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# AZERBAIJANI NAMES IN SPACE

HUMANITY IS PART OF THE COSMOS - A STRANGER IN ITS VAST OPEN SPACES FULL OF MYSTERIES TOGETHER WITH THE PLANET EARTH AND THE SOLAR SYSTEM. THE COSMOS, WHOSE NAME MEANS ORDER, ARRANGEMENT AND HARMONY IN GREEK, HAS ATTRACTED PEOPLE SINCE ANCIENT TIMES AND SERVED AS A SYMBOL OF HARMONY AND BEAUTY IN NATURAL PHENOMENA. WHO HAS NOT ENJOYED THE BEAUTY OF THE STARRY SKY ONCE IN THEIR LIFETIME, MARVELING AT THE INFINITE EXPANSE OF THE UNIVERSE? YET THERE IS SOME SPECIAL APPEAL AND DILAPIDATION IN THE MOSTLY ANCIENT NAMES THAT FLASH UP ON THE STARRY MAP OF THE SKY. WELL, THE LAND OF FIRE AZERBAIJAN – IS IT REPRESENTED BY ITS OWN NAMES IN THE WORLD OF HOT STARS, COLD PLANETS AND IMPERMANENT COMETS?

Azerbaijan has a worthy place in the history of astronomy. Our contribution to this science is not limited to the famous Maraga observatory founded in the 13th century on the territory of South Azerbaijan by great Nasireddin Tusi. This observatory can be safely called a prototype of a modern Academy of Sciences. What about the ancient rock paintings in Gobustan near Baku and Gamigaya in Ordubad, which, as has already been proven, are related to the cosmos and to astronomy?

Many believe that the famous masterpiece of medieval architecture Giz Galasi (Maiden's Tower) in Baku was a kind of primitive (in our view) observatory. These and other mysteries are waiting to be solved.

After the Maraga observatory, there was a long "silence", and then the "baton" was picked up by the Shamakhi Astrophysical Observatory, which was established at the foot of the sacred Mount Pirgulu in 1960. Agree that at that time, not every country could afford to have its own "window into space" as observatories are often called. Soon after that, we cut through a second window in the form of the Batabat astrophysical observatory in the ancient land of Nakhchivan, the home of prominent scholars and politicians and a region of historic monuments of world importance.

Naturally, **the contribution of the Azerbaijani people to the development of astronomy and space exploration did not go unnoticed, and the fact that celestial bodies were given names connected with Azerbaijan in one way or another can be considered one of the original awards for this.**

When heavenly bodies are discovered, they are initially assigned codes and then given names. The same happens with formations on their surface. In different years, the International Astronomical Union (IAU) actively discussed what category of names newly discovered heavenly bodies or formations on them (craters, plains, valleys, cliffs, mountains, etc.) should be given. In the end, they decided to give them the name of not only astronomers and scientists from other disciplines, but also of prominent writers, poets, painters, sculptors, composers, etc.

*Great Azerbaijani Nasireddin Tusi*

Of course, we all dream of a lengthy list of names connected with Azerbaijan in one way or another deserving "heavenly residence". And those names are now more than enough. It is already possible to draw up an initial version of the list. Let's make a little excursion starting with the closest cosmic neighborhoods.

THE MOON. It is the only natural satellite of the Earth and the second brightest object in the sky after the Sun. The Moon has attracted the attention of people since prehistoric times. The Romans called our satellite Luna, the Greeks – Selena and ancient Egyptians - Yah or Iyah. The invention of telescopes allowed us to distinguish fine details of the relief of the Moon. The first map of the Moon's surface was drafted by Riccioli in 1651. He also gave names to the largest craters. Lunar seas, which constitute about 16% of the surface of the Moon, are huge craters that emerged as a result of collisions with celestial bodies and were later filled with liquid lava. Most of the surface is covered with regolith - a mixture of fine dust and rocky debris resulting from falling meteors. Riccioli suggested giving craters the names of great scientists of antiquity and modern times. That is how the craters of Plato, Aristotle, Archimedes, Aristarchus, Eratosthenes, Hipparchus, Ptolemy and Copernicus, Kepler, Tycho Brahe and Galileo appeared on the Moon. The other side of the Moon is dominated by modern names - Apollo, Gagarin and Korolev, etc., mostly of Russian origin, as the first pictures of the other side were made by the Soviet spaceship Luna-3. Along with the above, **on the Moon we can find the name of the world-known Azerbaijani scholar and thinker Nasireddin Tusi.**

