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BEAUTIFUL BUT NOT HOSTABLE – ORGANOLEPTIC PROPERTIES OF THE SOLAR SYSTEMS' PLANETS

BOYKO RANGUELOV

University of Mining and Geology, B. Kamenov str., Sofia 1700, Bulgaria
E-mail: branguelov@gmail.com

Abstract. The paper presents the summary of the works dealing with the organoleptic properties of the Solar systems' planets and some other space objects. The intensive development of the space research technologies, new and effective ways of communications and achievements of the space remote sensing methods, gives wide possibilities to investigate distant objects like solar systems' planets, moons, comets, etc. Obtaining data and information about the chemical composition, physical properties and other parameters of the space bodies and using methods to transform these properties in sound, taste, smell and other organoleptic peculiarities available only for the human senses, it is really interesting how the human beings will feel if they'll be able to explore the space bodies, by their own sensitive feelings. As a result of such investigation the conclusion that the planets of the Solar system looks sometimes very beautiful, but more often do not provide rather welcome environments for the human beings.

1. INTRODUCTION

The organoleptic properties of the space objects are subjective feelings depending of human perception. Some people like color, others – the dynamic of color changes, the subjective feeling of the human perception is different (for example https://www.google.com/search?channel=nus5&client=firefox-b-1-d&q=Pics+of+the+planets).

Some people are interested by other properties, like sound, smell, taste, fractality, etc. - see Ranguelov, Iliev (2019). On a first glance these subjective human feelings is difficult to determine quantitatively, but during the last years it is more and more an engineering problem – to transform the physical and chemical properties into human senses – Iliev, Ranguelov (2019).

The space exploration of the planets in the solar system and other astronomical objects is developing at a rapid and accelerating temporal domain. Missions with spacecraft orbiting closer and more distant objects are now a daily occurrence and

bring more and more reliable information about various properties of the planets - see Ranguelov, Iliev (2019). One of the most interesting for the science are the taste, smell and possible sounds that can be felt during eventual visits to the various distant space objects - planets, satellites, comets, asteroids. Beautyfullness is a subjective feeling, and it is most often associated with the color range and dynamics of the layers enveloping the space bodies – Iliev, Ranguelov (2019).

At the basis of the methodologies for studying and collecting information which are well-developed and worked-out methods of physics, chemistry, astrophysics, remote measurements and other branches of science can help a lot to these achievements

The reliability of the obtained data is ensured by repeated missions of the spacecraft visits aimed at the study of the bodies of the Solar System and carried out by the various space countries. The interest of all developing space research countries in remote sensing and direct technologies is constantly growing and the number of missions is already over a hundred, which requires enormous scientific, technical and financial potential.

2. HOW THE INFORMATION IS COLLECTED?

The basis of these important studies is the chemical composition (elements and compounds) of the solid, liquid and gaseous envelopes of the studied space objects. Planetary chemistry methods are based both on remote methods from Earth and on the capabilities of the various analytical approaches used by spacecraft's (remote or direct sampling) as well as by direct astronauts' sampling (for example - on the Moon). These methods include several well developed and reliable techniques as spectral analysis (in transmitted or reflected light, in the infrared and/or ultraviolet spectral window), remote light and laser probing, gas chromatography, direct testing methods with various indicator reactions between chemicals sensitive to the action of one or another substance and other methods for determination of the chemical composition. The sensitivity of such methods is monstrous - concentrations of up to 1 ppm or even billionth parts of the substance can be determined (most people are familiar with this high sensitive analysis - when crossing the border points between countries, especially at the airports, the security people sometimes wipe sensitive tissue on clothes and/or other surfaces of our body and after seconds, the analyst says whether you have touched drugs - accidentally or on purpose). Similar high sensitivity methods are often used to determine the presence or absence of a substance (for example, in the atmosphere of planets, satellites or other space objects - comets, asteroids, etc.). The main way to collect information about the chemical composition (atoms, molecules and chemical compounds) and physical parameters (elevation, gravitational and magnetic field, radiation, etc.) are the space missions performed by various spacecraft reaching closer or farther of the studied space objects.

3. TRANSFORMATION OF THE CHEMICAL AND PHYSICAL PROPERTIES INTO ORGANOLEPTIC

After having a reliably determined chemical composition, the so-called transformation process, i.e. converting the data on the concentrations of various substances into an organoleptic sensation. This is especially true for detecting the smell of the space object. The cells in the human nose are specialized to sense the different odors of different chemical elements and compounds. The matter of taste is more complicated, but the mechanism of transformation works analogously. It is most difficult to transform the sounds emitted by the various cosmic objects into frequencies perceptible to the human ear. But the synthesizers of sounds easily cope with this task. After spectral analysis, shifting the frequency band to that perceived by the human ear is much easier. It should be noted that the lack of air (or atmosphere) around some space objects is not an obstacle to "sounding". Seismic waves, along with other elastic vibrations, are wave processes and can also be subject to spectral analysis and transformed placed within the audibility range of the human ear. Thus, all recordings of wave processes are transformed into sounds perceived by the hearing apparatus of people, creating the feeling of "sound of space objects". "Beautifulness" is dictated by the color spectrum, the mutual arrangement of colors on the images of objects, as well as of their change dynamics and variations.

