

ENGLISH

EXHIBITION
GUIDE

COSMOS

MARVELS

1 THE MAGIC MARVEL KEYBOARD MAKE YOUR OWN CABINET OF CURIOSITIES

(from left to right)

Sculpted nautilus

Nautilus pompilus, Indian Ocean.

The nautilus is a mollusc that is related to the octopus. Like the octopus, it has tentacles but no suckers. It lives in the South Pacific, floating in water thanks to its shell that is partly filled with gas and it feeds off crustaceans. From the 16th century onwards, nautilus shells were very much sought after to be transformed into art objects and engraved shells were very highly valued by collectors. The artist made the iridescent mother-of-pearl appear by delicately scraping off the outside layer of the shell. MCZ.

Glass urn

Ghemma, Piedmont (Italy), late 1st–2nd century AD.

This type of vessel made of blown glass was very common all over the Roman Empire. It was first used for domestic purposes but then could have been used as a funerary urn. The crack near the handle is due to a bomb explosion that occurred at the Cité in Lausanne on 8th February 1987 and which was aimed at the prefecture. The impact damaged the vessel, which was deposited at the Lausanne Historical Museum. MCAH.

Trochophore larva

Teredo sp.

This wax model, which was created in Freiburg im Breisgau by the well-known Ziegler studios in the early 20th century, was used as pedagogical material for students (it is accompanied by a diagram by Henri Blanc, the former director of the MCZ). It portrays a trochophore larva, the first stage in development of molluscs when they leave the egg. These larvae are tiny, they float in water and are a type of plankton. MCZ.

Uranium glass soda siphon

Stehrenberger & Fischbach mineral waters

Lausanne, 1960s.

Adding a small amount of uranium salts to molten glass produces uranium glass. This glass, which is slightly radioactive, is characterized by a yellow tint and green fluorescence when it is lit up by a light that is rich in ultraviolet rays. MCG.

Mandrake root

Mandragora officinarum.

A toxic and hallucinogenic plant of the family of Solanaceae (like the tomato). Its part beneath the ground, which looks like a human figure, has led to many legends, such as witches flying on broomsticks. MJBC.

Terracotta statuette

Cyrenaica (Libya), 4th–3rd century BC.

The city of Cyrene, in Libya, was a colony founded in the second half of the 7th century BC by Greeks coming from Thera (Santorini). The city gave its name to the region, Cyrenaica. This statuette represents a weeping woman (a mourner?). It was brought back by Vattier de Bourville, an employee of the French consulate in Tripoli, who in 1848 carried out excavations on the site of Cyrene, from which he notably brought back 600 objects for the Louvre. MCAH.

Woodblock for printing tarot card packaging

Nyon (Vaud), 1790–1800.

The passion for card games developed greatly in Renaissance Europe. The tarot was attested to in Italy in the 15th century and was soon very popular in Switzerland, but only latterly became a fortune-telling method (late 18th century). The allegory of Fortune rising from the sea, which symbolizes luck, here decorates the packaging of cards that were produced by the workshop of David Vachet, who was active in Nyon at the end of the 18th century. MCAH.

Flint hand axe

Saint-Acheul, Amiens, Somme (France), Lower Palaeolithic Acheulean, 300,000–200,000 BC.

This piece, one of the oldest at the MCAH, is part of a set of five hand axe from Saint-Acheul and entered the Museum on 28 April 1879. It was donated by Eugène Renevier, who was then a professor at the Academy of Lausanne and the curator of the Cantonal Geological Museum. The Saint-Acheul site has great importance for the history of science because it enabled Jacques Boucher de Perthes to highlight the antiquity of “primitive man” in the mid-19th century. Carved flint tools, and more particularly hand axes, were discovered in the same geological layers as extinct animals (mammoths, woolly rhinoceroses). The demonstration of an “antediluvian” man by the French prehistorian would shake the convictions of advocates of the relatively recent creation of humans in accordance with biblical narratives. MCAH.

Bronze medal by the engraver Pisanello

Italy, 1447 (copy).

According to legend, only a virgin can tame a unicorn. The scene in this medal highlights the purity of the woman to whom it is dedicated: Cécile de Gonzague, the daughter of the Marquis of Mantua, who refused to marry to consecrate herself to God. MMC.

Thaler from the City of Basel

18th century.

The Basilisk, a legendary creature whose body is a cross between a cockerel and a serpent, holds the coat of arms of the city. Several legends link this animal to the imperial city. One of them dates back to the 15th century: Basel is said to have chosen this symbol of power, which strikes down anyone who lacked respect, to assert its superiority over the Pope. In 1439, the Council of Basel deposed Pope Eugene IV and elected Amadeus VIII, the Duke of Savoy, with the name

of Felix V to replace him. The linguistic proximity between Basel (from the Greek *basilea*, “royal”) and basil (from the Greek *basiliskon*, “little king”) is not insignificant in this choice of heraldry. MMC.

Electrum (gold and silver alloy) stater

Armorican Gaul, Osismii tribe, 80–50 BC.

A horse with a human head is an imaginary animal that is frequently found on coins from North-West Gaul. However, it is difficult to interpret its symbolism because the Celts left behind no written records. A horse with a human head reminds us of other fantastic creatures such as the sphinx or the centaur. MMC.

Hippopotamus

Hippopotamus pentlandi, mouth of the Morges (Vaud), Pleistocene, 1 million years ago.

In 1897, a hippopotamus tooth was discovered in sediment in the mouth of the river Morges. The scholar François-Alphonse Forel suggested that it was an existing species and that the tooth had belonged to a hippopotamus travelling with a menagerie! It was presented to the Cantonal Museum of Geology in 1896 and was initially identified as a mastodon molar or a primitive elephant tusk. However, in 1907 the palaeontologist Hans Georg Stehlin, a specialist of vertebrate fossils, determined with certainty that it originated from a fossil species, *Hippopotamus pentlandi*, that was known in Sicily and which dates back to the Pleistocene (1.8 million years ago). The origin of this tooth became even more mysterious because no other hippopotamus remains of the glacial period had been discovered around Canton de Vaud. Was it the sole witness of an interglacial deposit that had eroded and been carried away with the sediment of the Morges? Another possibility that was mentioned was that it came from a paleontological collection that had been tipped into the river. During the 20th century, several other similar findings were made in various places in Switzerland and the conundrum of the hippopotamus of the Morges was finally solved: it really originated from Sicily, from very rich layers of bones of fossil mammals. They were used more than a century ago to produce phosphate fertilizers by crushing, which were exported to Switzerland and spread on fields. MCG.

Golden Stater of the Pharaoh Nectanebo

Egypt, 360–343 BC.

This coin, the first that was ever struck in Egypt, shows a curious representation: a heart and its vertical trachea artery decorated with a pearl necklace. These symbols are hieroglyphs that mean “of pure gold” in late Egyptian. MMC.

Silver didrachm

City of Gela, Sicily, 490–475 BC.

This bull with the head of a bearded man is a divine personification of the main river of the region (the Gela). This representation, which is typical of Greek art, is inspired by the legend of Achelous, the river god of Aetolia who changed

into a man-bull to try to win the hand of Princess Deianira in combat against Hercules. MMC.

Narwhal

Monodon monoceros, upper left canine.

Until the early 18th century it was thought that the known specimens of this “horn” were part of the legendary unicorn. The rarity of the narwhal and its limited habitat contributed to the persistence of the legend. It was then considered to be a weapon or a tool, but the narwhal’s tusk is today seen to be a sensory organ: its rich nerve endings enable the animal to sense differences of pressure, salinity and temperature. MCZ.

Gold ring and pin decorated with enamel, precious and semi-precious stones

Austro-Hungarian Empire, late 19th century.

This jewellery was presented by Empress Elisabeth (“Sissi”) and her husband to the station master of Lausanne when their train stopped there. They are today held at the Palais de Rumine. A cruel irony: The Empress’s murderer got hold of the file used in the crime “from a shop display on the Place de la Riponne in Lausanne”. MMC.

Ostrich egg

Struthio camelus.

The ostrich egg is said to be the largest living cell. It is true if its volume is considered. However, certain nerve cells reach a much larger size, up to 10 metres in the giant squid, so it seems! MCZ, W. Morton collection.

Hematite

Taouz, Er Rachidia, Anti-Atlas (Morocco).

Humans extract more than 3 billion tonnes of iron ore every year, mainly consisting of haematite. But samples that are as beautiful as this one are exceptional. MCG.

Vermouth bottle filled with petroleum

Humniska, Brzozów (Poland).

Inflammable and hazardous, petrol was only considered as a marvel after the invention of the internal combustion engine in 1859. MCG.

Sea urchin

Heterocentrotus sp.

This magnificent sea urchin with large spines well deserves its name of slate pencil sea urchin. It lives in Indo-pacific tropical waters. MCZ, collection Gilliéron.

Stibnite metal crystals

Wuning mine, Qingjiang, Jiangxi Province (China).

This fine mineral, when it is reduced to a fine powder is an important ingredient in certain pyrotechnic compositions that led to the fame of Chinese fireworks. MCG.

Orange-coloured crocoite crystals

Adelaide Mine, Dundas, Tasmania (Australia).

This chromate of natural lead, formerly used as a pigment in paint, derives its name from its colour, which is identical to that of saffron, a precious spice extracted from the crocus. MCG.

Terracotta zoomorphic vase

Vulci, Tuscany (Italy), c. 580 BC.

This vase in the shape of a reclining hare was used for conserving perfumed oils. This specimen has the particularity of representing the living animal, which is not the case of other known pieces, in which the hare is shown dead with its rear paws stretched out and its head thrown backwards. MCAH.

Brittle star

Ophioderma longicauda, Aiguebelle beach, Var (France).

Brittle stars are related to starfish. They are distinguished from them by their thin arms and a very special central body. They are sea creatures and mainly feed off young molluscs and sea worms. MCZ.

Everyday object, 21st century

Potential marvel of the centuries to come.

Exploded view of human skull

Homo sapiens.

A meticulous preparation of the bones of a human skull that makes it possible to distinguish every bone and its anatomical positions individually. This “Beauchêne exploded view of a skull” comes from the company Rouppert in Paris, which was specialized in the preparing osteological pieces in the late 19th and early 20th century. MCZ.

Domestic cat

Felis catus, anatomical preparation, first half of 20th century.

Anatomical preparations were mainly intended for students. Today, they are replaced by a variety of multimedia and print methods and are only significant as historical pieces. MCZ.

2 CULTIVATING CURIOSITY OR THE ORIGIN OF MUSEUMS

(on the wall)

Cabinet of curiosities of the Neapolitan pharmacist and naturalist Ferrante Imperato (1550–1625)

Dell'istoria naturale, Naples (Italy), 1599 (reproduction).

Cabinets of curiosities were the ancestors of museums and flourished in Europe from the 16th century on. They were private spaces belonging to owners who were scholars, collectors and connoisseurs. What is important about them is not yet the spectacle of Nature organized by Science, but the intimate experience of belonging to a secret, diverse and marvellous world. The objects that were accumulated derived their value from their rarity and their ability to enable the visitor to weave analogical links between this

world and the order of Divine Creation which, since the Fall of Man, could only be understood by discovering shrouded and enigmatic clues. BCU.

George Scharf, *Staircase of the Old British Museum (with giraffes)*

Drawing on paper, 1845 (reproduction).

The British Museum is one of the oldest museums in Europe, founded in 1753. It was originally an encyclopaedic museum, gathering antiquities, books and natural history objects. It was only in 1832 that the general public could first visit the museum in the former building known as Montagu House, which was gradually demolished in the 1840s. The Trustees of the British Museum.

(on the ceiling)

Crocodile

Crocodylus niloticus.

The skin of this impressive specimen from Africa was unfortunately not documented in collections of the Museum of Zoology. Its provenance, date of capture and donator are therefore unknown. MCZ.

ARCHITECTURES

3 WELL-ADAPTED FRAMES

Deinotherium

Dinotherium giganteum, Hausmannstetten, Styria (Austria), Late Miocene, 10 million years old.

Dinotheria are a branch of the order of elephants that are distinguished by their tusks that are located on their lower jaws. Their descendants have tusks on their upper jaws. In both cases, these tusks are really extremely long incisors. MCG.

Louis Grobét

Model, framework of the main spire of Lausanne cathedral, pine, c. 1860.

This model represents the structure of the spire of the lantern tower that was erected by the architect Henri Perregaux in 1826. It was built by the carpenter Louis Grobét, who would later demolish it and build the structure that would replace it in 1873, according to the plans of Viollet-le-Duc. MCAH.

Australian trumpet

Syrinx aruanus.

This shell is the largest gastropod in the world. The shell of this snail is particularly spectacular, as it forms a larger and larger spiral while the animal grows. The original shell of young individuals, which is located at the extreme end of the tip, is markedly more fragile than the rest of the shell and disappears generally when the animal ages. MCZ, Gilliéron collection.

4 THE LANGUAGE OF THE FORMS OF NATURE

Polyhedral crystals (cardboard)

made by Dr A. Krantz
Bonn (Germany), 1910. MCG.

Polyhedral crystals (pearwood) according to René Just Haüy

Paris, early 19th century. MCG, Frédéric-César de la Harpe collection.

Quartz and pyrite crystals

Intake tunnel for the power station at Châtelard (Switzerland)
and Huanzala Mine, Huallanca, Ancash (Peru).

The geometric shape of the crystals is the spectacular expression of the geometric layout of atoms that make up the ordered solid matter. It is also known as a “crystalline state”. MCG.

5 ARCHITECTURES OF POWER

Trajan sestertius

Roman Empire, 103–111 AD.

The Roman Emperors were great builders and placed many buildings on the reverse of coins. This Trajan sestertius presents a temple with eight columns and three steps and may be dedicated to Peace. MMC.

Medals of the Canton de Vaud commemorating

On 14th April 1803 the first assembly of the Grand Conseil.
On 14th April 2017 the inauguration of the new Parliament of Vaud.

Struck in 1810, the first medal with an eagle evokes the role of Napoleon and the act of Mediation in the creation of the Canton de Vaud. The reverse represents the facade of the first Parliament, which is kept in the building that was inaugurated in 2017. The second medal shows the new Parliament on the obverse, whereas it has the same reverse as the first, referring to the events of the 19th century. MMC.

Mirror case (bone and gold leaf)

Cologne (Germany), 1180–1200.

This object was found in 1835 in a vault located under the former gardens of the Château Saint-Maire in Lausanne and was immediately designated as a “little chapel” in reference to its decoration. With its curved crown and its openwork towers, it does evoke the architectural shape of a little medieval building. It was considered to possibly be a reliquary before being identified as a case for a portable mirror. MCAH.

