In 2014, a crew of the Mars Research Station in Utah performed an experiment to see if they could grow sorghum seeds and hops in simulated Mars soil. The experiment was successful and the plants grew faster and larger than other samples in 'Earth soil'.

- **Wine:** Can we grow grapes on Mars or on the Moon? Mars will certainly provide the most suitable soil to grow grapes in space, but even if this was successful, could a safe and drinkable wine be produced? Perhaps more than any other alcoholic beverage, the (terroir) climate, soil, and terrain of a grape growing region greatly impacts the taste of a wine. Mars is known for iron oxide as well as some potential toxins, like perchlorate. Would this render Mars wines unpalatable or even toxic? If it is, a new vocabulary would need to be established to reflect the unique.