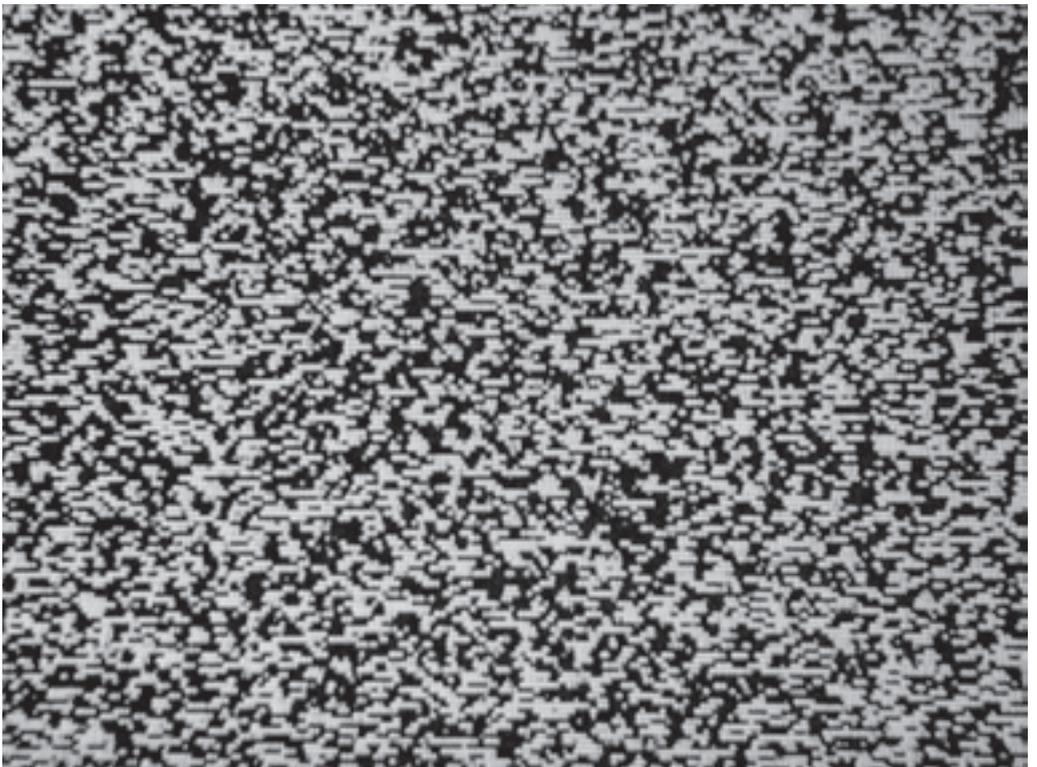


Alex Plademunt
Matter

Sala Canal de Isabel II
Santa Engracia, 125 Madrid
12 May to 24 July 2022

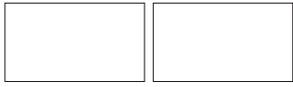
1



Derived from mater, the Latin word for mother, matter refers to the substance from which all things are made. In English, the word *matter* can also indicate importance or significance – something to be concerned about. The *Matter* project analyses the age old question of existence; it pursues our origin.

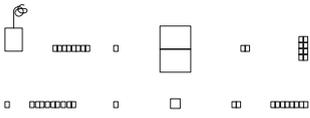
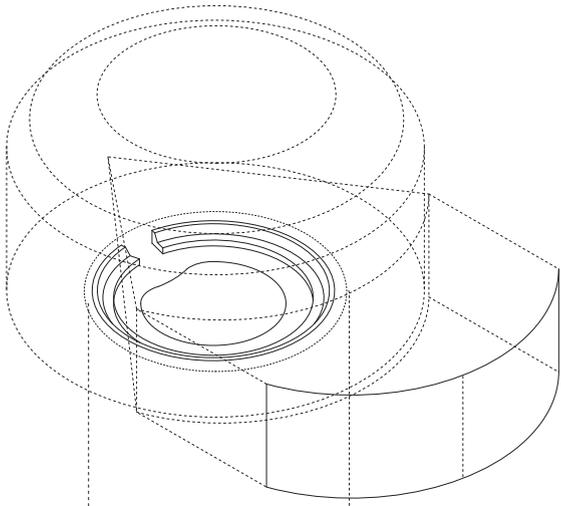
Matter is composed of tiny indivisible particles, inert in themselves, without motion, unable to reproduce. But it leads to life. The Big Bang's radical expansion created everything. During its life cycle, an organism undergoes many changes – it grows, learns, evolves and dies – but matter always remains. Matter is a constant. It was there from the beginning and it will remain long into the future.