6 A SENSE OF PROPORTIONS

Model and plate of the circulatory system of the grass snake

These remarkable representations are the work of Paul Murisier, who was a preparator and then a curator at the Museum of Zoology in the early 20th century. Apart from his talents as a taxidermist, he cultivated a special gift for

scientific drawing and bequeathed a large number of plates and models to the Museum of Zoology. MCZ.

The human body

Anatomy of man and Anatomy of woman with removable plates and instruction manual, Paris, 1927.

From the 16th century onwards, our conception of the body became mainly anatomical. From old anatomical theatres to school tables, finding out how the body worked meant understanding the architecture of its parts. Starting with its outside view and going through its innards, the student discovered and memorized their positions, forms, sizes, numbers, relationships and substances. BIHM.

Proportion of the human body or Vitruvian Man

Vitruvius, *De architectura*.

This very famous architecture treatise written by Vitruvius (90–20 BC) includes the representation of the ideal proportions of the human body drawn in a circle and a square. Vitruvian Man became the symbol of humanism, the Renaissance and rationalism, placing Man at the summit of Divine Creation and at the centre of the universe, before being displaced by modern science, which places Man in relation to the other beings in nature. BCU.

7 NATURE AND STRUCTURE

(on the wall and on the ceiling)

Models of crystalline structures of minerals

Teaching chemicals on an atomic scale calls for extreme simplification: atoms are represented by spheres of different colours that are attached to each other by bars that represent the interatomic links. MCG.

Weaver's nest

Weavers are passerines that are well known for their special nests, which are woven from plants. Certain species like this one make individual nests, while others make community nests that can reach very large sizes. However, the record is held by another passerine, the Social Weaver, whose community nests can reach a diameter of 7 metres, for a small bird of the size of a sparrow. MCZ.

Electron imaging

Radiolaria Corocalyptra sp. and *Acrosphaera sp.*, single-celled plankton, Equatorial Pacific Ocean, caught in 2010. Area photographed: 0.2 mm. Anatase (titanium oxide) and lamellar crystals of mica on quartz, Morcles, Vaud, Switzerland. Area photographed: 0.1 mm.

Contrary to traditional microscopy, which uses a light source (a light bulb), electronic microscopy requires another kind source: electrons. The electrons form a focussed beam and interact with the object, producing an interpretable image. These images appear in the most total darkness! When a picture is taken, the electronic beam “sweeps” over the surface of the object. By interacting with the material, the electrons produce a signal of measurable intensity for every point of the scan, which can then be used to reconstruct

the image pixel by pixel. The image is therefore not all collected at once, as is the case with a traditional camera, but point by point, line by line. The images that are displayed here each needed more than 12 hours of exposure. MCG.

8 ARCHITECTURES OF BODIES

(on the wall)

Flying fox skeleton

Pteropus melanotus.

This species of flying fox is a bat that is only found on the Nicobar Islands in India. The wingspan of males can reach 170 cm. Most of the species are diurnal and feed off fruit. What is the anatomical particularity of the bat? Its feet are back to front. MCZ.

Exploded view of European crayfish

Astacus fluviatilis.

This exploded view makes it possible to clearly observe the different parts of the body and its appendices, especially the five pairs of ambulatory legs, the different mouthpieces and the two pairs of antennae that are typical of crustaceans. An invitation to do a little morphology the next time you eat seafood! MCZ.

Three-quarter armour for a cuirassier made of iron and steel

Probably manufactured in Northern Italy (Milan).

1st quarter of 17th century. This Savoy-type armour was destined for a knight. Château de Morges & its museums, Mestral collection.

Sea urchin

Eleuthera Island, Bahamas.

In sea urchins, the mouth is located at the bottom of the body, close to the ground, and the anus above. The only edible parts of sea urchins are the gonads, i.e. the reproductive organs. MCZ, E. and C. Gex bequest.

Exploded view of sea urchin

Strongylocentrotus lividus, Villefranche (France).

The shell of a sea urchin, consists of a succession of small plates that are bonded to each other. The small tubers that are visible on certain plates support the spines. The tiny pores of the plates let through their feet that are known as ambulacraria, a sort of mini-tentacles that are used for locomotion. MCZ, Dr Roszkowski donation.

Stick insect

Eurycnema goliath, New Guinea.

Insect or stick? With its wings unfurled, this stick insect shows that it is an insect. But when it is immobile on a bush, with its wings furled along its body, it is only a large stick among many others. A predator would have to be very smart to see such a prey. *Eurycnema goliath* is one of the largest species of stick insect in the world. MCZ, J. Rochat collection.

DISAPPEARANCE

9 COLLECTIONS, MEMORIES OF DISAPPEARANCE

(from left to right)

Banque cantonale vaudoise Bancomat ATM

Installed on 01/02/1988 and removed on 06/12/1999.

The first Bancomat models were installed by the BCV during the 1980s. The name “Bancomat”, which is used in Switzerland and Italy, comes from the name of the inter-bank protocol that was set up in Italy between 1983 and 1988 for operating of ATMs. MMC.

Wall chart, Lausanne during the molassic era

Coloured engraving after Oswald Heer, 1865, *Die Urwelt der Schweiz*.

This landscape consisting of various palm trees and other subtropical plants is based on fossils discovered in the region Lausanne dated from 20 to 25 million years old. It is a romantic and idealized vision of this distant past, an approach that was fashionable in the 19th century. MCG.

Steel, iron and brass arquebus with bone and antler incrustations, manufactured by Tobias Duer Burgdorf (Bern), 1613–1614.

This ceremonial object, with a butt ornamented with characters, animals and plants, displays its own identity card: the hallmarks of the gunsmith Tobias Duer and of the city of Burgdorf, two dates, 1613 and 1614, as well as the name of its owner, Hans Rothenbacher on a plaque. Sources indicate that the donator was Mr German, a pharmacist, in 1825. MCAH.

Fera

Coregonus fera, Lake Geneva, off Yvoire, 7 July 1910.

The species disappeared in the early 20th century because of overfishing. The “fera” that we eat today on the banks of Lake Geneva is really the vendace from the Lake of Neuchâtel, which has replaced the fera in traditional cooking. MCZ.

Guillaume de Calesio, head of bishop with mitre

Fragment in sculpted and painted limestone,

Romainmôtier church (Vaud), 1385–1387.

Fragment of the funerary monument that prior Henri de Sévery had built for his private use in the choir of the church. The monument was the target of protestant iconoclasm during the Reformation. It was broken into hundreds of pieces and unceremoniously thrown into a ditch. This fragment was discovered during the archaeological excavations that were carried out by Albert Naef in the early 20th century. This relentless destruction of the emblematic monuments of the Catholic clergy nearly 500 years ago may remind us of the recent destructions of the Buddhas of Bamiyan (Afghanistan) and on the site of Palmyra (Syria). MCAH.

Just like animals,

rocks and minerals can disappear

Giant spinel crystal, Betsakoka, Betroka, Fianarantsoa (Madagascar); Anorthosite, Peninsula of Nuussuaq, Qaasuitsu (Greenland); Banded Iron Formation, Brockman Tiger eye mine (Marra Mamba Formation), Mount Brockman, Ashburton Shire (Australia), 2.6 to 2.4 billion years old.

Just like living beings, minerals have also evolved according to their environments. With the cooling of the planet and the appearance of life, the atmosphere gradually became richer in oxygen. These two major modifications were the reason for the disappearance or increasing scarcity of rocks such as anorthosite, the reduced size of certain minerals like spinel and the temporary appearance of other rocks, such as haematite in Banded Iron Formations. Today, the conditions that prevail in and on the planet no longer enable the formation of these rocks. MCG.

Great Auk

Alca impennis, North Atlantic, probably Icelandic coasts.

The species became extinct in 1844 because of hunting. The two last Great Auks were killed by Icelandic fishermen on Eldey on 3rd June 1844. This one entered the museum in 1883 with Captain Vouga's collection and there are only 80 preserved specimens in the world. That specimen at the MCZ in Lausanne was one of the stars of the film "Oceans" by Jacques Perrin, which was released in 2009. MCZ.

100 and 25-mark emergency banknotes printed on silk

Bielefeld, North Rhine-Westphalia (Germany), 1921.

Germany underwent an episode of hyperinflation between 1921 and 1924 due to an irrational borrowing policy related to the payment of war debts. Cities printed emergency banknotes to remedy the lack of change. Their imagery and captions are often irreverent: "*There is nothing more terrible in the world than the mayor of Bielefeld*", "*The big sausage among sausages is like the Emperor among princes!*", "*Things have gone wrong with women and devils since cloth and silk have been printed as money*". This banknote was printed by the city of Bielefeld, which has been famous since the Middle Ages for its craftsmanship and its linen trade and later for its factories producing fabric, including silk. MMC.

Mammoth

Mammuthus primigenius, Friderici gravel pit, Morges, Pleistocene, 15,000 years old.

Only 20,000 years ago, an enormous thick glacier covered almost all Switzerland. After it receded, grassy steppes developed, attracting an entire fauna that is typical of the glacial period, as is seen in this woolly mammoth tusk that was found near Morges. The major global warming that occurred 14,600 years ago replaced the steppes by forests, which led to the disappearance of large herbivores like the mammoth in our regions. MCG.

Smaky 100 computer

Manufactured at the EPFL (Lausanne), 1984.

This computer, which was "Made in Vaud", appeared at the same time as the first Apple Macintosh. Totally in French, it was mainly used in schools in French-speaking Switzerland until 1998. It was invented in 1974 and the name Smaky derives from SMARt KEYboard. MCAH.

10 CIVILISATION IN DANGER

Portraits of Indians

Original photographic prints on albumen paper mounted on cardboard, United States, 1870-1874.

In 1867, Ferdinand V. Hayden (1829-1887), a Professor of Geology, was entrusted by the United States Government with exploring the vast territories of the American West. He also hired photographers. The large number of photographs taken are not signed, but those belonging to the MCAH are mostly by William Henry Jackson (1843-1942) and also by Alexander Gardner (1821-1882) and Charles Milton Bell (1848-1893). These black and white portraits were all taken in the studio, with rare exceptions. MCAH.

Stuffed leather saddle decorated with glass and metal beads

Plains region, North America, 1850-1860.

The introduction of the horse revolutionized the life of the Plains Indians after the Conquest of the Americas by the Europeans. This animal quickly became essential for all sorts of activities, for transport, buffalo hunting, war and trade. This richly decorated saddle is an object of value, a sign of great prestige for its owner. MCAH.

Fabric bag (wool and cotton) ornamented with beads

Cree people, subarctic region, North America, 1850.

This bag with a sliding strap and with a fringed edge is decorated with multi-coloured beads. This type of beads was introduced to Amerindian populations by fur merchants, missionaries and settlers from the 16th century onwards. This fine specimen is a unique piece in Swiss ethnographic collections. MCAH.

Pair of leather indoor moccasins

Great Lakes region, North America, 1770-1800.

Moccasins are the quintessential shoes of Amerindians. The term itself is of Algonquin origin. This old pair is beautifully ornamented with patterns in coloured porcupine quills and glass and metal beads mounted on red-dyed hair. Nowadays, they are still worn and are still much appreciated for their suppleness, lightness and comfort. MCAH.

NATURE AND ARTIFICE

11 WHEN ART IMITATES NATURE. WHEN NATURE IMITATES ART

(from left to right)

Plaster copy of a Roman milestone

Versvey, Yvorne (Vaud).

The original of this milestone was discovered in the gravel pit of Communailles (Yvorne) at the end of a former arm of the Rhône in February 1980. The inscription enables its attribution to the reign of Emperor Claudius and dates it to the year 47 AD. It is part of a series of milestones that bordered the road linking Martigny to Lausanne. The distance from Martigny is noted as being 21 miles (1 mile equals approximately 1,480 m). MCAH.

Pedestal table carved out of pure rock salt

Slănic, Prahova (Romania).

Donated by the engineer T. Charlier, the former director of the Slănic mines, in 1883. During the Tertiary, 12 million years ago, a vast region located in the South of Romania was covered by a shallow sea. At its edge, isolated lagoons formed, and, with the action of the sun, the water evaporated slowly, leaving thick layers of rock salt. In the Slănic region, the layers of salt reached several tens of metres of thickness. Salt is sodium chloride which crystallizes in cubes. This table therefore consists of a multitude of agglomerated crystals. MCG.

Nearly spherical pebble

Chedde, Haute-Savoie (France).

This microgranite pebble owes its shape to erosion. Very hard boulders, which often are already abraded by glaciers, are rolled into powerful energy watercourses due to the steep inclines and they gradually take on a spherical shape. MCG.

African elephant tusks

Loxodonta africana.

Ivory elephant tusks are unfortunately very highly valued for a wide variety of uses. The ivory trade, which is strictly regulated, is unfortunately not spared by the black market! This tusk was seized by Swiss customs, confiscated and deposited at the Museum of Zoology. MCZ.

Mounting of a deer

Capreolus capreolus.

This exploded view illustrates the work of the taxidermist. It is a medium-size piece in which the skeleton of welded tubes is carefully sized according to the bones of the original animal. The body made of wood shavings and the plaster sculpture reproduce the musculature. The tanned hide is then put back on the body and sewn up. MCZ.

Wolperdinger

Just like the famed *Dahu*, the Wolperdinger is an imaginary animal, part of the mythology of the Bavarian Alps. Its shape varies, going from a hare with antlers or with a coxcomb, as well as wings and fangs. What is certain is that the Wolperdinger is aggressive and mainly feeds on urban tourists. MCZ.

Dog-jackal hybrid

This hybrid resulted from the crossing of a female jackal and a male dog (wirehaired fox terrier), carried out at the kennel of Mr Iten-Merz in Oberdorf, Unterägeri. Born on 19th April 1934, it died in Lausanne on 4 October 1934. It was bequeathed to the Museum of Zoology by Mr Edmond Ruedi. In a memo dated 7 October 1934, the curator Paul Murisier thanked Mr Ruedi and mentioned that it had been discovered after dissection that the reproductive system of this specimen was very limited. Like many hybrids, this specimen was sterile. MCZ.

Giant resin mushroom

The speed of growth of mushrooms is fascinating. They are often present in popular imagery in the form of giant mushrooms. It was perhaps due to this fascination that this one was used as a decoration in a department store.

Private collection.

12 TROPHIES' HUNT?

(on the wall)

Common eland

Taurotragus oryx, Kwekwe (Zimbabwe), 1983.

The museum regularly receives offers of donations of hunting trophies, which are witnesses of days that are luckily gone. The rule is that it is only when a minimum amount of scientific data is known (place and date of "capture") that museums can consider including them in their collections. MCZ.

Eric Poitevin (Longuyon, 1961),

Untitled

2002, Silver print on paper.

