On the creation of technology for a comfortable human life on the Moon. A. F. Steklov[1,2], A.P. Vidmachenko[1,3] and G.N. Dashkiev[2], [1]Interregional Academy of Personnel Management, Str. Frometivska, 2, Kyiv, 03039, [2]Main Astronomical Observatory of National Academy of Sciences of Ukraine, Str. Ak. Zabolotnogo, 27, Kyiv, 03143, [3]National University of Life and Environmental Sciences of Ukraine, St. Heroyiv Oborony, 12, Kyiv, 03041, stec36@i.ua.

Due to the rotation around the axis, temperature on the Moon surface varies from 100 to 390 K (-173°C to +117°C). In the constantly shaded depressions in polar regions, its value decreases to 50 K [2, 8–10]. At such conditions, it is necessary to create specific protection against temperature and powerful solar radiation. Therefore, it is clear that on the Moon a person can live on the surface only in shelters with powerful walls, or below the surface [1, 3]. To do this, arriving on the surface of our satellite, a person must first of all protect himself from extreme temperature and radiation. In our opinion, the most appropriate way is to place astronauts under the surface of the moon [6]. To this end, it is necessary to develop a technology for the very rapid construction of residential and industrial premises and their heating systems there. Heat penetrates deep into the soil due to thermal conductivity [6, 7]. But the thermal conductivity of the lunar regolith is very low. For example, almost 230 years ago, the French scientist A.L. Lavoisier proved the year-round constancy of temperature at + 11.7°C at a depth of 28 meters in the Paris Observatory. For Kiev, such a constant temperature is always + 9°C. At the beginning of the twentieth century mathematician Steklov A.L. has solved the problem of mathematical physics for the thermal conductivity of a semi-infinite rod. This solution could explain such planetary phenomena. Solving a similar problem for the Moon, using the temperature difference in the equatorial part of its surface in the range from + 117°C to -173°C, we found that the temperature difference below the surface at depths of 1.5÷20 meters will be constant too.

And under the surface (endo) of the Moon, this constant temperature depending on the latitude will be from -20 to -50°C. That is why the Main Astronomical Observatory of the National Academy of Sciences of Ukraine is working on the topic "Thermal systems for terraforming of planets and planetoids." The authors have developed an effective technology for creating special daytime light "wells" to heat the ground by sunlight near the settlements under the lunar surface. To transfer energy from the Sun to subsurface rooms we offer lift up at the morning periscope of lens-mirror coelostat installation. Such installations can work the whole lunar day, tracking the movement of the Sun across the sky, and to redirect beams of light to special accumulating systems, that are located below the surface. This will allow the formation of special "heat accumulators" around and above our "endosettlements". With the onset of the evening, the retractable parts of the periscope with coelostat must be omitted in wells under the surface; and immediately these wells must be closed for the night by powerful covers of thermal insulation material. This will provide at night a comfortable temperature (+15÷25°C) for the biological form of life. After 15 Earth days the built-in periscope is again will be brought to the working position.

And the area to accommodate such endosettlements on the moon is millions of square kilometers! It remains to provide them with water and special spacesuits for long-term residence and the extraction of resources of our satellite [4, 5, 11-13]. Therefore, we must first send to the Moon special robots-builders and/or specialized 3-D printers for carrying building works. Initially, special symbiotechnical cocoons for long-term endostation stations can be placed in small shallow craters and covered with a nearby layer of regolith. Here we must build a network of solar power plants too.

We believe that researchers need to pay particular attention to the analysis of the above information. Continuing research in this direction will be very interesting and promising..

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