Humans emerged from one of the most recent evolutionary alignments in space and time. We have endeavoured to dominate and transform matter: augmenting it in impossible compounds; generating artificial constructions in both the laboratory and everyday environments; interpreting it through increasingly abstract means. Complexity governs evolution, to the point of forgetting that evolution has been possible thanks to the precise imitation of the original processes.



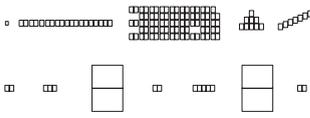
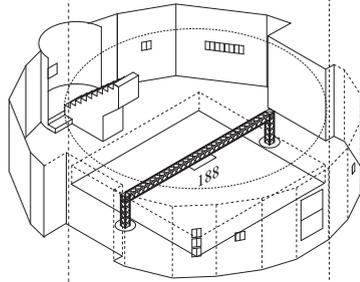
4th floor

Film
Un árbol es un árbol



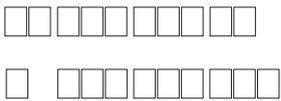
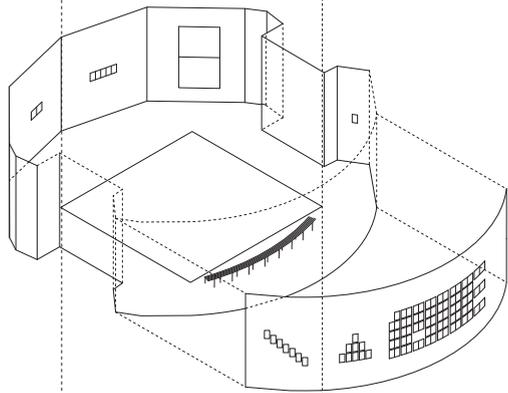
3rd floor

Photographs 151 → 188



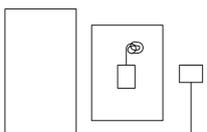
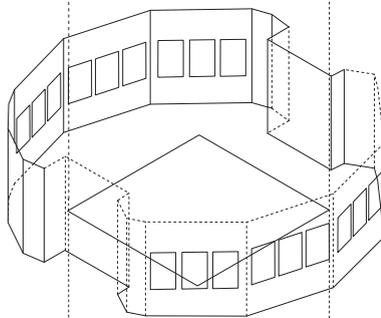
2nd floor

Photographs 26 → 150



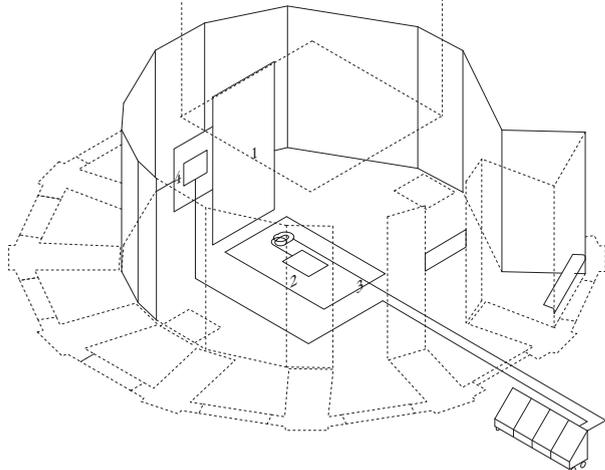
1st floor

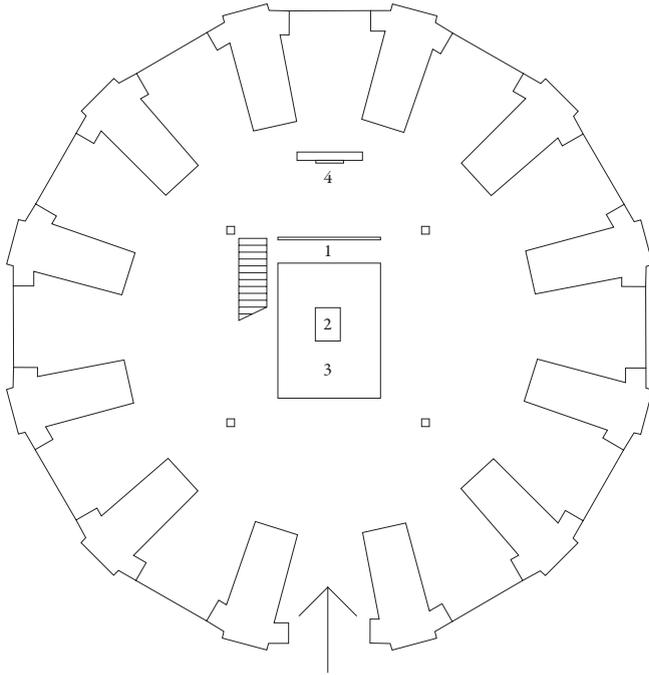
Photographs 5 → 25



Ground floor

Photographs 1 → 4





1 Electromagnetic radiation is a combination of oscillating electric and magnetic fields that propagate through space, carrying energy from one place to another.