Represented by artists or transformed into trophies, animals confront us with our relationships with nature and ask us insistently: What is an animal? It is a biological, philosophical, ethical and cultural question, to which art responds with its language, either reassuringly or worryingly, such as this deer that is still bleeding, positioned on a white pedestal in the middle of a white box, alone in the middle of nowhere. MCBA.

13 ART IN NATURE

Sandstone landscape

Kanab, Kane County, Utah (U.S.A.).

This sandstone of totally natural origin was formed nearly 225 million years ago following the disintegration of ancient mountains. Much later, under the influence of water that was full of mineral salts, mainly iron and manganese, it took on varied hues. It was only after boulders had been sawn up that strange images of desert landscapes appeared, which, paradoxically, look like the current landscapes of North American deserts! MCG.

Butterfly

Diaethria clymena meridionalis, Brazil.

As surprising as it may seem, this motif in the shape of a number 88 on the face lower of the wings of this butterfly is quite natural. The “double 8”, as it is known in French, lives in South America. MCZ, collection J. Rochat.

Natural veins of pure metal copper

White Pine, Ontonagon County, Michigan (U.S.A.).

This remarkable specimen presents a natural metal, known as native copper, which permeated into a 1.1 billion-year-old carbonized rock. The formation of this assembly consisting of pure metal and rock is still a mystery. MCG.

Gypsum partially dissolved by water

Canyon de l'Envers, Sollières-Sardières, Savoie (France).

Gypsum is a mineral that is quite soluble in water: nearly 2.5 grams per litre of rainwater. Gypsum mountains gradually dissolve with rainstorms, leaving short-lived karst structures that remind us of stumps of teeth. MCG.

Botryoidal malachite

Ekaterinburg, Central Urals (Russia).

This fine copper mineral has rounded forms that are joined together in bunches, like grapes or viscera. MCG.

Festooned chrysocolla and malachite

Lupoto Mine, Kakumba, Katanga (Democratic Republic of Congo).

These two copper minerals have a festooned internal structure consisting of a succession of segments of imperfect circles highlighted by differences of hue. MCG.

Felted malachite

Chessy-les-Mines, Rhône (France).

Covered by a myriad of tiny acicular crystals, the surface of this mineral has a felt-like aspect that is hard to the touch, reminding us of its inorganic composition. MCG.

14 ADAPT TO HUMAN POLLUTION

Peppered moth

Biston betularia.

The peppered moth is a nocturnal moth that often lands on the barks of birches. The white colouring with brown spots

on its wings gives it a rather efficient camouflage. Only the typical light-coloured form of the moth was known until the early 19th century. From 1849, dark brown specimens started to be observed in England. They even became dominant in the late 19th century, especially near industrial centres. Were their wings blackened by deposits of soot from factories? No, it is a very striking example of natural selection. As industrial pollution caused the blackening of tree trunks, light-coloured moths became much more visible to the eyes of predators and these rare individuals known as melanic moths, which were now perfectly camouflaged, became dominant. Once factories had been equipped with particle filters, the reverse evolution occurred in a few decades. MCZ.

15 FINDING THE THIRD DIMENSION

Pterosaurus

Rhamphorhynchus gemmingi, Workerzell, Bavaria (Germany), Late Jurassic, 150 million years old.

Deposits of lithographic stone from Bavaria sometimes contain vertebrates, like this pterosaurus. But their skeletons were completely flattened during fossilisation. Current casting techniques make it possible to reconstitute their original shapes in 3D for study. MCG.

16 NATURAL TOYS

Concretion of sandstone in the shape of a Pokemon

Fontainebleau, Seine-et-Marne (France).

This stone with an astounding natural shape is a sandstone also known as a Gogotte. It looks like a face that is derived from a well-known Japanese manga. This exceptional concretion, the possible ancestor of a long lineage of Pokemons, resulting from the sulphurous interaction of sand and water, was probably formed in the last 30 million years. MCG.

Walrus tusk animal figurines

Arctic (Alaska, Canada, Greenland), 19th-20th century.

Small walrus tusk figurines (amulets) with several animal species that are seen in the Arctic world: polar bears, polar foxes, walruses, seals and different aquatic birds. MCAH.

17 REAL FAKE. FAKE REAL

Double silver thaler of Auguste II

Duchy of Brunswick-Lüneburg (Germany), 1655, with a copy of its obverse created by electroplating.

The technique of electroplating makes it possible to reproduce objects in precious metals by electrolysis. It is frequently used in museums to make copies for exhibition and study. MMC.

Two counterfeit coins, one Greek and the other Roman, made in the 20th century and their prototypes

Silver tetradrachm of Lysimachus, King of Thrace and then of Macedonia, 285–281 BC. and denarius of the Roman general Mark Antony, 32–31 BC.

These coins show how difficult it sometimes is to tell the difference between a fake coin and a real one. MMC.

“Sand dollar”

Echinoidea Clypeasteroidea, indeterminate.

Dollar

United States, 1921.

The name “sand dollars” given to these sea urchins comes from the appearance of dead individuals that wash up on beaches. Having lost their epidermis and whitened by the sun, these shells look like large coins, hence their name of “sand dollars”. They live slightly buried in the sand or the marine sediments of many seas around the globe. MCZ, L. Gilliéron collection and MMC.

Commemorative dollar

Palau (Micronesia, Pacific), 2017.

Its reverse celebrates the “sand dollar” sea urchin that can be found on the beaches of this archipelago. MMC.

Pyrite dollar

Sparta, Randolph Co. Illinois (U.S.A.).

Very rarely, pyrite is a mineral that is found in flat circular aggregates that look like large coins. As the most famous deposit was found in the United States, the name “pyrite dollar” is given to this unique type of crystallisation. MCG.

Debit and credit cards

1980s to 2000.

Using bank cards is very common in our society today. As they enable virtual transactions, they are more and more prevalent than traditional payment methods (coins, banknotes & cheques). MMC.

SIZES

18 VARIATIONS ON SCALES

Folded charoite

Murunskii Massif, Yakutia, Eastern Siberia (Russia).

The mixture of minerals in of this exceptionally rare rock is caused by geological history. It started nearly 200 million years ago and lasted nearly 100 million years. It included seven intense thermal events that led to a chemical and mineralogical composition that is unique in the world and to its folding. MCG.

Wall chart, 1991

Geological cutaway through the Diablerets Massif. The different layers of rocks underwent folding and faults of kilometeric dimension during the formation of the Alps some 30 million years ago. The folds have the same morphology whether they are millimetric or kilometeric. MCG.

19 SIZES OF THE LIVING

(turn the cylinder of the magnifying glass)

Amber with ants

Palo Alto (Dominican Republic), Oligocene, 30 million years old.

Dozens of perfectly preserved ants were trapped in this resin, which was transformed into amber during fossilisation. MCG.

Sea sand

Bay of Mondello, Sicily, today.

This sand is made up of the debris of marine organisms: shells, white and pink coral, seaweed, etc. MCG.

Sands of dunes and deserts

François-Alphonse Forel (1841-1912) was a doctor and naturalist from Morges and a pioneer of limnology: the science of lakes and other fresh water environments. The samples in his collection come from all over the world, garnered either by the scholar himself or by acquaintances. MCG, François-Alphonse Forel collection.

(on the wall)

Hydra

Hydra sp., pedagogical model.

Hydras are tiny aquatic organisms. They are sedentary and live attached to a substrate. As they often practise asexual reproduction by producing buds, certain scientists affirm that the hydra is virtually immortal and does not age, as it regularly gives birth to a new organism. MCZ.

Radiolaria, pedagogical model

Radiolaria, including several models blown up 1,000 times displayed here, are single-celled marine organisms. They are characterized by a mineral shell (silicon dioxide) with often spectacular geometric forms. They measure between 0.05 and 0.3 mm. MCZ.

Sea scorpion

Stylonurus lacoanus, Eastern United States, Late Devonian, 370 million years old.

Called “sea scorpions”, Eurypteridae were among the largest sea predators of the Palaeozoic Era, with lengths that can reach 2.5 m. They were the largest arthropods (insects, spiders, crustaceans) of all time. MCG.

20 BIGGER AND BIGGER!!

Katanga copper cross

Democratic Republic of Congo, 19th century.

Katanga is a region that is particularly rich in copper. Extracting and casting the metal were once reserved to a mysterious community called the “copper eaters”. These operations, which were highly ritualized, are characterized by an atmosphere that was both sacred and magic. Crosses were made in moulds that were traced with a finger in the sand. These objects were used as a means of payment from the 13th century onwards. In the 19th and 20th centuries, when a man proposed to a woman, he paid the family with one of these large crosses to compensate them for the loss of labour due to her leaving. MMC.

Sea heart

Entada gigas, mangrove of Central American tropical forests.

Entada gigas, the sea heart is a liana of the family of leguminous plants. This species is well known for producing the largest pods in the world. Their length can reach 2 metres and they contain 10 to 15 seeds. Carried away by rain and rivers, the seeds of 4 to 6 cm of diameter in the shape of a heart can reach the oceans and are then carried away by currents. They can often be found on beaches around the Gulf of Mexico, where they are known as “sea hearts”. In certain cases, they are carried by the Gulf Stream to Europe and can they resist the action of sea salt for several years. MJBC.

Replicas of famous historic diamonds

Large diamonds with the size of several centimetres and weighing more than 10 grams are exceptional. The weight of precious stones is measured by the carat, which is equivalent to 0.2 gram. The value of a diamond is exponential to its mass. In other words, a two-carat diamond has a greater value than two diamonds of one carat, as it is considered as rarer and therefore more expensive. MCG.

“Livre de Beurre”, flint core

Grand-Pressigny, Touraine (France), Late Neolithic, c. 2,600 BC.

The cores are blocks of flint from which flakes or blades were split from that were used as material to manufacture different tools: arrowheads, daggers, scrapers and knives. This type of nucleus special core, known as a “pound of butter” due to its shape, was aimed at producing long straight blades that were generally transformed into daggers. The production workshops were located in Touraine or in the region of Forcalquier (France). These blades circulated over great distances by trade; this is why we find them in Neolithic sites in Switzerland. MCAH.

21 GET A LITTLE HIGHER

Giraffe

Giraffa camelopardalis.

This giraffe was part of the zoological collection of the Jenisch Museum in Vevey. It was kept in the gymnasium of a middle school in this city. It is difficult to imagine all the damage of all types that was done to it in such a place. This collection is today administered by the MCZ but kept in the storeroom of a middle school in Vevey. Only the giraffe, due to its size, was officially bequeathed to the Museum of Zoology. MCZ.

(on the wall)

Magali Koenig, Giraffe from the Jenisch Museum, Photograph, 1987.

22 SMALL IS BEAUTIFUL

Etruscan shrew

Suncus etruscus, Sardinia, 1980.

This animal is the smallest mammal in the world. The skeleton was meticulously prepared by Professor Peter Vogel, director of the Institute of Ecology and Zoology at the University of Lausanne in 2003. MCZ, P. Vogel collection.

Bronze Statuette of shrew

Egypt, Late Period, 750–330 BC.

In ancient Egypt, the shrew was a sacred animal, consecrated to the sun god Horus of Letopolis. Engraved on its back, it is carrying a winged beetle, a winged sun and a vulture with spread wings. Many shrew mummies dating from the Late Period were discovered in Egypt. MCAH.

23 CLASH OF THE TITANS: EXTREME ROCKS AND MINERALS

(from left to right)

Very deep and very slow

Mined abyssal polymetallic nodules.

Collected at depths of between 4,000 and 6,000 metres on the ocean floor off the coast of Peru in the Pacific Ocean, these nodules were formed by a very slow accretion of oxides of manganese, nickel, copper, cobalt, etc. With a speed of around one centimetre every several million years, it is the slowest known geological phenomenon on earth today. MCG.

Very high, very hot and very rapid

Swiss and Italian summits of the Matterhorn (4478 m) that are partly molten due to lightning.

The great geologist Emile Argand (1879-1940) collected these two samples during his geological survey of Matterhorn in the very early 20th century. This major accomplishment required him to climb the mountain many times by all the routes that were known at that time, as well as harvesting and carrying many rock fragments: a real feat! It may be observed that the rock is partially molten and vitrified by multiple impacts of lightning at nearly 30,000°C,

lasting barely 0.1 second: it is the fastest geological phenomenon known on earth today. MCG.

Very old but very fast

“The Rosetta stone of planetology”.

This meteorite fell at Allende in Mexico on 8th February 1969 at a speed of 16 km per second and is one of the most studied extra-terrestrial objects. It contains amino acids, pre-solar grains (formed before the Sun!), many new minerals and white refractory inclusions dated at 4.567 billion years old, which corresponds to the oldest known material, 30 million years older than that of the Earth. MCG.

Very powerful

Impactite. Manicouagan, Quebec (Canada).

214 million years ago, an extra-terrestrial fireball, whose diameter is estimated at between 5 and 10 kilometres, collided with the Earth. Geologists consider that this meteorite hit our planet at a speed varying from 17 to 60 kilometres per second and that the shockwave created by this collision is equivalent to 40,000,000 times that of the atomic bomb that destroyed Hiroshima. MCG.

24 OF COINS AND MEN

Silver Hemiobol from Marseille

c. 470-460 BC. and photograph of stone coins from the archipelago of Yap (Micronesia), referred to for the first time in the 18th century.

The silver coin, measuring scarcely 8 mm of diameter and weighing 0.48 g, is one of the smallest coins in circulation during Antiquity. It is in line with the first coins struck in Asia Minor, because it is known that Marseille was founded by Greek settlers from Phocaea (Asia Minor). The stone coins from the archipelago of Yap, which can reach up to 4 metres in diameter, are the largest coins ever used in the world. The native material that they are composed of a mixture of aragonite and calcite, is not found in the archipelago. The inhabitants had to go by canoe to fetch these stones from neighbouring islands in Palau, more than 400 km to the west. Thus, for the inhabitants of Yap, these stones have acquired an “intrinsic” value, like gold or silver for us. MMC.

25 FROM THE SEA FLOOR TO THE HIGHEST PEAKS

Giant clam

Tridacna gigas, Indian Ocean.

The giant clam is the largest and heaviest living bivalve mollusc. The largest specimens can reach 150 cm and weigh 250 kg. Clams of this size are unfortunately becoming rarer and rarer due to overfishing. MCZ.

Model of the Matterhorn

A tectonic sandwich.

This relief model of the Matterhorn that was created by Xavier Imfeld was painted by Emile Argand in 1907 according to the different rock formations. It highlights

the architecture of this region of Alps. The pink part of the Matterhorn corresponds to rocks originating from the Adriatic microcontinent. It overlaps the yellow, blue and green parts that are the remains of the Tethys Ocean that disappeared during the formation of the Alps. The dark pink part that appears in a corner represents rocks from the European continent. MCG.