4. ORGANOLEPTIC PROPERTIES OF THE OBJECTS OF THE SOLAR SYSTEM

The smell, taste, sounds and the "beautifulness" of the objects are extracted from their chemical composition and adapted for the human senses (illustrations – can be reached by a public domain located and visualized in the web-page https://www.google.com/search?channel=nus5&client=firefox-b-1-d&q=Pics+of+the+planets)

The Moon

The Moon is the only space body so far visited by space crews. Main chemical substances: Hydrogen, Helium, Oxygen, Sulphur, Iron, Silicates. Odor: Gunpowder (organoleptically detected by the astronauts. When the samples come into contact with oxygen – this smell disappears over time). Taste: matchsticks with a sour undertone. Sound: sharp tone resounding from the collected solid rock samples when kick on them, seismographs registered seismic waves (their "sound" is much longer than that one of the seismic sounds on Earth), the crackle sound as well as of meteorite impacts. Beautifulness: visible every evening from the Earth during the clear sky nights (even during the day). Color is gray brownish, elevation relief is full of craters, view, as of a volcanic desert. Weird lights probably generated by meteorite impacts.

Mercury
Chemical substances: Hydrogen, Helium, Sulphur, Silicates. Smell: probably like the Moon. Taste: sour. Sound: low-frequency echo (boom on impact). Beautifulness: color is brown-grey, elevation relief is full of craters, view is as a shining volcanic desert.

Venus
Elevation – heavily disintegrated with river valleys and plateaus; view - closer to Earth, predominantly desert, with mountains and plains, volcanic craters and meteorite impacts. Chemical substances: Sulfuric acid, Carbon monoxide and dioxide, Hydrogen sulfide, Phosphine, Silicates. Smell: Stifling, rotten eggs, rotten fish, highly poisonous atmosphere. Taste: intensively sour. Sound: of blowing winds and thunder, seismic waves observed. Beautifulness: color – silvery with brown components, thunder lights.

Mars
Elevation relief – craters, river valleys and the plateaus, strongly cut and with high amplitudes**;** view - closest to Earth, predominantly desert, with mountains and plains, volcanic craters and meteorite impacts. Chemical substances: Sulfur, Hydrogen sulfide, Iron and iron oxides, Silicates. Smell: Safety Matches, Gun powder, Rotten Eggs, Rust. Taste: of rust. Sound: of blowing winds, seismic waves, sometimes rolling stones. Beautyfullness: color - predominantly grey-reddish-brown.

Jupiter
Chemical substances: Hydrogen, Helium, Hydrogen sulfide, Ammonia, Phosphine, Hydrogen cyanide. Odor: Strong stench of rotten eggs, intestinal gases, urine, rotten fish, bitter almonds. Taste: sharp sour-bitter, poisoning. Sound: Roaring, low-frequency humming, frightening sounds. Beautifulness: color - silvery white and light brown and tan undulations from heavy storms and hurricanes, attractive.

Saturn
Chemical substances: Hydrogen, Helium, Hydrogen sulfide, Ammonia, Phosphine, Hydrogen cyanide, Ammonium hydrosulfide. Smell: Very strong stench of rotten eggs, intestinal gases, urine, rotten fish, bitter almonds, hair dye. Taste: sour-bitter, poisoning. Sound: Roaring, low-frequency humming, heavy wheezing. Beautifulness: color – bluish-brown, famous rings and many satellites (probably the most beautiful view of all extraterrestrial bodies).

Titan (The Saturn moon)
Chemical substances: Nitrogen (98%) Methylacetylene, Cyanoacetylene, atmosphere and liquid substances envelopes. Smell: Gas station. Taste: extremely unpleasant. Sound: whistling from geysers. Beautifulness: color - bluish, brown, violet, beautiful view, (probably most similar in colors to the Earth's).

Uranus
Chemical substances: Hydrogen, Helium, Hydrogen sulfide, Ammonia (less), Phosphine, Hydrogen cyanide, Ammonium hydrosulfide. Odor: Strong stench of rotten eggs, intestinal gas, urine, rot, bitter almonds, hair dye. Taste: sour-extremely unpleasant. Sound: No data (Saturn-like). Beautyfullness : color – bluish, view – attractive, with rings vertical on the rotation axis. Expectation of frozen sounds due to gravitational forces.

Neptune
Chemical substances: Hydrogen, Helium, Hydrogen sulfide, Ammonia (less), Phosphine, Hydrogen cyanide, Ammonium hydrosulfide. Odor: Strong stench of rotten eggs, intestinal gas, urine, rot, bitter almonds, marzipan, hair dye. Taste: sour-extremely unpleasant. Sound: No data (Saturn-like). Beautifulness: color – bluish, cold.

Are there any more unusual properties and effects in the Solar system?
They can be expected a lot. Of course, the study of the properties and characteristics of the bodies of the solar system cannot be limited to the present knowledge. There are a number of questions (a consequence of the current knowledge), which are yet to be solved (for example – the separate formation of solid and gas planets). The logic that denser chemical substances are building blocks for the planets closer to the Sun, and gaseous ones for the more distant ones, somehow does not coincide with the presence of Pluto and its largest moon, Charon, both solid bodies, the most distant from the Sun…or the biggest exception – the Earth, with its variety of chemical compositions, active geodynamics, hydrosphere and gaseous atmosphere. It is hardly to believe that was created by nature only to provide good conditions for the development of mankind. From what has been said so far, it follows that all the bodies of the solar system, with the exception of the Earth, are too unfavorable for humans and living organisms of the terrestrial type. So, LET'S SAVE OUR PLANET.

5. CONCLUSIONS

The organoleptic properties and beautifulness of the planets of the solar system is under discussion. Along this subjective feeling of the humans, some engineering problems arise to determine more important subjective properties like smell, sounds, even taste of space objects. Due to the engineering advances in probing space objects by spacecraft the convincing results are obtained due to the transformations of the chemical and some physical properties into the human feelings and senses. This branch of the knowledge seems to be in the frontiers of the near future space science. The analysis shows that the nice looking space bodies frequently are not very hostable to the humans. Even more – they are really dangerous for the potential visitors.

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