It is estimated that 1% of interference in cathode-ray tube televisions comes from cosmic (or microwave) background radiation from the Big Bang, which took place around 13.8 billion years ago.

2 Photograph of earth from 6 billion kilometres away, taken in 1990 by the Voyager 1 space probe. This is the most distant image of the earth in existence.

3 Fragment of a stone *tzompantli* sculpture. Mexica culture, Mexico (AD 1345–1521). The *tzompantli* is a structure with long wooden crossbeams on which the severed heads of sacrificed captives were impaled to honour the gods and terrify enemies. It can be found in many Mesoamerican cities. This example is a representation of a real *tzompantli*, and it also references sacrifice.

4 Sunset. Hostalric, 31 December 2020.

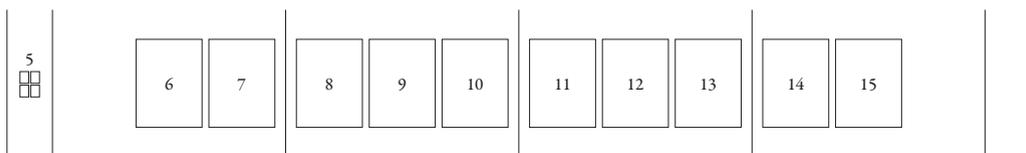
Modern physics describes the photon as the elementary particle responsible for the quantum manifestations of electromagnetic phenomena. It is the carrier particle of all forms electromagnetic radiation → 1, including visible light.

A photon is formed in the core of the sun, takes ten million years to reach its surface, and travels 150 million kilometres in 8 minutes and 20 seconds to reach the earth's surface.

Sunlight is the propagation of a disturbance composed of photons that transmits energy but not matter and can propagate in a vacuum. When light travels it acts as a wave, but when it is absorbed by objects it acts as a particle. Sunlight is composed of all wavelengths, although only a part of it can be seen by our eyes. When it is the sum of all visible colours it is seen as white. When it travels through solids and fluids whose molecules are smaller than the wavelength of the photons, it is absorbed and scattered in all directions due to the electrical polarisation of the particles.

Upon reaching the atmosphere, the short-wavelength blue and violet light dissipates more than the long-wavelength yellow and red light. That is why we see a bluish sky in all directions. When light passes through a cloud composed of water vapour molecules that are larger than the wavelength of visible light it is not dissipated and appears white. At sunset, when the sun is close to the horizon and light passes through a much thicker atmosphere, the shorter wavelength (blue) rays dissipate almost 90% of the light before it reaches our eyes, and the remaining 10% of undissipated light is mainly of longer wavelength (orange and red). Aerosols, dust, and airborne pollutants reflect and dissipate more of the red

radiation, and the red hues of sunset are more intense.



5

Mother.

6

Dome of the Pantheon, Rome, Italy. The word *pantheon* comes from the Greek *pántheon* (Πάνθειον), meaning ‘temple of all the gods’. The Pantheon in Rome was completed in 126 AD and is dedicated to the gods of the planets. The hemispherical dome simulates the celestial sphere and has a central opening nine metres in diameter that allows the sunlight to pass through. The five levels of coffered ceilings that help support the weight of the dome represent the five concentric spheres of the ancient planetary system: Mercury, Mars, Jupiter, Saturn and Venus. It is the largest unreinforced concrete dome in the world and is now a church dedicated to Christian worship.

7

Placenta.

8

Compact Muon Solenoid (CMS). Particle detector built at the Large Hadron Collider (LHC). European Organisation for Nuclear Research (CERN), Geneva, Switzerland.

9

Old Tjikko is a Norway spruce (*Picea abies*) located in Fulufjället National Park, Dalarna Province, Sweden. Radiocarbon dating has established its age at 9,560 years. It could be the oldest living spruce in the world, appearing during the first millennia after the last ice age.

It is a clonal organism, connecting multiple trees through a common root system. It perpetuates itself clonally by layering, so that it continually regenerates each trunk, which is rarely more than 400 or 600 years old.

Due to the extreme conditions of its environment, Old Tjikko existed in bush form for thousands of years. During the 20th century, however, global warming has enabled it to grow as a tree. Its trunk repeatedly dies and grows back, but the roots remain intact and new branches sprout from them.

10

Code of Hammurabi.

Department of Near Eastern and Mesopotamian Antiquities, Louvre, Paris, France. Basalt stele erected by King Hammurabi of Babylon (1792–1750 BC), probably in Sippar, city of Shamash, solar deity and god of justice. The Code of Hammurabi (𒂗𒍪𒌆𒍪𒌆𒍪𒌆) is the most important legal compendium of the Ancient Near East, and the predecessor of biblical law. It is written in Akkadian, in cuneiform script, and is a valuable source of information on the society, religion, economy, and history of this period.