26 JELLYFISH AND COCCOLITH

A surprising contrast between a creature of which 98 % is water and whose proportions defy the imagination, with 40-metre long tentacles and very small spheres that disintegrate. Nature is full of paradoxes: an enormous jellyfish that leaves no traces and these coccoliths, tiny calcareous plates with the size of a few microns that make up the most famous chalk cliffs in the world, like those of Étretat and Dover.

27 SHARP!

Joseph Vuillermet (Belfort, 1846 – Lausanne, 1913)

Major Davel

Undated, oil on canvas. MCBA.

Charles Gleyre (Chevilly, 1806 – Paris, 1874)

Sketch for the Execution of Major Davel

1847-48, oil on canvas.

In his will, Marc-Louis Arlaud, a former student of David and the founder of the Museum of Fine Arts of Lausanne (the building on the Place de la Riponne bears still his name), bequeathed a sum of 2,500 francs for the creation of a work by Charles Gleyre. The subject was supposed to be a scene from the life of Major Davel. Gleyre was inspired by the work of his friend Juste Olivier and chose the famous scene of the execution of the Major on 24th April 1723. This first study demonstrates that he initially placed the scene in the actual landscape of Vidy where the event took place. The final painting, a large format (3 x 2.7 metres) exhibited for a long time in the staircase of the Palais de Rumine, was burnt by a vandal on 25th August 1980. The French artist Sophie Calle made it the subject of a work that is held at the Cantonal Museum of Fine Arts. MCBA.

Metal and hide “Executioner’s sword”

Germany, 16th century.

This sword includes a piece of blade known as a “square”, which is typical of swords of justice, as the tip was of no use in decapitation and to avoid it being stuck in the vertebrae of the condemned person. Decorated with a ritual motto in German, it is said to have been used for executing Major Davel on 24th January 1723. MCAH.

Dagger flint

Chevroux (Vaud), Late Neolithic, c. 2600 BC.

Usually known as a “dagger”, this type of large flint blade was mainly used as a knife for harvesting cereals. The distant origin of the flint (Touraine, France) as well as the care taken in the debitage and finishing to obtain a long and regular blade certainly made it a prestige object. MCAH.

EXPLORATION

28 EXCAVATE AND RECREATE

Mosaic panel with a dog and a boar

Avenches (Vaud), first half of the 2nd century AD.

The complete mosaic was discovered in a *domus* in Avenches. In the centre, one could see Bellerophon riding Pegasus armed with a lance. Discovered almost whole in the 18th century, this pavement was at the origin of a project of the first museum in Avenches with the mosaic *in situ*. The Roman Museum of Avenches has the preparatory drawings of this project. Roman Site and Museum of Avenches.

Bronze situla (bucket) and cauldron

Le Mormont (Vaud), 100 BC.

These two objects were discovered during archaeological excavations on the hill of Mormont near La Sarraz between 2006 and 2016. At this Celtic site, which is unique in Europe, nearly 250 pits were unearthed, which were dug out of limestone and filled with animal and human remains, ceramic and metal cooking objects and ornamental items, which had been thrown into them after large banquets. To understand what happened on the site, archaeologists need to better apprehend the objects, which are often deformed and covered with corrosion. The laboratory of the Museum of Archaeology and History deals with these objects to make them intelligible and presentable to the public, with a long process of removal of oxides and bonding and reassembly. The cauldron displayed here is under treatment while the situla is being restored. MCAH.

29 READING SKULLS

Every testimony has its own collection: at the Palais de Rumine, extinct species of fauna are at the Museum of Geology, contemporary species at the Museum of Zoology and everything which is related to humans at the Cantonal Museum of Archaeology and History.

(from left to right)

Cat skull

Felis attica, Island of Samos (Greece), Late Miocene, 8 million years old. The Ancient Greeks reported that the island of Samos had been the theatre of gigantic struggles in which Amazons had taken part. Bones spread over the island attested to the

truthfulness of the narratives. The English palaeontologist Forsyth-Major, a friend of the former Vaud Member of Parliament William Barbey, had been entrusted by the latter to carry out botanical research in these distant regions. In 1887, the English scholar, who was a refined Hellenist as well as a patient researcher, discovered the sources of the famous legend in the existence of a fossil deposit of the greatest importance. Huge boxes of materials were sent to Chambésy to the Barbey family property in the Canton de Genève. This collection, which is unique in the world and which consists of more than 1,200 pieces including this skull of the ancestor of the cat, was presented to the Museum of Geology in 1915. MCG.

Lion skull

Panthera leo.

This lion skull is part of the collection of Paul Narbel (1876-1920) that was bequeathed to the museum by his widow shortly after his premature death. He was a skilled physician and naturalist and was fascinated by mammals. He built up a collection of skulls with more than 600 pieces, a part of which is still visible in the comparative anatomy room of the Museum of Zoology. MCZ.

Skull of a modern man

Homo sapiens, Bex (Vaud).

This skull, probably female, is part of the anthropological collections of the Cantonal Museum of Archaeology and History, which have tens of thousands of bones. These human remains mostly come from excavations of tombs that were carried out in the Canton de Vaud. MCAH.

30 COMPARE IN ORDER TO UNDERSTAND

Charles Darwin, *De l'origine des espèces*

ou des lois du progrès chez les êtres organisés

Paris, 1862 (French edition of *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. 1859).

English naturalist Charles Darwin revolutionized biology and zoology. His landmark work led to violent debates and strong opposition from scientific and religious circles. If his theory of evolution became widely accepted in his lifetime, his theory of natural selection only became widely accepted during the first half of the 20th century. BCU.

Darwin's Pigeons

The pigeon of our cities is a domestic variety of the rock pigeon (*Columba livia*), selected for its meat and for breeding and sport. Charles Darwin raised domestic pigeons at the end of his life. It was especially by comparing various breeds of birds such as pigeons and hens that he developed his theory of the heredity of characteristics. MCZ.

31 THE COLOURFUL MIDDLE AGES

Casimir Reymond, *Isaiah*

Plaster cast of one of the statue-columns of the painted portal of the cathedral of Lausanne, c. 1920.

During the partial replacement of the originals by copies in the 1920s, several mouldings of the medieval statues were made. These statues were originally painted before being covered by whitewash by the Protestants from Bern. Isaiah holds a disc that is ornamented with seven doves representing the seven gifts of the Holy Spirit that were announced in his prophecy and is seen in two specimens, one in rough plaster, the other painted. The coloured moulds are above all based on a study at the end of the 19th century that detected remainders of paint under the damaged whitewash. MCAH.

32 FLASKS AND THE PLATYPUS

Collection of saline minerals of potassium, sodium and magnesium

Leopoldshall, Stassfurt, Sachsen-Anhalt (Germany).

This collection was presented to the Cantonal Museum of Geology in 1908 by the operator of the mine thanks to the good offices of a former student of the Academy of Lausanne, the engineer Desgraz. It is displayed in the original containers, made of ground glass, which are absolutely hermetic, guaranteeing perfect conservation. Many of these potassium and magnesium salts are very sensitive to the humidity in the air. MCG.

Glass Flask with smoked tea

Souchong.

This was part of a collection used for teaching at the *École cantonale de commerce* (Cantonal Business School). MJBC.

Platypus

Ornithorhynchus anatinus.

The Platypus is a strange mammal with a duck's beak which lays eggs. It is one of the rare venomous mammals. On its rear legs the male has a sting that allows it to inject a paralyzing venom. It was described in 1799 and was often considered as a hoax by the British zoologists of the time, who thought that it was a skilful assembly by an Asian taxidermist. As it is a mixture of a mammal and a bird, it is by definition unclassifiable. MCZ.

33 REVEAL WHAT THE SENSES CANNOT ORDINARILY PERCEIVE

Description of a flea

Robert Hooke, *Micrographia: or some physiological descriptions of minute bodies made by magnifying glasses, with observations and inquiries thereupon*, London, 1665.

The young Robert Hooke (1635-1703) discovered a new world: the microscope revealed unexpected beings and the delicacy of structures that had been invisible until then. His discoveries were so surprising that the English scholar

never stopped repeating that what he revealed was really true despite the strangeness of the forms of these minute worlds. He was an active campaigner for experimental science at the Royal Society of London and his ideal was clear: science above all consists in describing what is seen "with a loyal hand and a faithful eye". BIHM.

"Iceland Spar", calcite

Helgustadir Mine, Reydarfjörður (Iceland).

Calcite is a birefringent crystal, so unlike glass, a light beam that crosses the mineral is divided into two. This remarkable property is at the origin of the discovery of light polarisation that is widely used in sunglasses. MCG.

Optical direction finder with two circles for measuring crystals

Heidelberg, Germany, c. 1925, manufactured by Peter Stoe. MCG.

Petrographic microscopes

The identification of the minerals of rocks using crystalline optics requires the use of a polarizing microscope, a tool that was developed in the early 19th century and which is still widely used. MCG.

34 MEASURE FOR MEASURE

Wood and brass portable monetary scale, manufactured by A. Wilkinson

Kirby near Liverpool (Great Britain), 18th century.

The instructions are written down inside the box on a glued piece of paper. They tell how to use this measuring instrument and the coins that can be checked with it: guinea, 1/2 guinea (and fractional coins, such as probably the 7-shilling coin, the sovereign and the 1/2 sovereign). MMC.

Set of touchstones and radiolarite touchstone

20th - 21st centuries.

In order to check the alloys of coins or other gold objects, the expert may refer to a set of touchstones that include different alloys of gold (all of them here are 14 carat). The expert rubs the object to be checked on a touchstone and does the same with a sample of metal from the set of touchstones. He then uses dilute aqua regia (a mixture of nitric acid and hydrochloric acid) and compares the reaction of the two traces that are left, that of the object that is tested and that of the reference metal. If the traces are identical, the object is really 14 carat gold. This method has been attested to since the 2nd century BC. The touchstone test has not been used for coins since the appearance of instrumental methods. *Contrôle fédéral des métaux précieux*, Geneva.

Orrery

Cologne (Germany), late 19th century.

This orrery was used to explain the movement of the planets to children and illustrates eclipses mechanically. MCAH.

Broca osteometric board and goniometers

Paris, c. 1900.

The osteometric board enables the measurement of long bones (femur, tibia, humerus) and the different goniometers are used for measuring the angles. All these instruments come from Collin (Paris), a supplier that specialized in medical equipment. They were ordered and used by Alexandre Schenk (1874-1910), the curator of the prehistoric and anthropological sections of the museum from 1901 to 1910. MCAH.

Skull and femur

Pully Chamblandes (Vaud), discovered in 1881, Middle Neolithic, c. 4000 BC.

In 1901, Schenk participated in the archaeological excavations of the necropolis of Pully Chamblandes, which delivered a benchmark anthropological series. MCAH.

R. A. Reiss, Skull from Pully Chamblandes

Photographic prints, 1901-1902.

Rodolphe Archibald Reiss (1875-1929), a photographer and a pioneer of modern forensics, the founder of the Institute of Police Science at the University of Lausanne in 1909, made several photographs of skulls from Chamblandes on the request of Schenk. The MCAH has several original prints of them. MCAH.

Measure of Man

Adolphe Quetelet, *Anthropométrie ou Mesure des différentes facultés des humains* (Anthropometry or measurement of the different faculties of humans), Brussels; Leipzig (etc.), 1870.

At a time when governments and their bureaucracies compiled registers for almost everything (births, deaths, crime, diseases, etc.), from the 19th century onwards scientists searched for possible “laws” that could give meaning to these piles of figures. This was the case of the Belgian mathematician, astronomer, naturalist and statistician Adolphe Quetelet (1796-1874). He tried to understand if human and social phenomena have the same regularities as natural phenomena and decided to submit humans to measurement. From the size of their ears to the strength of their hands, from predilections for crime to the age of spouses when they got married, he shared the obsession of his time with establishing the physical and psychological profile of the “Average Man”, a yardstick by which one could identify the deficient, the abnormal and the non-standard. These classifications opened the path to the worst excesses, which the 20th century unfortunately suffered from. BCU.

35 EXPLORATION KITS

Metal and wood sabre, in its fibre scabbard

Indonesia or Malaysia, late 19th-early 20th century.

This sabre from Maritime Southeast Asia whose haft looks like a flower bud, encased in worked metal, looks like certain weapons from Sumatra. Apart from sabres, the repertory of

weaponry also includes cartridge belts and firearms that came from trade with foreign merchants and settlers. It was brought back to Switzerland by William Morton. MCAH.

William Morton's helmet

Helmet worn by the curator of the Museum of Zoology during his journey to Indonesia in the early 20th century. MCZ.

Exploration of lakeside dwellings

Watercolour from the Bern Historical Museum (reproduction).

On 22 August 1854, Adolf Morlot dived for the first time to explore the lakeside dwellings of La Grande-Cité de Morges, using an iron helmet tied to his shoulders supplied with air from the surface. On the ship in a black top hat was Frédéric Troyon, the first curator of the Museum of Antiquities, the future Cantonal Museum of Archaeology and History. This exploit became famous worldwide thanks to this watercolour. Bern Historical Museum.

36 NEW MATERIALS

Synthetic Light Bulbs with super-crystals

Helmuth Berger & Francis Lévy, Institute of Condensed Matter Physics, EPFL (Lausanne).

These materials have been made synthetically at the *École Polytechnique Fédérale* since the 1970s. They have extraordinary physical properties: they are mostly semiconductors. They can be found in countless current electronic applications, such as light-emitting diodes (LEDs), photovoltaic cells and solid-state memories. These are quintessential 21st century materials. MCG.

Synthetic crystals and rare earth

Humans ceaselessly replicate or improve on nature. The development of optics and electronics and the challenge of the energy transition encourage scientists to purify and synthesize crystals: synthetic quartz, praseodymium sulphate, samarium sulphate, europium sulphate, erbium acetate, etc. MCG.

37 PRESERVE WHAT YOU FIND

Press for herbarium

Probably early 20th century.

Drying out herb specimens satisfactorily with a press makes it possible to extend their conservation time. Certain herbaria are more than 300 years old and are perfectly preserved. MJBC.

Jean Muret's herbarium box

Plastic bags have now replaced herbarium boxes. Jean Muret (1799-1877), a lawyer and politician from Vaud, gave up politics in 1862 to consecrate all his life to botany, which he had studied as an amateur since his youth. MJBC.

Samples of rock from a large alpine railway tunnel

Simplon (Switzerland, Italy).