The Nasireddin Crater (Nasireddin or eponym Nasir al-Din al-Tusi) is of impact origin and is located in the rugged terrain in the southern part of the Moon. This crater is connected to two much older formations invading the Miller Crater in the north and the Huggins Crater in the west. To the east of the Nasireddin Crater, there is the vast Stofler plain with ledges. The Nasireddin Crater, as a young formation, has preserved many of its structural details very well, including the terraces on the inside wall and the sharp periphery (rim) towards the south and the east where the inner

*Nasireddin Crater on the Moon*

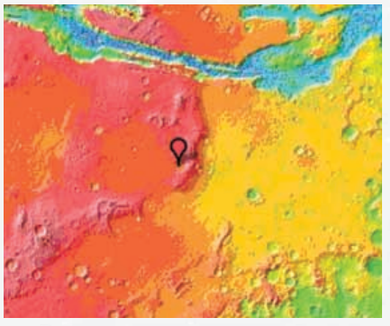
wall is sharply lowered. The external pavilion is relatively flat, but with a rough surface. There are also several low central peaks in the central part of the interior and a few small crater cuts that bisect the surface.

The lunar (or selenographic) coordinates of the Nasireddin Crater are 41 degrees southern latitude and 0.2 degrees eastern longitude. Its diameter is 52 km and depth - 3 km. The selenographic co-longitude (longitude of the morning terminator separating the dark and lit parts of the Moon calculated from the main meridian in the direction of the west) is 1 degree at the sunrise.

MARS. It is the fourth most distant planet from the sun and the seventh largest planet of the solar system. It can be easily observed with the naked eye as a bright reddish star. Mars, like other planets in the solar system, is named after one of the gods of the ancient pantheon - god of war Mars (the ancient Greek version is Ares). Two-thirds of the surface of Mars is occupied by bright areas known as continents and about one-third – by dark areas called seas. The seas are concentrated mainly in the southern hemisphere between 10 and 40 degrees latitude. The nature of the dark areas is still a subject of discussion. They remain in spite of the fact that dust storms are raging on Mars. Large-scale images show that in fact the dark areas are made up of clusters of dark stripes and spots associated with craters, hills and other obstacles in the way of the wind. Seasonal and long-term changes in their size and shape are related, apparently, to changes in the ratio of surface areas covered with light and dark matter.

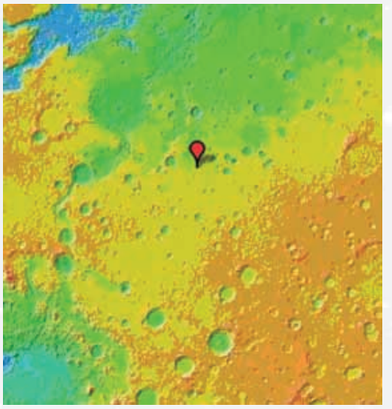
On Mars, there are two craters related to us: named after N. B. Ibrahimov and the Azerbaijani town of Guba.

**The Ibrahimov Crater (Ibragimov Crater) was named in 1982 after the talented Azerbaijani astronomer Nadir Baba oglu Ibrahimov (29.12.1932-1.1.1977), who made a great contribution to the study of Mars.** Ibrahimov was an employee of the Tusi Shamakhi Astrophysical Observatory (SAO). The Martian coordinates of the crater are 25.9 degrees southern latitude and 59.5 degrees western longitude. The crater has a diameter of 89 km.



*Ibrahimov Crater on Mars*

Another crater Guba (Kuba Crater) with a diameter of 25 kilometers received its name in 1976 and has coordinates: 25.6 degrees southern latitude and 19.5 degrees western longitude.



*Guba Crater on Mars*

MERCURY. It is the closest planet to the sun and is named after one of the gods of the ancient pantheon - the Roman god of commerce (corresponds to Greek Hermes). It is rather difficult to observe Mercury from the Earth, as the planet is briefly visible in the morning or evening glow. Therefore, in ancient times Mercury was often mistaken for two different stars (morning and evening stars). In ancient Egypt, these two sides of Mercury were named Seth and Horus, in ancient India - Buddha and Rogineya, and in ancient Greece - Apollo and Hermes.

