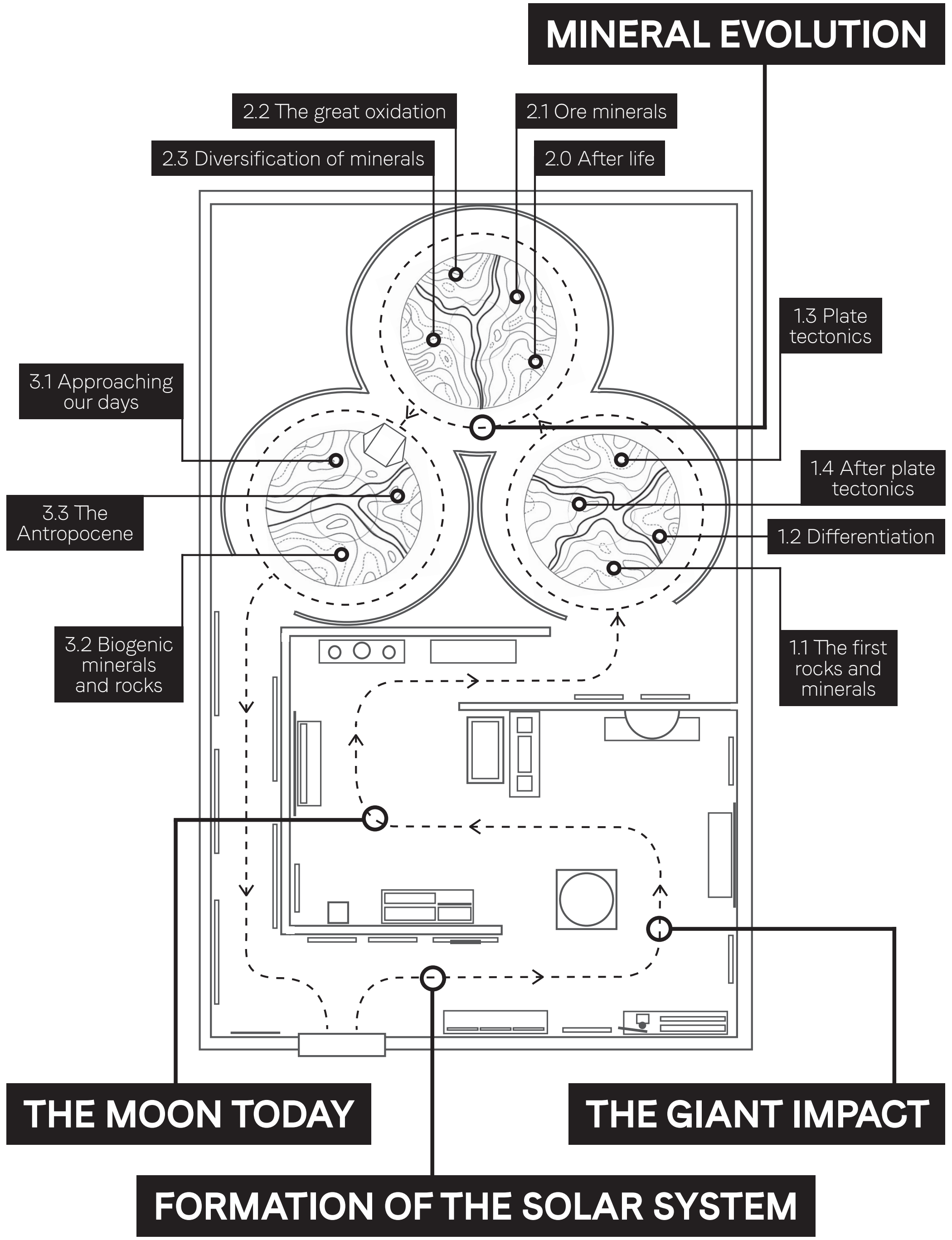


EXHIBITION

"Grigore Antipa"
National Museum of Natural History
1 Kiseleff Avenue, Sector 1, Bucharest

PERIOD OF THE EXHIBITION

July 2, 2021 - January 16, 2022

Opening times:

SUMMER (April - October)
Monday: closed
Tuesday - Sunday: 10 a.m. - 8 p.m.
Last entry: 7 p.m.