The Cantonal Museum of Geology has samples of all the Swiss tunnels and therefore has a collection of several hundred rocks that were collected from 1898 to 1905 during the drilling of the first Simplon tunnel, which is 19.8 km long. Only three symbolic samples are displayed here. (From left to right): the rock at the North gateway of the Simplon tunnel at Brigue, the rock where the North and South Simplon tunnels meet and the rock at the South gateway of the Simplon tunnel at Iselle. These samples make it possible to precisely find the nature of rocks during accidents or for maintenance, for example. MCG

38 THE ERA OF EXPEDITIONS OR THE LEARNED CONQUEST OF THE WORLD

Wooden architectural model

Plant fibre, lime and pigment, Karo Batak population, Sumatra (Indonesia), late 19th–early 20th century.

This large architectural model, which was brought back to Switzerland by William Morton, the curator of the Museum of Zoology, is probably the replica of a house or a grain store. The Karo-Batak village, which is traditionally considered as the centre of the world by its inhabitants, is sedentary. It consists of around ten houses, laid out parallel to each other near rice fields and a waterway. MCAH.

Collection of Myriapoda, William Morton

During his expedition to Ceylon and Borneo in 1899, William Morton collected tens of thousands of insects and other invertebrates. One practical way of preserving some of them was to put them into jars with alcohol, ensuring that the specimens were preserved well. This collection of centipedes has been in the same condition since its arrival at the Museum of Zoology. It has never been studied by a specialist to determine which species are present. MCZ.

Morton's Stork

This stork was shot by William Morton on the island of Borneo in 1899. It was examined by the British ornithologist William Robert Ogilvie-Grant from the British Museum who thought that it was a new species, which that he named *Dissoura mortoni* in tribute to its collector. This bird therefore became the archetype, i.e. the reference specimen for this species. Since then, it has been declared synonymous with a sub-species of the woolly-necked stork and today is known as *Ciconia episcopus stormi*. MCZ.

Wood and pigment shield

Borneo (Malaysia), late 19th–early 20th century.

The Kelabit shield, an emblematic object of the Apo-Kayan people, is also representative of the traditional practice of head-hunting, which is present all over South-East Asia from Nagaland in India to the Marueas Islands in Oceania. The external face of the shield, ornamented with monstrous “aso” (literally “dog”) heads was covered with human hair,

supposedly from head-hunting. The owner of the shield fastened them with wax after each of his victories over his enemies as trophies. It was among the objects brought back by William Morton. MCAH.

Rat trap

The Museum of Zoology inherited a magnificent collection of traps, including this black rat trap. Max Hagner, a rat catcher who is now retired, was in charge of disinfecting the deposits of the Museum for many years. Similar traps were used during expeditions to catch rodents. MCZ, M. Hagner collection.

39 GRASPING THE INVISIBLE

Mist chamber

Manufactured by PIHWE, Göttingen, Lower Saxony (Germany), 2000.

This particle detector led to the Nobel Prize of Physics in 1927. At every moment we can see traces left by the passage of the particles that make up atoms. Through disintegration, fission or fusion, atoms produce particles that make up the natural radioactivity of the minerals of the rocks of the Earth and cosmic radiation. A small fragment of radioactive mineral is placed in the mist chamber: one can observe that the stone is permanently ringed by traces, they are particles that are caused by the gradual disintegration of the uranium, radium and polonium atoms that are contained in the mineral. All the electrically charged particles are detected. Their presence and their belonging can be recognized by the shape of the traces that they leave in an artificial mist, somewhat in the same way as aircraft in the sky. MCG.

40 MAKING THINGS IMMORTAL

Documentaries about the techniques of taxidermy and restoring archaeological objects.

HELL

41 THE ERA OF PUNISHMENTS #DENOUNCEYOURTEACHER

Dunce cap

Vaud, 19th century.

Cat-o'-nine-tails

Geneva, 1894.

Among the academic heritage objects from Vaud, this dunce cap, made of felt and cotton, and this cat-o'-nine-tails, with a wooden handle and cow leather lashes, tell us of methods of the past. The cap is deep; when schoolchildren wore them, they covered their eyes, which forced them to look at the ground. The first Vaud Regulation about schools in 1806 stipulated that “schoolteachers must treat their schoolchildren gently and avoid any violence when they are called upon to correct them”, but the use of the dunce cap

and the cat-o'-nine-tails for corporal punishment actually continued to be tolerated all through the 19th century. MCAH.

Door of punishment cell

Pestalozzi Middle School, Yverdon-les-Bains (Vaud), 1912.

At school, punishments and rewards appeared in the 19th century, in a historical context in which the goals of public education were to select the most deserving and discipline the pupils, using regulations and instruments of repression, as can be seen in this door of a punishment cell from a school in Yverdon. MCAH.

42 REPULSIVE OR REPUGNANT?

Elephant foot waste bin

This piece was seized by Swiss customs in the 1990s. Bad taste and stupidity are still around today. MCZ.

Wax model

This wax model of the innervation of the skull certainly came from Tramond-Rouppert in Paris, which was specialized in anatomical objects at the end of the 19th century. MCZ.

43 PHALLIC OBSESSIONS

Love nut

The coco de mer (*Lodoicea maldivica*) is a palm of the family of the Arecaceae and is native to the Seychelles. It produces the largest seed in the world, which is also known as the love nut and which can weigh twenty kilos. MJBC.

Bronze phallic amulets

Roman era.

These amulets had an apotropaic function (warding off bad luck) and a prophylactic function (preventing illness). On one side there is a phallus and on the other a closed point, the symbol of the vulva; together they represent life and fertility. The Romans did not see them as obscene objects, it is our “modern” point of view that gives them this characteristic, the reason why these pieces were collected in a “secret museum” in the 19th century, which gathered together objects that could scandalize polite society. MCAH.

Priapoliths

These absolutely natural and often well-mounted geological objects were great attractions in former prurient “cabinets of curiosities”. MCG.

Stinkhorn

Phallus impudicus.

Its vernacular name is the stinkhorn, and the phallus impudicus, which is sometimes called the Devil's egg when it is young, is a species of basidiomycota mushroom in the phal-laceae family. In its adult condition it looks like an erect penis, hence its name - unchanged since Linné, which is extremely

rare in mycology - and, like most representatives of this family, it generates a putrid odour. MJBC.

Attic vase with red figures

Vulci (Italy), c. 450 BC.

This large drinking vase (oenochoe) was acquired at the Lucien Bonaparte sale in 1867 by Arnold Morel-Fatio, who was then the curator of the Museum of Antiquities. It immediately entered the secret museum, which contained objects that were considered as obscene. The scene represented illustrates a maenad (follower of Dionysus) trying to escape from a satyr with an erection. MCAH.

Tokens from brothels

Strasbourg and Rouen (France) and Tombstone (United States), 19th-20th centuries.

The tokens were a substitute for coins inside brothels and saloons and created a dependence of prostitutes on the managers of the places where they worked, because only they could change them into currency. MMC.

44 THE FASCINATION WITH MONSTERS

Teratological specimens of pig and cat.

Works of fiction show our fascination for perversion and monsters. In pagan antiquity, they were warnings; after the triumph of Christianity, they became manifestations of Evil. The scientific spirit made them into phenomena that are worthy of study, curiosities to be preserved. The collections of the Museum of Zoology include several “monsters”, i.e. still-born animals with serious problems of development during gestation. MCZ.

45 FEARFULLY UGLY

Botfly

Gasterophilus sp.

This jar contains a series of larvae of the botfly or *Gasterophilus* (which means “the one that likes the stomach”), a parasitic fly of the digestive tube of equine animals (horses, donkeys). The female of these flies lay their eggs on the fur of their host, which is contaminated when it licks itself. The larvae then migrate to the digestive tube, fixing themselves on the partition of the stomach or the intestine. At the end of their development, they break free and are evacuated during defaecation. MCZ.

Taenia

Bothriocephalus latus.

This 6-metre long tapeworm was removed from the intestine of a patient of Dr Jeanneret in Lausanne in 1918. Tapeworms are parasites of mammals, including humans. They start their development in a crustacean, which is then eaten by a fish. If a human eats the raw flesh of an infested fish, he or she can then be contaminated. The taenia then fixes itself in the small intestine, laying millions of eggs

during its life, which are evacuated with the excrements of the host. If these eggs are in water, they hatch and release a small larva that can be swallowed by a crustacean. The process has come full circle. MCZ.

Tarantula

Colombia.

Spiders are among the least liked organisms. Arachnophobia, or the fear of spiders, is one of the most common phobias in the world. Due to their large size, tarantulas are the very image of this fear. But contrary to preconceived ideas they are mostly totally harmless, as only one species, an Australian one, can cause death with its bite. MCZ.

Scorpion

Pandinus imperator, Gabon.

The *Pandinus imperator* is one of the largest species of scorpions, which can reach a length of 20 cm from its claws to its tail. Like other scorpions it has a sting at the end of its tail that can inject venom to defend itself. Its puncture is very painful but not fatal for humans. However, when faced with an enemy or to catch the insects that it feeds off, the *Pandinus* most often uses its large claws. This species is very quiet and is often raised in a terrarium. Over-collected from nature, the *Pandinus imperator* is now a species that is protected by CITES (Convention on the International Trade in Endangered Species). MCZ.

46 ARS EROTICA

Terracotta oil lamps with erotic scenes

Roman era.

Many museums have collections of Roman sexual art that have been largely hidden from view until recently. Romans, both rich and poor, proudly displayed images in their homes that we would hide away today, and freely indulged in acts that we would consider as objectionable, immoral or illegal. Sex was seen as a sign of divine blessing in a sexually tolerant society that encouraged creation and open display of erotic art (Adapted from John R. Clarke, *Roman Sex*, 2004). MCAH.

Silver Drachm

Greece, Thasos, 510–490 BC.

This coin represents a satyr chasing a maenad. This scene is related to Pan, a divinity that is physically close to satyrs, whose sanctuary was located on the acropolis of Thasos. All these characters were the companions of Dionysus, the divinity of wine, excess and orgies. MMC.

Bronze assarion in the name of Septimus Severus

Moesia (Bulgaria), City of Nicopolis, 193–211 AD.

This very rare coin represents Priapus raising his clothing and showing his penis. The main characteristic of this son of Aphrodite and Dionysus is his oversized and perpetually erect penis. He gave his name to an erectile dysfunction, priapism. In Antiquity, he was a protective divinity of food crops and houses. MMC.

Penis bone of walrus

Odobenus rosmarus, Arctic, Holocene, 10,000 years old.

This walrus bone is a *baculum*, or penis bone, which is present in the penis of many male mammals, like most rodents, bats, insectivores, carnivores and primates. Humans are one of the rare primates that does not have one. In the middle of the *baculum* exhibited here, one can see a large swelling that is a bony callus: a record of an old fracture that was probably very painful. MCG.

47 DEFILED BODIES, MUTILATED BODIES

Iron fetters, burnt human skull and human spine

Le Mormont (Vaud), c. 100 BC.

These items were discovered during archaeological excavations on the hill of Mormont, near La Sarraz from 2006 to 2016. They remind us of a sad reality of ancient societies (Celtic and Roman): the practice of slavery. Slaves are often forgotten or neglected when these periods are discussed, but they were greatly involved in trade and formed a large part of the workforce, especially when it came to carrying out arduous and dangerous tasks. At Mormont, several discoveries indicate that there were not only fettered humans, slaves or prisoners, but also that bodies were mutilated, grilled and probably eaten. MCAH.

48 REALLY BAD MEMORIES

Cross of honour

Germany, 3rd Reich, 1938.

This decoration aimed at boosting the birth rate. The gold cross was awarded to mothers with 8 children and more, the silver cross to mothers with 6 to 7 children and the bronze cross to mothers with 4 to 5 children. MMC.

Arthur de Gobineau, *Essay about the inequality of human races*

Paris, 1853.

This essay by the French diplomat, writer and politician Arthur de Gobineau (1816–1882) means that he is one of the founding fathers of racialist thought. He postulated the existence of three “primitive races” whose mixing would inevitably lead to the decay of the human species. Unsurprisingly, he placed the “white race” at the summit of “beauty, intelligence and strength” and, inside it, the “Aryan race” above all the others. The “black race” for him is a mishmash of negrophobe stereotypes, characterized by “mediocre or even non-existent powers of thinking”. Gobineau notably inspired the racialist theoretician Houston Stewart Chamberlain who later inspired Adolf Hitler. BCU.

Pair of wrought iron fetters

Lausanne (Vaud), 16th–18th century.

These ankle fetters were discovered in the attic of the City Hall of Lausanne in the “chamber of coats of arms” in the late 19th century. This type of instrument was in use during the Bern period. Lausanne Historical Museum.

“Rascal catcher” or “neck catcher”

Wrought iron, 17th century.

This instrument of unknown origin, acquired for a planned history museum at the Château of Chillon at the end of the 19th century, is similar to a pole weapon in use in Europe in modern times. Mounted on a long wooden handle, it was probably initially designed to unhorse riders on battlefields, before being simply used to catch rascals in prisons. MCAH.

49 BEWARE OF POISON!

Flask of potassium cyanide

Dr. Bender et Dr. Hobein, Zürich, c. 1920.

Flask of trioxide of arsenic

Former Industrial School of Vallorbe.

Cyanide and arsenic are the best-known poisons. According to the dose that is ingested they can kill a human either very quickly or with incredible suffering. They were formerly very much used for conservation and restoration in museums but they have now been abandoned and replaced by less toxic substances. MCG.

Chocolate spread

Europe, 21st century.

Trinityite

Jornada del Muerto, White Sands Missile Range, Alamogordo, New-Mexico (United States).

Ultra-rapid photographs of the first milliseconds of the Trinity test. Trinityite is nuclear lava that resulted from the fusion of sandy earth during the first test of an atomic bomb, the Trinity test, on 16th July 1945. MCG.

50 BEAUTY AND THE WORLD OF INDUSTRY

Flower Pot “Le Fuseau” in the shape of a diablo

Eternit with asbestos, 1951, manufactured by Eternit AG (Switzerland). Neo-functional industrial design by Anton Bee, a student of Willy Guhl (1915-2004), MCG.

Bill Viola (New York, 1951)

Anthem

Colour video with sound, duration 11m 30sec, 1983. MCBA.

51 RADIOACTIVITY

Phosphuranylite and autunite

Margnac II mine, Compreignac, Haute-Vienne (France).

These minerals are slightly radioactive natural uranium ores. They were widely used in the Massif Central for the development of the French nuclear programme, both civil and military. MCG.

52 FACING DEATH

Embalmed female body

Late Period (500–300 BC).