For its relief, the surface of Mercury is remarkably similar to the surface of the Moon and is completely riddled with craters of different sizes. The fundamentals have been developed of the nomenclature of details of the relief of Mercury. There are following forms of relief: craters, plains, valleys, cliffs, mountains and ridges.

Large craters on Mercury are named after people who have made outstanding contributions to the humanities and arts - writers, painters, sculptors, architects, composers, and musicians. Names are usually assigned to all craters with a diameter greater than 100 km and selectively – smaller ones that stands out for their clarity or halo of light rays.

Giving names in honor of researchers who made major contributions to the study of Mercury is limited. This is done to minimize the recurrence of names already existing on Mars and the Moon. The main craters on Mercury are named after famous writers and artists. One of them is the Nizami Crater with the eponym Elyas Yusof Nezami Ganjavi. Nizami Ganjavi Abu Muhammad Ilyas ibn Yusuf (c. 1141 - c. 1209, Ganja, Azerbaijan) is a classic of Azerbaijani poetry, one of the greatest poets of the medieval East and founder of realism in poetry. His legacy is revered around the world. The Nizami Crater (70 km in size) has the following coordinates: 71.5 degrees northern latitude and 165 degrees eastern longitude.

By the way, we would like to draw attention to the fact that, **thanks to the efforts of scientists from the Shamakhi Astrophysical Observatory, errors in the registration of names, for example, Tusi (crater on the Moon) and Nizami (crater on Mercury), where the relevant persons were listed as Persians, not Azerbaijanis, were corrected.**

ASTEROIDS. These heavenly bodies are also moving in their orbits around the sun. Asteroids, also known as minor planets (planetoids), are significantly smaller in size than real planets and greatly differ among themselves in diameter. Today, there are more than 85,000 "minor planets" known in the solar system whose orbits have been accurately defined and which have been given official numbers. Nearly 12,000 of them have officially approved names. Asteroids are somewhat traditionally neglected by scientists and are even called a "cosmic rabble". It is assumed that there might be about a million of these objects in the solar system, but the estimated total mass of all asteroids is less than one thousandth of the mass of the Earth. The largest asteroid in the solar system is 1 Ceres with a diameter of 900-1,000 km, which has the status of a dwarf planet. Two other large asteroids - 2 Pallas and 4 Vesta - have a diameter of about 500 km. Most of the currently known asteroids are concentrated in the so-called asteroid belt between the orbits of Mars and Jupiter.

At first, the asteroids were given the names of characters of Roman and Greek mythology, and then discoverers were authorized to name

*Nizami Ganjavi*

them at their own discretion and even give them their own names. Initially, only female names were given. Only asteroids with unusual orbits were given male names (e.g., Icarus, coming to the Sun closer than Mercury). Later, this rule was no longer enforced.

Not all asteroids, but only those whose orbits are more or less reliably calculated can have names. There have been cases when an asteroid got a name 10 years after being discovered. As long as the orbit is not calculated, an asteroid is assigned a serial number, which reflects the date of its discovery, for example, 1950 DA. The numbers signify the year. The first letter is the number of the fortnight in the year in which the asteroid was discovered, and therefore, there are 24 of them. In the example, it is the second half of February. The second letter indicates the sequence number of the asteroid in the fortnight: in our example, the asteroid was discovered first.

The letters I and Z are not used in serial numbers, as there are 24 fortnights and 26 letters. The letter I is not used because of its similarity with one. If the number of asteroids discovered in a fortnight exceeds 24, they return to the beginning of the alphabet again, adding the index 2 to the second letter, next time they return, they add 3, etc. According to the rules, after giving a name, it is necessary to write the number (serial number) and the name - 1 Ceres, 8 Flora, etc.