WINTER (November - March)
Monday: closed
Tuesday - Sunday: 10 a.m. - 6 p.m.
Last entry: 5 p.m.
Sâmbătă - Duminică: 10 a.m. - 7 p.m.
Last entry: 6 p.m.

Curator
Răzvan Caracaș (CNRS)

Producer
Léna Martin (CNRS)

The IMPACT team (Mandy Bethkenhagen, Tim Bögels, Anaïs Kobsch, Zhi Li, Renata Schaan, Natalia Solomatova).

Contacts:

"Grigore Antipa"
National Museum of Natural History
Phone: 021.312.88.26
info@antipa.ro
www.antipa.ro
/muzeulantipa
/mnin_antipa

Centre National de la Recherche Scientifique
exhibition@moonimpact.eu
http://expo-moonimpact.eu

Partners

Main sponsor of the Museum

Moon Impact, a geological story.

JULY 2, 2021 – JANUARY 16, 2022

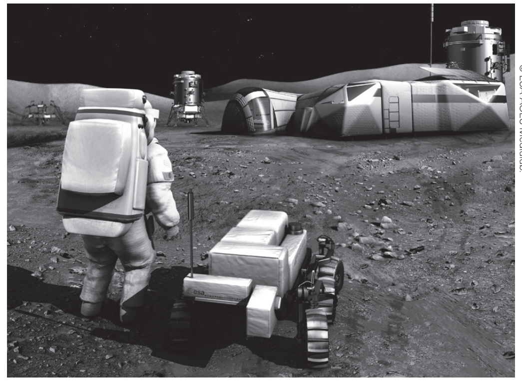
The formation of the Moon is the single most important moment in the history of our planet. But do you know that it formed in the blink of an eye, when our solar system has just been formed? That was born from a catastrophic clash of two planets that died in that collision? That the Earth condensed in only two days? That ever since, as the geological time passes, the Earth evolves, and so do her minerals and rocks? That without the Moon you would not be here today?

This exhibition tells the story of the giant impact and the Moon formation in the context of the geological evolution of the Earth and of the solar system. It is geological because it concerns the rocks and the minerals that form all the objects of our world. The time flows inside the exhibition, starting with the formation of the solar system and ending with the present day.

FORMATION OF THE SOLAR SYSTEM

The story of any planet begins in a solar system. A star with everything that gravitates around it forms a solar system. How did our solar system form? Our story starts a long long time ago, more than 4.5 billions years in the past. At this time, in this part of the galaxy there is a giant cloud of hot gas, rich in hydrogen and helium, remnants of the Big Bang. A shock wave originating in a supernova many light years away hits this cloud and produces a strong turbulence. The cloud starts to collapse and as more and more gas arrives in its innermost part, it heats up so much that eventually nuclear processes ignite. At this moment a star is born and most of the gas from the cloud is attracted to the central star. Whatever material is left continues to rotate and flattens out in a disk of hot gas.

Gradually, over up to 10 million years, the gas cools down and condenses into dust, then into millions of small boulders and eventually accumulates as thousands of planetesimals. These tiny planets collide with each other and finally form a few dozen planetary embryos. The collisions between planetesimals can be utterly devastating, and the bodies can be completely torn into pieces, reset back to the stage of dust and boulders. But in other cases this is just a loving touch that can glue them together forever. It then takes a few more tens of millions of years for the embryo planets to grow into just a few full planets.