11

Colossal 150-cm hand of the bronze statue of Emperor Constantine, made around 337 AD. Musei Capitolini, Rome, Italy. Constantine I (272–337 AD), emperor from 306 until his death, built a new imperial residence at Byzantium and renamed the city Constantinople (present-day Istanbul), making it the new capital of the Roman Empire. After two imperial ordinances (the Edict of Galerius in 311 and the Treaty of Milan in 313), he became the first Roman emperor to authorise Christian worship.

12

Agonale Obelisk (17.60 m). Carved between 81 and 96 AD in the quarries of Aswan, Egypt by order of Emperor Domitian and transported to Rome to be erected in front of the Temple of Isis. It was installed in Piazza Navona in 1651.

The word ‘obelisk’ comes from the Greek word *obelós* (ὀβελός), meaning ‘needle’ or ‘rod’. In Ancient Egypt it was called *tejen* (𓏏𓏏), the etymology of which is unknown. The obelisk’s function was neither unique nor defined. Its origin is connected to the solar cult of the god Re in the Temple of Heliopolis (*Iunu*, 𓆎𓅓, in Egyptian) during the Old Kingdom (2686–2181 BC), although obelisks as we know them today are specific to the New Kingdom (1550–1070 BC). They linked the pharaohs to Re, were associated with the material representation of the sun’s rays

falling on the earth, and with the cult of the sacred stones on which the rays fell each daybreak. Re was considered god of the rising sun, of power, and of wisdom.

Obelisks are tall, thick monolithic pillars made of a single block of stone (usually red granite), with four slightly converging trapezoidal sides, topped by a small pyramid or pyramidion, covered with gold or with a gold-silver alloy to reflect light. The sides of the obelisks bear inscriptions that provide the name and titles of the pharaoh who had them built, information about the god he worshipped, as well as events connected with the pharaoh’s reign. The earliest known obelisk was found in the solar temple of Pharaoh Niuserre (2453–2422 BC) in Abu Gurab.

Many of the obelisks were plundered, moved and repurposed by Roman emperors. In this way, the original symbolism and significance of the monoliths underwent a slow process of transformation. After the collapse of the Roman Empire, many of the obelisks fell and were buried. After the Middle Ages, the pontiffs of Rome recovered and raised the obelisks once more. Today, Rome has the largest number of obelisks in the world. Eight of them come from Ancient Egypt, while another five were built in Ancient Rome. Obelisks are no longer elements of worship to Egypt’s ancestral divinities, but rather aesthetic monuments that form part of the design of cities around the world.

Source: Beatriz Navarro, ‘El obelisco egipcio. Origen, técnica, expolio e influencias posteriores’, *Historia del Antiguo Egipto*, Máster del Mediterráneo Antiguo, UOC.

13

1:1 scale reproduction of the Columbus Laboratory of the International Space Station. European Space Agency (ESA), Noordwijk, the Netherlands. The module was sent into space in 2008. It measures 1.4 m in external diameter and 6.8 m in length. Columbus orbits the earth once every 90 minutes, 16 times a day, at an average altitude of about 340 km.

14

Ponce Monolith. 1580 BC–900 AD. Monument

16

17

18

19

20

21

22

23

24

25

located inside the Temple of Kalasasaya, Tiwanaku, Bolivia.

15
General audience with Pope Francis. Vatican City. 5 February 2020.

16
1,750,000 euros on a workbench, ready for counting and packaging.

17
Hands prepared for forensic study.

18
Coltan is a metallic mineral composed of columbite and tantalite, and is relatively rare in nature. Due to its recent technological applications, it has become a strategic material and a cause of geopolitical conflict. It is mainly used for the manufacture of capacitors for electronic devices. The Democratic Republic of the Congo (DRC) is estimated to have 80% of the world's coltan reserves, although currently only 10% is being exploited. Mining extraction projects remain active in the country and have plunged it into situations of social conflict, human rights violations, deforestation and economic and business abuses, in addition to a continuous civil war that has lasted over fifteen years and has claimed over five million victims.

In 2001, Japanese multinational corporation Sony is forced to delay the launch of its PlayStation®2 by 6 months, due to internal conflicts in the DRC and the consequent impossibility of exporting coltan. The setback generates millions in losses for the company. Not long after, the PS2 becomes the best-selling video game console in history.

19
Leopold II (1835–1909), the second Belgian king, reigns from 1865 to his death. During the Berlin Conference (1884–1885), the European nations agree on the division of Africa. Leopold II is appointed owner of the Congo Free State under agreement to improve the lives of the territory's natives. The result is 75 years of exploitation of natural resources worth an estimated 1 billion euros, the use of the local pop-

ulation as forced labour, slavery, large-scale atrocities, and the first and most extensive contemporary genocide, leading to the death of approximately ten million Congolese people.