Among the thousands of small planets, we found **eight names associated with Azerbaijan. They were assigned both in Soviet times and after independence.**

1. Asteroid ShAO (1881 ShAO), initial name RS 1940. It was discovered on 3 August 1940 when by K. Reinmuth in Heidelberg, Germany. The asteroid is named after the Shamakhi Astrophysical Observatory.
2. Asteroid Azerbajdzhan (2698 Azerbajdzhan), initial name 1971 TZ. It was discovered on 11 October 1971 by employees of the Crimean Astrophysical Observatory of the Academy of Sciences of the USSR (hereafter the Crimean Astrophysical Observatory). This object belongs to the main asteroid belt and is named in honor of the Azerbaijani SSR. The information about it was giv-

ОФИЦИАЛЬНОЕ СВИДЕТЕЛЬСТВО
о присвоении имени
малой планете

Институт теоретической астрономии
Российской Академии наук (ИТА РАН),
настоящим свидетельствует,
что малая планета,
получила имя

NIZAMI

в честь
Низами Гянджеви Абу Мухаммеда Ильяса ибн Юсуба

en in the Minor Planet Circular, № 7474, 1 December 1982.

3. Asteroid Nizami (3770 Nizami), initial name (1974 QT1). It was discovered on 24 August 1974 by an employee of the Institute of Theoretical Astronomy of the USSR Academy of Sciences, Lyudmila Chernykh, at the Crimean Astrophysical Observatory. In the USSR, the institute led the study and cataloging of small planets in the solar system on behalf of the International Astronomical Union. The asteroid was named on 18 November 1997 in honor of the prominent Azerbaijani poet and thinker Nizami Ganjavi (1141-1209). The information about it was given in the Minor Planet Circular, № 18454, 1991.
4. Asteroid Magomaev (4980 Magomaev), initial name 1974 SP1. It was discovered on 19 September 1974 by the same L. I. Chernykh at the Crimean Astrophysical Observatory. The asteroid was named after Muslim Magomayev - a legend Russia and Azerbaijan still cannot "divide between themselves". And this is impossible because he believes Azerbaijan is his father and Russia is his mother.
5. Asteroid Sorin (5989 Sorin), initial name 1976 QC1. It was discovered on 26 August 1976 by Nikolay Chernykh, a specialist in astrometry and dynamics of small bodies in the solar system, at the Crimean Astrophysical Observatory. The asteroid is named after Sergey Ivanovich Sorin, one of the pioneers of astronomy in modern Azerbaijan. The name was approved by the IAU on 4 May 1999.
6. Asteroid Javid (6262 Javid), initial name 1978 RZ. It was discovered on 1 September 1978 by the same N. Chernykh at the Crimean Astrophysical Observatory. The asteroid was named on 18 November 1997 in honor of Huseyn Javid (1882-1941), a prominent Azerbaijani poet, playwright and historian, author of several historical plays, who was repressed in 1937. The information about it is given in the Minor Planet Circular, № 30098, 1997.
7. Asteroid Tusi (10,269 Tusi), initial name 1979 SU11. It was discovered on 24 September 1979 by N. Chernykh at the Crimean Astrophysical Observatory. The asteroid was named on 17 August 2001 in honor of the outstanding Azerbaijani encyclopedist, scientist, astronomer, mathematician and philosopher Nasireddin Tusi (1201-1274). The information about it is given in the Minor Planet Circular, № 42360, 9 March 2001.
8. Quite recently, in the fall of 2007, very good news spread not only for astronomers, but for all citizens of Azerbaijan. The International Astronomical Union named one of the asteroids after the Azerbaijani astronomer and researcher of comets, director of the ShAO of the National Academy of Sciences, Ayyub Guliyev. Now the asteroid numbered 18749 is called Ayyubguliev. It is the 12th heavenly body that has a name associated with Azerbaijan. The asteroid was discovered on 9 April 1999 as part of the LONEOS international program in Anderson Mesa (Arizona, USA) and had the serial number 1999 GA8. In conclusion, we should draw the reader's attention to the fact that the aforesaid list of astronomical objects with names related to Azerbaijan may be incomplete and expand even further in the future. Whatever it is, we are proud of these names and are absolutely confident that there will appear other names associated with Azerbaijan in the depths of space.

СВИДЕТЕЛЬСТВО
о присвоении имени
малой планете

TUSI

в честь
выдающегося азербайджанского
ученого-энциклопедиста
Насираддина Туси.