Mummies play an important role in our vision of ancient Egypt and this fascination is not new. From the end of the 18th century, Europe was fascinated by these pieces that were arriving in museums. This mummy is among the first pieces that entered the Cantonal Museum in 1822. It was acquired in Constantinople (Istanbul) with another one, a male one, by the Dantz brothers from Lausanne and was donated to the Museum. These two mummies were exhibited for a long time at the Palais de Rumine but were removed from exhibition in 1986. MCAH.

(on the wall)

Reserves of the Cantonal Museum of Archaeology and History at the Dépôt et abri des biens culturels in Lucens (Vaud), photograph by Régis Golay, 2018.

Since the early 20th century, human skeletons discovered during archaeological excavations have been almost systematically preserved. The MCAH has several thousands of them in its inventory. Thanks to archaeologists, they have a second life while they are studied as well as new cemetery in the walls of the former Lucens nuclear power station.

Other photographs from the reserve collections of the museum can be seen in the atrium on the 5th floor.

Necrophagous insects

Case that is part of the experiment “pig99”. Claude Wyss, an Inspector at the *Police de Sûreté vaudoise*, was a pioneer of forensic entomology in the Canton de Vaud. The aim of this science is to date corpses with necrophagous insects. Rigor mortis and body temperature only enable the precise dating of a death within 72 hours following death. Using the progress of development of necrophagous fly larvae, it is possible to estimate a post-mortem period of up to 60 days. In collaboration with the curator and professor of entomology Daniel Cherix, C. Wyss carried out many experiments on species of insects colonizing corpses. MCZ, C. Wyss collection.

Najas

Naja haje.

These two cobras, which were symbols of death in ancient Egypt, were seized by Swiss customs in the luggage of a tourist who thought that he or she had brought back a magnificent holiday souvenir. Queen Cleopatra is said to have committed suicide by letting herself be bitten by one of these serpents. MCZ.

(on the wall)

Frederik Ruysch, *Thesaurus anatomicus*

Amsterdam, 1701–1717 (reproduction).

At the heart of the culture of curiosities, Frederik Ruysch (1638–1731) is perhaps the most surprising of anatomical artists. He created and then engraved imaginary compositions of preparations that were fixed using an embalming liquid of his own invention to preserve colour and elasticity. His proto-surrealist paintings mix up human, animals, plants and minerals. And that skeletons of foetuses seem to be having a good time building up these incongruous still lifes, *memento mori* that tell us “remember that you are going to die”. BIHM.

53 PAY THE TOLL ON THE ROAD OF THE DEAD?

Gold coin, Kingdom of England, Edward IV, 1461–1483 and human skull

La Madeleine cemetery in Lausanne (Vaud), 15th century.

In ancient Greece, when someone died, a coin was put into their mouth, an offering to Charon, the boatman who took them across the Styx to enter the kingdom of the dead. This tradition, which was adapted to beliefs over time, seems to have persisted. In the Middle Ages, such a funerary rite still existed, but was it really a viaticum or simply an offering? Between the 13th and 16th centuries, a church dedicated to Saint Marie-Madeleine, a convent of Dominicans and its cemetery, was located in the space that today is occupied by the South wing of the Palais de Rumine (the former lower part of the Place de la Madeleine). The abandonment of the cemetery in the 19th century led to the unearthing of many bodies, including one with this coin, a noble with an English rose, in their mouth. It could be related to the events of 1476. After his defeat at Grandson, Charles the Bold assembled a large army in Lausanne to get his revenge against the Swiss. It was made up of English, Picard and Lombard mercenaries, who hated each other and fought each other on the slightest pretext. MCAH and MMC.

PRECIOUS

54 TO EACH THEIR TREASURE

Vase and treasure

Avenches (Vaud), Roman era.

Made up of 61 sesterces struck by Trajan (98–117 AD) to Marcus Aurelius Caesar (139–161 AD), this monetary treasure in a jug was discovered at the foot of the boundary wall of Avenches in 1807. It is the first treasure that entered the collections of the future Cantonal Museum of Currency. MMC.

Cowries in a basket

Africa, 19th century.

Metal coins are not the only means of trading between individuals; they can be replaced by all sorts of natural objects or objects manufactured by humans. These small shells, known as cowries, which come from the warm seas of the Indian Ocean and the South Pacific, were used in China from the Shang dynasty onwards (1600–1046 BC). They may have been carried by trade routes to Africa in the 10th century before circulating and becoming a real monetary system all over the Sub-Saharan area of the continent for more than a millennium and also in Oceania. These shells had all the characteristics of real coins, enabling the acquisition of many goods (objects, animals or slaves) and paying for any service rendered, but they were also ritual objects that were related to many ceremonies. MCAH.

55 EXTRA-TERRESTRIAL MESSAGES

(from left to right)

Lunar meteorite

Dar al Gani, Fezzan (Libya).

This lunar fragment, which was found on 10th March 1998, resulted from the fall of a gigantic meteorite on the Moon. It was trapped by the pull of earth's gravity and fell to Earth in the Libyan desert. The analysis of the lunar samples that were collected by astronauts from 1969 made it possible to acquire good knowledge about the geochemistry of the Moon. The comparison between the lunar samples and this fragment demonstrate that it is really a fragment from the Moon. MCG.

Martian meteorite

Dar al Gani, Fezzan (Libya).

This piece of Martian basalt was ejected during a meteor impact and it then fell to Earth. Its connection to Mars is based on chemical analyses that were carried out by space probes that have landed on this planet. MCG.

Meteorite

Orgueil, Tarn-et-Garonne (France).

These fragments came, which fell to Earth on 14th May 1864. They are full of water and contain organic molecules of extra-terrestrial origin, including amino acids, the basic elements of proteins, which themselves constitute living matter. This proves that organic compounds are produced in space. From there was born the hypothesis of “panspermia”, which posits that life could have been sown on Earth from space. MCG.

Extrasolar black diamond

Ubangi (Central African Republic).

Such diamonds are found in very few areas on the surface of the Earth and is only found in Brazil and the Central African Republic. Slightly harder than traditional diamonds, black diamonds of the carbonado variety are of extra-terrestrial origin. They are said to have been formed during the

explosion of a supernova a short time before the formation of the solar system. Much later, a rain of these relics may have landed on Earth. MCG.

56 PROTECTIVE JEWELLERY

Pearl oyster

Pinctada margaritifera.

Pearl oysters should not be confused with edible oysters, even if the latter can very exceptionally enclose pearls. Pearl oysters live in warm seas. They have been cultivated for more than a century to produce the pearls that are so prized in jewellery. These pearls are created by an oyster when a foreign body enters its shell. Reacting to this irritation, the animal surrounds the object with layers of mother-of-pearl, finally forming a pearl. MZL.

Silver leaf amulet cross

Cathedral of Lausanne (Vaud), late 6th–early 7th century.

This amulet is as exceptional as it is enigmatic. It was found in 1910 on the chest of a skeleton that was exhumed from beneath Lausanne Cathedral. Its inscription in Latin letters (ABRACA) certainly has an apotropaic function (to ward off bad luck) and it could derive from the magic formula abracadabra, which has been attested to from the 3rd century. It could also be connected to the form of address *abraxas*, which is present on many talismans in late Antiquity and the Early Middle Ages. MCAH.

57 DEEP UNDERGROUND

Photograph of core samples of the Eclépens sounding in the reserves of the Cantonal Museum of Geology at the University of Lausanne, photograph Régis Golay, 2018.

This sounding, made in 1981, reached 2,150 m. At that depth, rocks are nearly 250 million years old. MCG.

Other photographs from the reserve collections of the museum can be seen in the atrium on the 5th floor.

Crude oil

Essertines-1 forage oil, Essertines-sur-Yverdon, (Vaud).

The oil archives of Vaud are about the drilling and ultrasound scans of the subsoil. They cost oil companies hundreds of millions of francs. The subsoil of the Canton de Vaud is rich in clues about these precious materials but poor in real deposits. More than 100 tonnes of oil of excellent quality and a few thousand cubic metres of natural gas were extracted during the exploratory phase of the drilling in 1963. But operations were not considered profitable in the 1960s. MCG.

58 SHOWING YOUR PRECIOUS WARES

1. Perforated dove snail shell

(*Columbella rustica*), shelter of Sciernes-Picats, Châteaux d'Oex (Vaud), Late Mesolithic, c. 6200 BC.

This small shell of Mediterranean origin was discovered at 1,200 m of altitude in a rock shelter in the Alpine foothills, where many relics of populations of prehistoric hunter-gatherers were found. It was worn as an ornament, either sewn on clothing or included in a necklace or a bracelet. This shell bears witness to early long-distance trade between the Mediterranean coast and the Alpine regions, probably along the Rhone corridor. MCAH.

2. Shell pendant

Necropolis of Chamblandes, Pully (Vaud), Middle Neolithic, c. 4000 BC.

The species used is a Mediterranean gastropod, the Triton (*Charonia nodifera*). These ornaments can be found around the neck or on the bust of the deceased, without distinction of sex. MCAH.

3. Baltic amber beads

Grandson-Corcellettes (Vaud), discovered between 1877 and 1879, Late Bronze Age, 1050–800 BC.

Used from the late Palaeolithic onward, there was a great demand for Baltic amber from the Bronze Age onward and it was exported all over Europe, bearing witness to a very large-scale trade. MCAH.

4. Gold-plated silver Bracelet

Baulmes (Vaud), Roman era, 3rd century AD.

This bracelet was discovered in June 2012 with two other almost identical pieces by illegal prospectors using a metal detector. Having learnt of the discovery and to clarify its context, the Vaud Cantonal Archaeology Department made a survey of the site of the find. The trench in which the objects were deposited has been pinpointed, but unfortunately the dating and nature of this deposit have not been clarified. MCAH.

5. Glass bead necklace and ear loops

"Bel-Air" necropolis, Lausanne (Vaud). Early Middle Ages, c. 600 AD.

These objects originate from the grave of a richly-endowed young woman in the North of the Bel-Air necropolis, discovered by chance in 1838 by Frédéric Troyon, the first curator of the Museum of Antiquities from 1852. With more than 300 tombs excavated, it is the largest funerary group in Western Switzerland from the period from the 5th century to the 8th century. MCAH.

6. Fibulae made of iron, gold, silver and glass mounting

Saint-Prex (Vaud), 2nd half of 5th–early 6th century.

Round bronze, silver and glass fibula in mounting

Montricher (Vaud), 7th century.

These prestige ornaments were discovered during the excavations of the great necropoleis attributed to the

Burgundian people that lived in the Vaud region and they reflected both the social rank and the cultural origin of the deceased. MCAH.

7. Case of cabochons of precious minerals

Early 20th century.

Eduard Bally (1847-1926), a very rich shoes manufacturer from Aargau built up a very comprehensive collection of minerals. In 2003 and 2004, a large part of the minerals entered the Cantonal Museum of Geology, including his entire collection of precious stones. MCG.

8. Uncut and cut emeralds

Malyshevskoe, Yekaterinburg, Central Urals (Russia).

This precious stone is a variety of beryl that owes its so particular green colour to the presence of traces of chromium or vanadium. Pure and intensely green emerald crystals, which are gems, are extremely rare. In nature, the emerald very often has inclusions that are poetically described as *jardins* (gardens) by jewellers. MCG.

9. Uncut and cut topazes

Klein Spitzkopje, Swakopmund, Usakos, Namibia & State of Minas Gerais (Brazil).

This is a mineral of great hardness that enables excellent polishing and which has a slippery feeling to the touch. Topaz has a multitude of hues according to the presence of traces of iron or chromium, but its fine intense blue colour is generally obtained by artificial irradiation. MCG.

10. Water chestnut

Trapa natans, fruits in a string.

Theophrastus, the father of botany, who was born in 370 BC, wrote about them: "What is rather particular in this plant are its shoots that are as fine as hair that appear on the main stalk and which are neither leaves, nor stalks." Naturalists and artists were greatly impressed by its fruit. They were crafted as jewellery-amulets, especially in Thailand. MJBC.

11. Bucranium (ox head) potin

Belgian Gaul, Remi people c. 90-60 BC.

Celtic culture, with its oral tradition, is difficult for historians to understand. That is why coins are essential in understanding this period, which is still mostly unknown. Potins consisting of copper, tin and lead are cast coins. Their appearance, which is rougher, less fine and less detailed than that of struck coins, is the reason for their name, which means, not without a certain irony, that they come "from the bottom of the pot". MMC.

12. Electrum third-staters

Lydia (Turkey), Alyattes II (610-561 BC) or his son Croesus (561-547/6 BC).

This coin was one of the first that was struck in the Mediterranean basin. It symbolizes the popular expression "as rich as Croesus". It was thanks to river Pactolus, which was rich in electrum (a natural alloy of gold and silver), that Croesus the King of Lydia became rich. MMC.

13. Stone and bronze seal matrices and their prints in wax or lead

The word seal, *sigillum* in Latin, derives from the word *signum* (sign) and designates the print that constituted a signature or authenticated it on documents. It also enabled the "sealing" of documents, furniture and premises, guaranteeing that the information held inside was not modified or disclosed. The name of "seal" spread to the metal matrices that were used for making the prints. MMC.

14. Wax seal with the name and effigy of Queen Bertha of Burgundy

12th century fake.

In the early 12th century, the monks of Payerne faked documents, including a diploma, antedated to 962, which designated Bertha as the founder of the priory. This gave them the right to elect their superior themselves, which they were not really allowed to do. These documents were known as the "Testament of Queen Bertha". They were sealed with various imprints and were considered as authentic until the 19th century. MMC.

15. Tokens or seals?

Roman Empire, 1st-3rd century.

These small ceramic objects are probably Roman seals whose imprints were made by intaglios mounted on rings or pendants. The use of fired clay gives them an aspect that is similar to wax, but it is more solid and therefore more resistant. MMC.

59 WHAT IS RARE IS PRECIOUS

Dodo

Raphus cucullatus, Mare-aux-Songes (Mauritius).

The dodo, which died out in the 17th century, less than 100 years after the beginning of the colonisation of Mauritius, has become the symbol of extinct species that were exterminated by humans. Its fossilized remains are extremely rare and only around ten other museums in the world have skeletons as complete as this one. MCG.

Jadeite ceremonial axe

New Caledonia, late 18th century.

This Kanak axe is called a monstrance due to its great resemblance with the monstrance of Catholic worship. This axe is an object made of semi-precious stone, with a wooden haft, cords and braids made with the hair of flying foxes and plant material and a coconut half and is emblematic of the figure of a Kanak chief. This specimen, which was donated by Benjamin Delessert in 1824, is said to have originated from collections made by the members of the crew on the voyage that was searching for the ship *La Pérouse* in 1791, that was undertaken by Bruny d'Entrecasteaux. On the plates of the Atlas that describe the voyage there is an axe that is similar both to the ornament of cords and braids made with the hair of flying foxes and to the

shape of the blade. This piece is therefore unique, as such ancient pieces are very rare in European museums. MCAH.