The Democratic Republic of the Congo is declared on 30 June 1960. Patrice Lumumba becomes the country's first legally and democratically elected prime minister, and Joseph Kasavubu its first president.

Due to its vast area and richness of natural resources, the Democratic Republic of the Congo has a great geopolitical value. Lumumba strives for effective control of all the country's resources in order to improve the living conditions of its people. With the outset of the second phase of the Cold War, the United States and its Western allies fear Africa's complete control of strategic raw materials and that these might eventually fall into the hands of their Soviet enemies. Patrice Lumumba is perceived as a threat to Western interests. To oppose him, the United States and Belgium use every method and resource available, including the United Nations Secretariat, in order to buy the support of Patrice Lumumba's Congolese rivals.

On 14 September 1960, General Mobutu takes control over the country through a coup orchestrated by the CIA and holds Lumumba under house arrest. On 17 January 1961, six months and a half after being appointed prime minister, Lumumba is assassinated near Élisabethville, High Katanga, at the age of 35. In 1965, Mobutu seizes power from President Kasavubu and proclaims himself president. He will remain in that position until 1997.

Photograph taken on 17 July 2019 in Patrice Lumumba Square in Brussels, Belgium, inaugurated on 30 June of the same year.

20
Belgian military.

21
Hydra. Robot developed by Professor Yoshihiko Nakamura (中村仁彦) at the Department of Science and Technology, University of Tokyo, Japan.

22
Hydra. A cnidarian polyp of the family Hydridae. It mainly inhabits rivers, streams, marshes and clear water lakes. It is 2 to 3 mm long and is a predator. The *hydra* supports a unique system for dissecting the multiple regulation and functions of cell death in an adult organism. Studies conclude that *hydra* cells do not age or show deterioration over time. Under ideal conditions it is believed that they could live forever.

23
Otonaroid. Robot created by the studio of Professor Hiroshi Ishiguro.

24
Barcelona, Catalonia. 2020.

25
Skull of an adult female found in a Bronze Age megalithic tomb (2000–1800 BC) at Cape Trafalgar, Cadiz, Spain. The excavation was carried out in May 2021 by an archaeological team composed of Eduardo Vijande and Darío Bernal from Universidad de Cádiz (UCA).

26	27		30	31	32	35	36	37	38			42
		28	29			33	34		39		40	41

26

Dome of the Pantheon → 6, Rome, Italy.

27

Sun. Photograph taken with a telescope.

28

Aluminosilicate residue derived from the Old Tjikko → 9 sample preparation process. Electron microscopic visualization at a magnification of 2 μm.

29

Volcanic landscape. Antofagasta de la Sierra, Catamarca, Argentina.

30

Fulufjället National Park → 9, Sweden.

31

Landscape formed on 23 January 1973 by the eruption of the Eldfell ('Fire Mountain') volcano, Vestmannaeyjar, Iceland.

32

Gerlachovský štít, Slovakia. At 2,655 m a.s.l., it is the highest peak in the Tatra Mountains (Tatry).

33

Anthropomorphic mythical being with a feline mask, painted on a ceremonial drum. Nasca culture, Peru (200 BC–650 AD). The mask is an attribute of immortal ancestors in funerary contexts. The drum illustrates the essential principles of the Nasca worldview. Supernatural beings appear in a scene of human capture and sacrifice. Temporary exhibition *Nasca. Buscando huellas en el desierto* (February–May 2019) at the Fundación Telefónica, Madrid, Spain.

34

Mount Eboshidake (烏帽子岳) inside the super volcano Aso San (阿蘇山), Aso Kuju National Park, Kumamoto Prefecture, Japan. Aso San reaches a height of 1,592 m a.s.l., and its volcanic crater is 120 km in circumference. The magma chamber of super volcanoes is a thousand times larger than that of conventional volcanoes.

35-36

Volcanic landscape. Antofagasta de la Sierra, Catamarca, Argentina.

37

Ceramic bottle. Chimú culture, northern coast of Peru (1300 BC–1532 AD). Museo de Arte Precolombino, Cusco, Peru.

38

Aerial view of the Province of Seville, Spain.

39

Hellisheiði geothermal power plant, Iceland. Its CarbFix research project converts CO₂ emissions into stone.

40

Vero cell observed under an electron microscope. The Vero cell culture belongs to a cell lineage isolated from the epithelial cells of a kidney of a green cercopithecine primate (*Chlorocebus aethiops*) from sub-Saharan Africa. This lineage was developed in 1962 by Yasumura and Kawakita at Chiba University, Japan. Since then, the cells have been extensively employed in viral replication studies and plaque assays all over the world.

41

Volcanic landscape. Iceland.