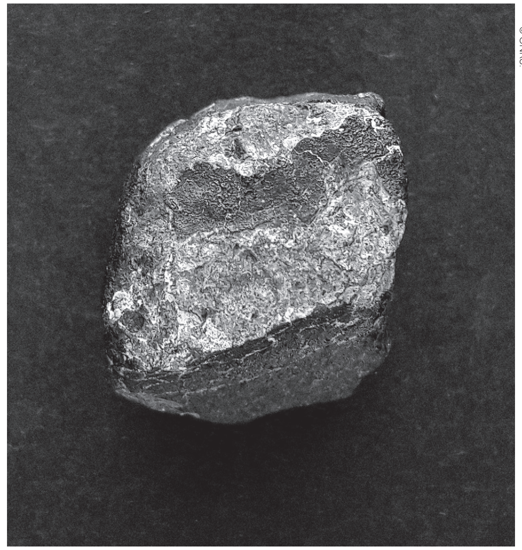


Artist view of a future moon base.

THE GIANT IMPACT

How did the Moon form? A small planet, called Theia, most probably about the size of Mars, hit the proto-Earth. The impact was giant, hence its name. It produced a huge disk of debris from which the Earth and the Moon as we know them condensed. But ours was not the only giant impact. In our solar system examples abound of traces of such impacts. For example, Pluto and his moon Charon must have formed from such a giant impact.

Allende meteorite. Chihuahua, Mexico.
Coll. CNRS | Impact.



THE MOON TODAY

But why is the Moon so different from the Earth? With no water, no carbon, no atmosphere, the Moon remained frozen in the same state as it formed. With geologic time it only cooled and its interior magma ocean slowly crystallized. Meteorite falls and cooling are the only geological activities, which continue even today. As the Moon cools, it contracts, and sometimes it cracks, provoking small seisms called moonquakes. A few of them were recorded by the Apollo missions.

The gentle shakes from the moonquakes are enough to erode the sides of the craters, which over billions of years slowly collapse. With such austere chemistry and a cold world, there are no reactions and no fluids at the surface and consequently no form of life could develop on the Moon. The only water found so far is traces of ice in the ever-frozen deep bottoms of the craters at the two poles, where sunlight never shines. And just because of its inert geology the Moon preserves information dating all the way back to its formation, the protolunar disk, and the Giant Impact. This is why it is very important to continue its exploration. The recent surge in missions to find life on Mars diverted some of the funds from the Moon exploration. Nevertheless we all hope for a future permanent base of humankind on the Moon, where people can work and live, study our beautiful natural satellite, and learn to adapt to new lives.

MINERAL EVOLUTION

We all know that life evolved over time. As research advances, we progressively improve our understanding of the chemical and physical processes that led to the appearance and evolution of life. Minerals underwent something similar. Minerals did not "evolve" in the pure sense of the word, but rather they diversified. As time passed, more and more chemical reactions took place, which led to increased mineral diversification. The process was initiated with about 60 minerals present in chondrites more than 4.55 billion years ago. From there, under the action of heat and fluids, over billions of years of chemical reactions, and strongly affected by the appearance and evolution of life, thousands of minerals formed. There were 5616 documented and approved minerals as of July 2020. And the quest for new minerals continues!

Aragonite, Romania. Coll. University of Bucharest.

WHAT IS THE ANTHROPOCENE?

The presence of humans on the surface of our planet modified and continues to modify the geological environment, whether we like it or not. We modify not only the climate, though a constant flux of pollutants, carbon dioxide and other greenhouse gases, but we also leave geological traces, which will be conserved for millions of years. We manufacture new synthetic materials. On the geologic time scale, some will disappear relatively quickly under the action of the environment, like oil derivatives and asphalt. Some will lurk around for many millions of years, like plastics. And some will simply remain in the geologic record, like glass, bricks and ceramics, and concrete.

We produce invisible pollutants, like industrial ash, black carbon powder, or tar from car exhaust gas. We leave behind mineral waste, like slags and mine tailings, which never formed before us on natural pathways. We fabricate and dispose of so much plastic that new rocks form with that plastic. Plastic is eaten by animals, by fish, by birds, and eventually by ourselves. Plastic is everywhere, we live in a sea of plastic. We build so much industrial and electronic equipment that much of it will remain and accumulate behind us.

We should not and we will not change the human nature of constantly seeking progress. But it would be wise to be much more careful. Then we would damage less our environment, the only one that we are adapted to live in.

Limonite, Romania. Coll. University of Bucharest.