60 FOR ALL THE GOLD AND SILVER IN THE WORLD

Gold bust

Avenches (Vaud), c. 180 AD.

The gold bust of Marcus Aurelius (121-180 AD) that originates from Avenches is among the most precious archaeological pieces the Canton de Vaud, both for the value of its metal and for the rarity of these pieces in the Roman world. Its attribution to Emperor Marcus Aurelius has been controversial, but a large part of the scientific community accepts this hypothesis today. The bust was found in a Roman sewer in 1939: it had already been hidden in Roman times, probably to hide it from pillagers during the decline of the Empire. It was originally used as a military emblem, deposited in the Cigognier temple that was dedicated to the cult of the Emperor. Its value in gold represents the weight of 220 *aurei*, the highest-value Roman coin. It is equivalent to 24 years of the salary of a Roman soldier. It was exhibited at the Palais de Rumine until the early 1980s. Roman Museum of Avenches.

Silver denarii with the effigy of Marcus Aurelius

Roman Emperor from 161 to 180.

There are many different portraits of the Emperor Marcus Aurelius on Roman coins and they are very realistic. The future Marcus Aurelius was born in 121 AD and was adopted by Emperor Antoninus Pius in 138. From 138 to 161, his portrait appears on certain coins that were struck by his father. He then reigned over the Empire from 161 to 180. In 42 years, his portrait changed greatly, presenting him successively with the features of a young adult, a man of mature age and then as the philosopher-Emperor when he was reaching the end of his life. MMC.

“Welcome Nugget”

Gilded plaster replica of the 68 kg nugget.

Discovered in Ballarat, Victoria in Australia on 10th June 1858, it was the largest gold nugget ever found. It was sold for \$21,000 at that time and then exhibited in London. When it was finally melted down, it gave up 57 kg of pure gold. In 1862, Lord Evelyn Ashley presented this replica of the “Welcome Nugget” to Charles-Théophile Gaudin for the opening of the Industrial Museum of Lausanne, which was financed by Catherine de Rumine (1818-1867), the mother of Gabriel de Rumine who gave his name to the Palais, which owes its existence to his generous bequest. Its value was estimated at 80 francs at that time. Today, it is the fact that it is the memory of the shape of this exceptional object that no longer exists that makes it so valuable. MCG.

61 A QUESTION OF VALUES

Black rhinoceros horn

The Museum of Zoology has a certain number of very sought after “trophies” of questionable taste, such as this one. MZL.

Wooden and steel plate of the Banque Cantonale

Vaudoise

Engraver Siber, Lausanne (Vaud), 1846.

Used for printing the first banknotes of the BCV, it has interchangeable stamps to manufacture banknotes of five, ten, twenty and one hundred ecus. This rare and precious object is said to have been found in a rubbish bin at the Cité in Lausanne by Colin Martin, the former curator of the Medal Cabinet. MMC.

62 FOREL AND THE ANT

Case of ants and 1,000 CHF Swiss banknote (copy)

This case of the ants of Switzerland, created between 1866 and 1874, was bequeathed to the Cantonal Museum of Zoology in 1914 by Auguste Forel (1848-1931). Forel, who was a psychiatrist, neurologist and the great Swiss ant specialist, published more than 250 articles about these insects and described more than 3,500 species and varieties of ants. This international renown led to him being depicted on largest banknote issued in Switzerland, the 1,000 CHF note, from 1978 to 2000. On the back there are three ants, of which he was a specialist, and a vertical cutaway of an anthill. MCZ.

63 WELL GUARDED TREASURES

Lock and key

German regions, 2nd half of 17th century.

Impressive due its size and ornament, this door lock with a handle and a pierced and engraved iron night lock together with its plate was probably designed for a mansion. It is ornamented with engraved scrolls and its mechanism is fixed on a pierced plate that has a curled shape. The handle of the night lock has the shape of a fixed key. This apparatus makes it possible to lock oneself in, as the lock has only one keyhole. MCAH.

SCIENCE BAR

64 "DREAM TEAM"

Daniel-Alexandre Chavannes (1765 – 1846)
Marble bust. MZL.

Charles Lardy (1780-1858)
Reproduction. MCG.

Frédéric Troyon (1815-1866)
Oil on canvas, 1859. MCAH.

Jacques Larguier des Bancels (1844-1904)
Reproduction. MZL.

William Charles James Morton (1866-1932)
Reproduction. MZL.

Ernest Wilczek (1867-1948)
Reproduction. MJBC.

Jean-François Gaudin (1766-1833)
Reproduction. MJBC.

THE NAMES OF THINGS

65 WORDS, WORDS

Box of Simplonite
(Dynamite + Simplon = Simplonite).

This explosive, which was formerly manufactured by the *Société Suisse des Explosifs* in Gamsen in Valais, was used during the construction of the second Simplon railway tunnel (1912-1921). This box was later reused for transporting geological samples to the Cantonal Museum of Geology. MCG.

66 MAPPING THE BODY

Anatomical écorché
Saint-Aubin-d'Écrosville (France), 1900.

The MCAH holds a rare specimen of a paper anatomical écorché on the scale of 2:3 that was created at the Auzoux studios in 1900. Doctor Auzoux's models (1797-1880) were immensely successful in the 19th century; they allowed students and young doctors to become familiar with the operations of human organs. They were manufactured in moulds with a recipe using paper pulp. This specimen was acquired for the Pestalozzi mixed secondary middle school in Yverdon-les-Bains; it then entered the collections of the Vaud Foundation for Academic Heritage, which were entrusted to the State of Vaud in 2015. MCAH.

67 NAME-CATEGORIZE-COMPARE

Money changer's box, containing scales and monetary weights

City of Geneva, Jacques Blanc, 1759.

Money changers had to check coins before changing money. As the coins had an intrinsic value (given by the precious metal of which they were made), they made them ring by throwing them on a counter covered by a metal plate (the more or less high percentage of base metal in the coin changed the sound the coin made). To ensure that they had not been trimmed and that they were not fake, the money changers weighed them using a jeweller's scales and placed the reference monetary weight in relation to the coin on the other pan. MMC.

Carl von Linné

System of nature through the three kingdoms of Nature, according to classes, orders, genera and species

Leipzig, 1748.

In his major work, the Swedish doctor and botanist Carl von Linné (1707-1778) developed a classification of nature that would be used as a model for generations of naturalists. In his system, differentiating, classify and naming natural things became established as the three basic stages in making an inventory of the world. BCU.

Genealogical tree of Man

Ernst Haeckel, *Anthropogeny or the Evolutionary History of Man*, Leipzig, 1874.

Haeckel profoundly marked Human Science by establishing the law according to which the formation of the embryo (ontogenesis) recapitulates the evolutionary history of the species (phylogenesis). The embryonic development of every human being would therefore go through all the stages of the genealogical tree of evolution on which it was placed at the top. BCU.

Giovan Battista della Porta, *Phytognomonica*

Rouen, 1650 (or. Naples 1588).

Faithful to his time, the Neapolitan doctor Giovan Battista della Porta conceived the world as an enormous analogical network of correspondences and sympathies between plants, animals and men. According to this system, through the grace of God, the outside aspect of plants bears the signature of their therapeutic properties. In this way, the Iris is supposed to treat the eyes, the Dandelion to relieve toothache and blood yellow Celandine to cure jaundice. BCU.

(on the wall)

Archaeopteryx

Archaeopteryx siemensis, (copy), Eichstätt, Bavaria (Germany), Late Jurassic, 150 million years old.

This specimen was acquired by the Berlin Natural History Museum in 1881 for the sum of 20,000 Gold marks that were donated by Ernst Werner von Siemens, the founder of the company with the same name. The detailed study that was carried out by Wilhelm Dames in 1884 demonstrated that this specimen was a different species from its counterpart *Archaeopteryx lithographica*. Dames therefore gave it another species name that was dedicated to his sponsor. MCG.

68 YOU MUST NAME DISCOVERIES WELL

Ephemeroptera insect

Darthus vadorus.

This mayfly was discovered by Jeff Webb and Pat McCafferty from the University of Indiana in West Lafayette (USA). This species is extremely rare and is endemic to the island of Borneo. Jeff Webb assigned it to a new genus and created a name that reminds us of the “Star Wars” series, of which he is a great fan. MCZ.

Diptera Syrphidae

Riponnensia splendens, Sardinia.

These hoverflies of the family of Syrphidae belong to a new genus that was created in 1994 by Alain Maibach, a PhD student at the Museum of Zoology, Pierre Goeldlin, the former director of the Museum of Zoology and Martin Speight from Dublin. The authors named it *Riponnensia* to remind us that “the Cantonal Museum of Zoology in Lausanne overlooks the Place de la Riponne”.

MCG, coll. P. Goeldlin.

BEAUTY

69 THE BEAUTY OF THE MULTIPLIED

(from bottom to top)

Punches for striking medals and insignia

Le Locle, Faude & Huguenin SA, 20th century.

This sample of monetary punches shows that the art of medal-making was particularly active in French-speaking Switzerland during the 20th century. Federal and cantonal shooting competitions, sports contests, congresses and various society meetings were all opportunities to hand out commemorative medals and insignia. The company that sold these coins to the Museum of Currency, which is based in Locle, still manufactures coins and medals. MMC.

Oak stilts

Concise-sous-Colachoz (Vaud), Neolithic and Bronze age.

The stilts, which are preserved in lakeside settlements, make it possible to recreate the plans of houses and villages and precisely date archaeological levels using dendrochronological dating methods. The traces of shaping of the tips, which was made by using polished stones or bronze axes, are still clearly visible. The black colour of these pieces comes from the method of treatment in a diluted polyethylene glycol bath, which little by little replaces the water for conservation. MCAH.

Polished stone axe blades

Lakeside settlements of Chevroux (Vaud), Neolithic, between 4000 and 2500 BC.

Bronze axe blades

Lakeside settlement of Corcelettes, Grandson (Vaud), Late Bronze Age, between 1050 and 800 BC.

These two series, collected between 1877 and 1881, illustrate the abundance of finds that originate from lakeside sites following the First Jura Water Correction, which, starting in 1868, lowered the level of the Three Lakes (Neuchâtel, Bienne, Morat) by more than two metres, which “dried out” several lakeside settlements and rapidly led to an intense activity of excavations. Relics from these excavations went to private collections and museums all over the world. MCAH.

70 SALT STICK

Halite crystals (rock salt) developed on a wooden pole

Saint-Nicolas mine, Varangéville, Meurthe-et-Moselle (France).

The Varangéville salt mine was deliberately flooded at the beginning of the Second World War. The water was pumped out when it was put back into operation at the end of the war, but a small part of the abandoned mine has remained in its original condition. Over the years, the salt-saturated water slowly evaporated, stimulating the growth of cubic crystals on the ground, on the walls and on objects in contact with brine. In June 2008, two staff members of the Cantonal Museum of Geology were given the exceptional opportunity of visiting this site and removing these crystals. MCG.

71 RANGE OF COLOURS

(from left to right)

Banknotes of various values and origins

19th-20th centuries.

Banknotes first appeared in China but only became widely established as a means of payment in the 19th and 20th centuries. All States have printed banknotes with varied designs and colours. More recently, banknotes denominated in local currencies have appeared to revitalize regional economies. MMC.

Animal colours

Almost all the colours of the rainbow are represented in the animal world. Ordinary scallops are sea shells that belong to the same family as St. James shells. Despite the astonishing diversity of their colouring, all these specimens belong to the same species. Among insects, metal colours ornament the shells or wings of many beetles, butterflies and wasps, making them real living jewels. MCG.

Carved and polished spheres from Swiss rocks

This part of a collection, which was created by Mr Robert Briod, the first President of the Association of Friends of the Museum of Geology, includes a total of 78 spheres. Rock fragments are first cut into cubes, then extensively sawn and polished in the shape of spheres. MCG.

Egyptian glass monetary weight of the Fatimid dynasty 10th–12th centuries.

These blue-green or brown-yellow moulded glass weights were used for checking the weight of coins in circulation, here for dinars of gold, dirhams and subdivisions of currency from different caliphs. This manufacturing method, which came from the Eastern Roman Empire, was easier and cheaper than manufacturing metal coins, which was more common in the West. MMC.

The colour of minerals

Scientific research has made it possible to identify six specific causes for the colouring of natural crystals, but only three of them are significant. Idiochromatic colouring is produced by elements that are present in large quantities, like, for example, the copper in azurite, diopside and turquoise, the chromium in kosmochlor and the manganese in heterosite and rhodochrosite. Allochromatic colouring is caused by elements that are present in small quantities or in traces in the mineral. Without impurities, such crystals are colourless, which is the case here of strengite and variscite. The colouring of metals, semi-conductors and insulation materials is much more complex and is based on the theory of bands, which is itself based on the energy of electrons in a solid; this is the case of cinnabar and sulphur. MCG.

Gambling chips from various casinos

20th century.

These small discs of plastic or metal are used in casinos all over the world and are well known to gamblers. They come from Macao, and a model for children representing Mickey Mouse shows that certain casino owners wish to make customers loyal and get them used to gambling from a very young age. MMC.

Flasks of synthetic dyes for textiles and catalogue/ colour chart

Manufactured by the *Gesellschaft für Chemische Industrie* in Basel (CIBA) in the early 20th century, these dyes were above all used for dyeing textiles. This mastery of chemical

synthesis applied to the reproduction and modification of plant or animal substances like alkaloids or hormones made Basel a worldwide centre of excellence in this field, which spread to the field of medicines. MCG.

Herbarium of algae

Used for teaching, probably dating from the early 20th century.

The species come from three main families of algae that are found at different depths: green algae on the surface, red algae at more than 100 m deep and brown algae at intermediate depths. MJBC.

72 THE SENSE OF COLOUR

Goethe's and Apple's Chromatic Circles

Goethe's theory of contrasted colours claims that there are four basic colours that are opposed to each other two by two. It is based on the balance between two poles of colours: blue is opposed to yellow and red is opposed to green. It is surprisingly based on a physiological reality, as it was discovered much later that our cerebral perception functions according to this principle.

Jean-Luc Manz (Neuchâtel, 1952)

Imbiss 2

2007, acrylic on canvas. Acquisition by the Cantonal Commission of Cultural Activities, 2010.

For this series of paintings, Manz was inspired by pictures taken from magazines. The photograph of a mosaic floor is taken as is and then cut up into six parts which will give rise to six paintings with a change of colours. The final compositions may remind us of certain paper cut-outs by Matisse and show a rare degree of freedom by the artist, compared to his normal strictly geometric shapes. MCBA.