42

Montsechia vidalii. The oldest known fossilised flower in the world, dating from about 130 million years ago. *Montsechia* are aquatic angiosperms that lived and reproduced in freshwater lakes during the Lower Cretaceous.

43	44	45	46	47	48	49	50	51	54	55	58	59				
	60	61	62	65	66				56	57						
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84	85	86	87	88	89	90	91	92	93	94						
84	95	97									104	105	106			
	96		98	99	100	101	102	103								
107	108	109	110	111												
							112	113	114	115	116	117	118			

43
Holmen TRND paper, 80
gramos.

44
Fulufjället National Park → 9,
Sweden.

45
Sweden.

46
Image of an organic sample
from Old Tjikko → 9. Electron
microscope visualization at a
magnification of 1.5 mm.
Laboratory of the Institut
Català de Nanociència i
Nanotecnologia (ICN2), UAB,
Bellaterra, Catalonia.

47
River. Fulufjället National
Park → 9, Sweden.

48
Fulufjället National Park → 9,
Sweden.

49
Scene from the painted garden
of Villa Livia. 40–20 BC. Palazzo
Massimo alle Terme, Rome, Italy.
Livia Drusila (58 BC–29 AD)
was wife of Tiberius Claudius
Nero (praetor between 42 and
39 BC), and later of Emperor
Augustus (39 BC–14 AD).

50-57
Old Tjikko → 9. 2021.

58
Esc Scene from the painted
garden of Villa Livia → 49.

59
Old Tjikko → 9. 2021.

60
Marble, Pantheon → 6, Rome, Italy.

61
Obelisco della Minerva (5.47 m).
Erected between 770 and 589
BC by order of the pharaoh
Apries in the sanctuary of Atum,
Sais, Egypt. The circumstances
of its displacement to Rome are
unknown. It was rediscovered in

1655 and erected in Piazza della
Minerva in 1667.

62
Obelisco Matteiano (2.68 m).
Carved between 1279 and
1213 BC by order of Ramses
II and erected in the Temple
of Re, Heliopolis, Egypt. It was
rediscovered in Rome in the
13th century AD and installed in
Boschetto delle Muse in 1817.

63
Obelisco Flaminio (23.30 m).
Erected between 1279 and
1213 BC by order of Ramses II in
the Temple of Re in Heliopolis,
Egypt. In 10 BC, after his
conquest of the country, Emperor
Augustus ordered the obelisk to
be moved to the Circus Maximus
in Rome. In 1587 it was placed in
Piazza del Popolo in accordance
with a design by Domenico
Fontana.

64
Obelisco Dogali (9.25 m).
Erected in around 1300 BC
by order of Pharaoh Ramses
II in the Temple of Re,
Heliopolis, Egypt. It was found
buried beneath the Biblioteca
Casanatense in 1719 AD. In
1887 it was erected in Piazza dei
Cinquecento, and in 1924 it was
relocated to Via delle Terme di
Diocleziano.

65
Obelisco Lateranense (32.18 m).
Carved in 1450 BC in the quar-
ries of Aswan by order of Pharaoh
Thutmose III and erected in the
Temple of Amun-Re in Karnak,
Egypt. In 357 AD, Emperor
Constantine II ordered it to
be installed in Rome. It was
rediscovered in 1587, and erected
in 1588 near the Basilica of San
Giovanni in Laterano, becoming
the last Egyptian obelisk to be
erected in the city.

66
Obelisco di Montecitorio
(21.79 m). Built between 595
and 589 BC by order of Pharaoh
Psamtik II and discovered in

Heliopolis, Egypt. In around
30 BC, Emperor Augustus
ordered for it to be moved to
Rome and placed in the Campus
Martius. It was relocated to
Piazza di Monte Citorio in 1792.

67
Obelisco Flaminio (13.91 m).
Carved in the 3rd century BC
in the quarries of Aswan, and
erected by order of Pharaoh
Seti I in front of the Temple of
Re in Heliopolis, Egypt. In 10
BC, Augustus ordered for it to
be moved to Rome. In 1798 it
was placed in front of the Church
of Trinità dei Monti.

68
Obelisco Macuteo (6.34 m).
Constructed in the 13th century
BC by order of Pharaoh
Ramses II in the Temple of Re
in Heliopolis, Egypt. In 1374 it
was rediscovered and relocated
in front of the Pantheon.

69
Museo della Civiltà Romana.

70
Tiber River as it flows through
Rome, Italy. The river originates
in the Apennines and empties
into the Mediterranean Sea
at Ostia, 405 km later. The
founding of Rome (753 BC)
is connected to the river, which
has been used for centuries to
transport materials and goods
to the sea.

71
Catacombs of Domitilla, Rome,
Italy. Underground burial place
for the ancient Romans. The
earliest tombs are estimated
to date from 250 AD. The
catacombs of Domitilla consist of
a 17 km network of underground
galleries, excavated on four levels.

72
Foro Italico, inaugurated in 1932
as Foro Mussolini. Sports com-
plex located at the base of Monte
Mario in Roma, inspired in the
Roman Forum. Benito Mussolini
(1883–1945) was President of

43	44	45	46	47	48	49	50	51	54	55	58	59				
	60	61	62	65	66		52	53	56	57						
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84	95	97									104	105	106			
	96		98	99	100	101	102	103								
107	108	109	110	111					113	114	115	116				
						112							117	118		

the Italian Council of Royal Ministers from 1922 to 1943 and Duce (Latin Dux) of the Italian Social Republic from 1943 until his execution. He led the National Fascist Party to power and ruled a totalitarian regime during World War II, with imperialist ambitions in Europe and Africa.

73
Foro Itálico → 72.

74
Palazzo della Civiltà Italiana. Inaugurated in 1940. Benito Mussolini commissioned Ernesto Lapadula, Giovanni Guerrini and Mario Romano to design the building as a symbol of the (frustrated) Universal Exhibition of Rome, 1942. After the first Rome (Imperial Rome), and the second Rome (the city of the popes), came the third iteration of the city (fascist Rome). This required the designing of a new capital. With a surface area of around 400 hectares on the southern outskirts of the city, this new palace was designed to be an extension of the city, connected to both the historic city and – by Via Cristoforo Colombo – to the sea. A block with a floor space of 51 × 51 m and a height of 68 m stands on a large podium with ceremonial steps. Aerial volume has a repetitive façade system on all four sides, with a series of perimeter galleries and 216 identical false semi-circular arches which connect to the Flavian amphitheatre (Colosseum → 77). Due to its monumentalism, symbolically-charged design and ideological spirit, it is considered one of the most representative buildings of Italian fascism.

Source: Fernando Moral-André, 'The definition of the urban and global icon. Public-private strategies for the regeneration of the Museum "Palazzo della Civiltà Italiana"', *R.A. Revista de Arquitectura*, no. 21, 2019.

75
Agonale Obelisk → 12.

76
76. Statue of Triton. 1 BC. Museo Archeologico Nazionale di Napoli,

Italy. Found in 1964 in the Grotta Azzurra, Capri, Italy.

77
Colosseum, Rome, Italy. 1st c. BC. Amphitheatre with a seating capacity of 65,000, built on the Campus Martius. Between 80 and 435 AD, public spectacles, gladiatorial games, naumachias, plays, executions, and the hunting of animals – mostly from Africa – all took place here. It is estimated that at least 500,000 people and a million animals were killed for the public's entertainment.

78
Colosseum, Rome → 77.

79
Right hand of the colossal statue of Constantine. 324 AD. Musei Capitolini, Rome, Italy. The marble hand measures 166 cm and was housed in the Basilica of Maxentius in Rome.

80
Golden monstrance. At the end of the 15th century, Queen Isabella commissioned Jaume Aimeric to hand carve a Gothic monstrance using 17 kg of the first gold brought from the Americas by Christopher Columbus. The monstrance, known as 'La Gran Ostensoria de Toledo', forms part of La Custodia de Enrique de Arfe and is housed at Toledo Cathedral, Spain.

81
Obelisco Vaticano (25.31 m). Thought to have been built during the Fifth Dynasty of Ancient Egypt. It was rediscovered in 30 BC in the Forum Julium in Alexandria, Egypt. Between 37 and 41 AD, Emperor Caligula ordered for it to be moved and erected in the Circus Gai in Rome. During Nero's rule, the circus became the setting for the execution of Christians and, according to Tacitus, of the martyrdom of Saint Peter. In 1586, under the pontificate of Pope Sixtus V, the obelisk was

relocated to Vatican Square. It is the first obelisk erected in the modern age and the only one not to have fallen since the times of Ancient Rome.

82
Santa Maria la Maggiore, Rome, Italy. Built in the 5th century on the site of the Temple of Cybele. At the end of the 15th century, Giuliano da Sangallo ordered the construction of the gilded ceiling with the first gold brought back from the Americas, as a gift from Charles I of Spain to Pope Alexander VI (pontiff from 1492 to 1503).

83
Red solution of gold nanoparticles. The colour exhibited by gold nanoparticles suspended in transparent media differs completely from that observed for gold at the scale of human perception. Gold particles in a colloidal system exhibit dimensions below the wavelength of the visible light spectrum. In this situation, the particle behaves like an optical resonator, which, depending on its size, composition and shape, allows the metal's free electrons to enter into collective resonance for a certain wavelength interval of the incident light. This interval is absorbed by the particle. In the simple case where the colloidal particles absorb in only one region of the visible spectrum, the colour of the colloid corresponds to the composition of all wavelengths of light transmitted through the particles. This colour is referred to as the 'complement of the absorbed colour'. So when a colloidal solution of nanoparticles absorbs the green and blue colours of white light, for example, the colour of the solution is red.