Edouard Hosch, *God the Father*

Stained glass, iron and glass, model for the central square of the rose window of the Cathedral of Lausanne, c. 1897.

The figure of the Creator sits on a throne surrounded by flames and stands out against a blue background in the same way as the other medieval and neo-medieval stained-glass that makes up the rose window. MCAH.

73 DOMINATING THE WORLD AND THE UNIVERSE

Guillaume de L'Isle,

Pair of globes (terrestrial and celestial)

Painted plaster, 1700.

Guillaume de L'Isle (1675-1726) was a student of Jean-Dominique Cassini (1626-1712), the astronomer of King Louis XIV. For Philippe of Orleans, nephew of Louis XIV, he created a globe that was a little larger than these ones, which was installed in Louis XVI's library in Versailles and then in the Dauphin's apartment. At a time when nation states were affirming their power, mapping was a favoured tool of sovereigns for ruling the world from their palaces.

It was with these globes that future sovereigns learnt to dominate the world. BCU.

74 MANUFACTURING COLLECTIONS

(from left to right)

Bird eggs

P. Wettstein was an egg collector, mainly of local fauna. In 2003, his collection of approximately 700 eggs was bequeathed to the Museum of Zoology by his son Jean-Bruno. MCZ, Wettstein collection.

Plaster casts of coins of Philip II of Macedonia and Alexander the Great (359–323 BC)

Last quarter of the 20th century.

Casting is the most accurate way of reproducing a coin. It contributed to the development of numismatics as a science. Apart from their aesthetic appeal, the moulds are sometimes more legible than certain coins themselves. MMC.

Myxogastria

Charles Meylan (1868-1941) built up an impressive collection of Myxogastria, a group of particular organisms, that are currently linked to protists. Myxogastria, related to amoebae, do not have partitions and can move a few centimetres per hour. They feed off fungi and bacteria. Charles Meylan described more than 1,000 species that are preserved in pill boxes, which are also interesting. MJBC.

Gastropod Molluscs

The collection of “terrestrial and fluvial shells” by Jean de Charpentier (1786-1855), the former director of the Bex salt mines, was bequeathed to the Cantonal Museum of Zoology in 1855. It has 37,000 specimens, which are organized in 8 wooden cabinets each having 20 drawers. These shells are not very spectacular by their size or their colour, but they have a great value as witnesses to the great diversity of molluscs in the 18th and 19th centuries. MCZ, J. de Charpentier collection.

Polished flint axes

Copenhagen (Denmark), Neolithic, 4300–2800 BC.

These flint axes that are partially polished (on the cutting edges), which are characteristic of the Neolithic of Northern Europe, are part of the collection of Frédéric Troyon, the first curator of the MCAH. In 1844, he met Christian Jürgensen Thomsen (1788-1865), a Danish prehistorian of great renown, who was the curator of the Museum of Antiquities of Copenhagen and father of the division of prehistoric time into three ages (Stone, Bronze & Iron). During this meeting, Troyon received the axes “in exchange for a skull and a cutlass”. MCAH, Troyon collection.

Minerals of Tsar Alexander 1st

Presented by Tsar Alexander 1st to Frédéric-César de la Harpe for the Cantonal Museum and for teaching in 1820, half of this collection of more than a thousand samples was

“consumed” in two centuries during classes or practical work at the Academy and at the University of Lausanne. MCG, Alexander 1st collection.

75 BEAUTIFICATION

Beauty is undoubtedly relative, because it does not exist in itself, in the same forms, everywhere and always. Is it not always the result of an embellishment? The English word beautification is derived from the Latin “facere”, so it literally means “Making beauty”. And isn’t a museum an ultimate beautification workshop, where things that were mostly ordinary are made into works of art?

76 CRYSTAL TRAP

Jars

Conservation in alcohol is the only method for preserving certain species that cannot be prepared by taxidermy or dried out. We may react to these jars with disgust or fascination, but they have a strange power of attraction. Some of them are more than 150 years old. MJBC and MCZ.

77 BEAUTY IN PROGRESS

Rules and instructions for money-changers

Antwerp, 1633.

From Antiquity, the multiplication of coins and the intensification of trade relations led to the appearance of the profession of money-changer. Books like this 1633 volume, list and illustrate the coins that were in circulation at that time. They therefore made trade easier. MMC.

Beaten bark pustaha book

Aquilaria malaccensis and pigments

Bata people, Sumatra (Indonesia), late 19th century.

The 42-page *pustaha* book, a manuscript written in the Kawi language, which is derived from ancient Javanese, is one of the traditional symbols of the *Datu*, a “priest” or spiritual leader, a healer of the ills of Batak society. Not all the *Datu* perform the same functions and every book includes instructions about how to carry out the special rites that are specific to every *Datu*. Even if there are fewer *Datu* today, they are still an important spiritual symbol in Batak culture. MCAH.

Original plate of the painted herbarium of Rosalie Constant

Drawing on handmade paper, sketched in pencil and water colour with gouache highlights of orange lily (*Lilium bulbiferum* L.). This original plate is part of the herbarium that was painted by Rosalie de Constant and was created from nature on 9th July of a year between 1795 and 1832. MJBC.

78 THE GRACE OF BLUE, THE DIVINE HUE

Lapis-lazuli

Sar-e Sang, Koksha valley, province of Badakhshan (Afghanistan).

Blue is caused by the human visual perception of part of the electromagnetic spectrum between 466 and 490 nanometres. An object that is illuminated by white light absorbs the other wavelengths that correspond to other colours. This ornamental rock derives its name by contraction from the word lapis-lazuli, which comes from the Latin *lapis* meaning stone and the Persian *lâdjaward* meaning azure. Lapis-lazuli is a mixture of minerals: lazurite or blue hauyne, white calcite and golden pyrite. It has been known since at least 3,400 BC and the most famous extraction site is located in the heart of the Hindu Kush in Afghanistan. MCG.

Painted wooden mask

Tlingit people, North-East Pacific coast (North America), late 19th–early 20th century.

This mask is impressive because of its bright colours, especially the azure blue of the background. It undoubtedly represents a spirit and would have been worn by a shaman during ceremonies. MCAH.

Quetzal

Pharomachrus moccino, Guatemala.

This dazzling male quetzal was brought back from Guatemala by Mr Diebold in the early 20th century, together with two other individuals of the same species. This bird was considered as sacred by Pre-Colombian civilisation and considered as the “God of the air” by the Aztecs and Mayas. Today, this species is considered as almost endangered by the International Union for Conservation of Nature (IUCN). MCZ.

10 FF banknote

French Republic, 1932.

This banknote was the first 10 FF banknote that was issued by the Banque de France. Known as the “Minerva 10 FF” due to the mythological figure on the obverse, it was issued between 1926 and 1933 and then identically between 1939 and 1941. The head of Mercury was added as a watermark to the banknote. MMC.

79 MOULDED BEAUTIES

Deformed Burgundian skull

discovered in Dully (Vaud), Early Middle Ages, late 5th century AD.

Deformed Inca skull

South-East of La Paz (Bolivia), 15th century.

Huns, Incas and Mangbetu, like this woman in the photo (*on the wall*), deformed the skulls of infants. This makes the face abnormally long with a very high forehead, which was considered as a sign of beauty and reserved to an elite. This practise gradually spread from Central Asia to Western Europe, following different movements of populations in the first centuries AD. This skull of an adult woman, which was

discovered in Dully in the Canton de Vaud in 1974, dates back to the last quarter of the 5th century AD. Several similar skulls were discovered in the Lemanic arc. They are associated with the presence of Burgundians that were accompanied by Huns from Central Asia. The MCAH also has a deformed skull from Bolivia. It was found at the foot of the Mount Illimani in the Andes and was donated to the Museum in 1876. How this skull was removed is unknown, but it can be supposed that it did not take place in a scientific framework. This was often the case in the 19th century when these relics fed a market that greatly interested museums and collectors. During the 20th century, many countries started to protect their archaeological heritage by forbidding these practices. Certain communities, such as the Maoris, are demanding the return of the skulls of their ancestors. MCAH.

Wooden war club with incised decoration

French Guiana, early 19th century.

This type of hard wooden club with sharp edges is a formidable weapon. The workmanship of this specimen is of great quality, due the elegance of its shape, the refinement of its incised decoration and the fineness of the cord surrounding the handle. MCAH.

80 SOUVENIRS OF JOURNEY

Black argillite box

Haida people, Queen Charlotte Islands, North-East Pacific coast (North America), late 19th–early 20th century.

This rare object is exceptional because its Haida author is almost certainly known: Charles Edenshaw. Among the sculpted motifs on the box, one can identify animals such as a bear and a bird of prey. On the lid, the mythological representation of the creation of human beings who emerge from a shell after a flood can also be seen. MCAH.

Miniature black argillite totem

Haida people, North-East Pacific coast (North America), late 19th–early 20th century.

The beaver, the bear, the crow and other figures in the mythology of the Haida are overlaid on this mini-totem. In the 19th century, this type of object was very popular with westerners, who bought them as emblematic “souvenirs” of American Indians. MCAH.

Obsidian

Hrafninnuhrikkur, Krafla, Reykjahhd (Iceland).

This fragment of natural glass, a real aesthetic quintessence of volcanism, was collected during a trip to Iceland in 1998. MCG.

81 THE BASKET AND THE TORTOISE

Openwork earthenware basket and display stand

England, 1780–1790.

This group was manufactured in a style that is similar to the productions of the famous Baylon pottery works (Nyon or Carouge), which was very highly valued in the early 19th century. For a long time, it was considered as of Vaud origin and it was acquired for this reason, but it is really from England. It is distinguished by the finesse of its openwork construction that imitates wickerwork. MCAH.

Radiated tortoise

Atrocklys radiata.

The radiated tortoise of Madagascar is in critical danger of extinction and is still subject to trafficking today, especially in Asia. This specimen was acquired by the museum in 1928, with a female and six eggs. MCZ.

82 SYMMETRY

Bronze trefoil pin

Ollon (Vaud), Early bronze Age, c. 2000 BC.

This ornament, which was discovered in 1835 and which has rich engraved geometric decoration, is one of the rare witnesses of enormous necropoleis that were destroyed in the 19th century during the development of the vineyard on the slopes. This type of pin, of which there are only seven specimens, has only been found in the Chablais and Central Valais regions. MCAH.

Butterfly

Chrysidia madagascariensis, Madagascar.

This butterfly, which is endemic to Madagascar, is particularly spectacular with its bright metallic colours. It is certainly one of the finest butterflies in the world. It lives in primary forests where the lianas grow on which the caterpillars feed. MCZ, J. Rochat collection.

83 FOSSIL PAINTINGS

(on the wall, from left to right)

Ammonite

Lytoceras sp., Morocco.

Inside of a shell of ammonite showing the very wavy partitions that divide the different chambers. After death of the animal, these chambers are covered in small crystals of calcite like in a geode. MCG.

Ammolite

Placentoceras intercalare, Lethbridge, Alberta (Canada), Campanian, 80 million years old.

The Lethbridge deposit in Alberta is unique in the world with shells with mother-of-pearl, whose iridescence is exceptional, with very bright colours and very aesthetic textures. This very special mother-of-pearl, known as ammolite, officially obtained the status of a gemstone in 1981. MCG.

Shrimp

Aeger tipularius, Solnhofen, Bavaria (Germany), Late Jurassic, 150 million years old.

The limestone deposits of Solnhofen, which are used for lithography, have produced many exceptionally well-preserved fossils, like this primitive shrimp. The sorts of algae that supplement this elegant composition are not fossils but mineralized manganese oxides that crystallize in the shape of dendrites. MCG.

ATRIUM

OPENING UP THE RESERVES

The free and sharp eye of the photographer **Régis Golay** lifts the veil on unexpected and extremely varied worlds. Thanks to him, you are invited to explore behind the scenes of the four Museums of the Palais de Rumine, where millions of exemplars of our nature and cultures have been gathered

together, listed, classified and referenced for more than two centuries. To make this report, the four Museums have immersed themselves in their respective reserves: treasures and research materials now enrich their joint explorations.

FOUNTAIN

PAVILLON DU CIEL INFÉRIEUR

Le Pavillon du Ciel Inférieur, an installation by the artist **Christian Gonzenbach**, counterbalances the massive structure of the building. Its structure floats lightly under the glass roof, forming a computer drawing, a virtual model, a reflection of the Palais, a mise en abyme of the building, unreal and yet distorted through its severity, insignificant. Through its presence, the outline puts into question all these majestic constructions, these stones, these palaces, whose outline it reproduces while reversing the codes of constructive logic. This pavilion is designed according to a

traditional symmetrical plan with abscissa and ordinate, it is not only a drawing in a vacuum, demarcating an elusive space. Inverted, it curves according to gravity, contrary to its models that are built to rise up. It is a temple, a palace, a greenhouse, a termite mound, a cathedral, an observatory, a nuclear power station. You discover its structure, first from below just like a stalagmite in a cave. Your gaze crosses the work, gets lost in the celestial web and finally is caught by the ropes. It is good to have ropes when you have to climb a cliff.

OUTSIDE SOUTH

GARDEN OF THE WORLD

Together with the Cosmos exhibition that is presented in the Palais de Rumine, *The Garden of the world*, in collaboration with the Cantonal Botanical Museum and Gardens and the City of Lausanne, invites you to discover a history of time through botany and evolution in the plant world. Modest or spectacular, popular or regal, weed-covered or well-ordered, why do gardens make us feel so good? Whether

you are tending to your carrots or gathering varieties of plants from distant lands, why are these plots of land so conducive for recharging your batteries? Perhaps because they are small worlds on a human scale that put us in touch with somewhere else, which we need to escape to from our daily tribulations.

COSMOS

A joint exhibition by the Palais de Rumine science and history Museums (geology/zoology/currency/archaeology and history), in partnership with the Botanical Museum and Gardens, the Fine Art Museum and the University of Lausanne.

We warmly thank everyone who participated in making this exhibition a success

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Gilles Borel, Daniel Cocchi, Anne Geiser, Julia Genechesi, Francesco Panese, Lionel Pernet, Giorgio Pesce, Michel Sartori

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Actoform SA, Ateliers du Colonel, Cauderay Electricité, L'illustre Atelier, Lumière Électrique, MakroArt, Pierre Martin SA, Pont Sarl, Schneider SA

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- MMC** Cantonal Museum of Currency
- MCZ** Cantonal Museum of Zoology
- MCG** Cantonal Museum of Geology
- MJBC** Cantonal Museum and Botanical Gardens
- MCBA** Cantonal Museum of Fine Art
- BCU** Cantonal and University Library
- BIHM** Library of the Institute of Humanities of Medicine, CHUV-UNIL

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