Source: Edgar E. González and Víctor F. Puentes (Inorganic Nanoparticles Group), 'Artesanía del color con oro coloidal', Institut Català de Nanociència i Nanotecnologia

84
In 1966, in preparation for the Mexico 1968 Olympic Games, the co-founders of Blue

Ribbon Sports (now Nike), Bill Bowerman and Phil Knight, designed and marketed the Aztec model of trainers in conjunction with Japanese brand Onitsuka Tiger (now ASICS) to compete with Adidas, the most successful sports-shoe brand at the time. However, Adidas launched a model with the name Azteca Gold, also in honour of the Mexican Olympics. Onitsuka Tiger and Blue Ribbon Sports, taking inspiration from Hernán Cortés → 85 – the Spanish conquistador who caused the downfall of the Aztec Empire – responded by changing the name of their model to Cortez. The Cortez immediately became the companies' best-selling trainer. The rise of gangster rap in Los Angeles resulted in the proliferation of the Cortez in the (mainly Latino) street culture, in which different gangs were associated with specific colours of trainers. Over the next fifty years, the Cortez became enshrined among the brand's most iconic models and retains its place in Nike lore as 'the most comfortable shoe ever'.

85
Tejo de oro (gold ingot). 1.93 kg, 26.2 cm × 5.4 cm.

At midnight on 30 June 1520, after the assassination of Moctezuma II and the days of fighting that followed, Hernán Cortés and his soldiers tried to flee from Tenochtitlan with the gold they had taken from Moctezuma's treasury and melted down. However, as they tried to make their escape, they were ambushed by the Mexicas. It is said that only the soldiers who dropped the jewels and gold were able to get away. 600 Spaniards, as well as 900 of their Tlaxcaltecan allies, were drowned in the city's canals due to the weight of the gold bars and armour. The episode is known as *La Noche Triste* ('The Night of Sorrows'). In 1981, during excavations carried out in an ancient canal in Tenochtitlan, a gold disc was found between Calle Soto and Plaza Santa Veracruz in

present-day Mexico City. In 2020, scientists and archaeologists confirmed that the object had formed part of Moctezuma's treasure, lost during the battle of *La Noche Triste*.

Photograph taken at the temporary exhibition *Golden Kingdoms. Luxury and Legacy in the Ancient Americas* in the Getty Museum, Los Angeles, California, USA.

86
Mexico City, Mexico.

87
Cargo ship MSC. Salvador de Bahía, Brazil.

88
Atlantic Ocean. Gran Canaria.

89
São Paulo, Brasil.

90
Potosí, Bolivia.

91
Cerro Rico de Potosí, Bolivia. Mountain with an altitude of 4,800m. In 1544, the mountain was found to contain a large amount of silver, and Potosí soon became the economic capital of the viceroyalty of Peru. In 1570, Francisco de Toledo, viceroy of Peru, established the *mita*, a kind of tribute to be paid to the state by the indigenous people of the whole region. In order to make the payment they had to travel annually to Potosí to work in the mines. Between 1545 and 1825, the Spanish extracted 35,578 tonnes of fine silver from Cerro Rico, subjecting the population to miserable, slave-like conditions. Today the mountain is exploited by local cooperatives and foreign companies in more than 560 mines. Geologists estimate that the mountain still contains 47,824 tonnes of fine silver: more than has been extracted so far. Each year, dozens of unprotected minors and mine workers die during long working days in the mines.

92
Detail of The Great Pyramid of Cholula, Puebla, Mexico.

93
Mural in the Central Library of the National Autonomous University of Mexico (UNAM), inaugurated in 1956 and designed by Mexican artist and architect Juan O'Gorman. The mural is titled *Representación histórica de la cultura* ('Historical Representation of Culture'). O'Gorman collected coloured stones from a variety of Mexican localities to introduce symbolic elements, hidden messages and codes representing the duality of the country. On the four sides of the building he confronts the pre-Hispanic past, the colonial past, the contemporary world, and the university itself.

On the northern wall, O'Gorman took inspiration from a number of codices to interpret many of the myths and dual cosmogonies of the Nahua peoples. Highlights include (to the left of the central axis) deities and scenes associated with fertility and the creative forces of life; the sun, framed by Quetzalcóatl in the form of a serpent, benefactor of mankind; Tláloc → 87, water deity, with a mat behind him; Huitzilopochtli → 87, god of war and the power of the sun, with a hummingbird headdress; Tlazoltéotl, goddess of the earth and childbirth, mistress of sex, depicted in the Aztec posture for giving birth; and next to her, inside a temple, Tecciztécatl, god of fertility.

In the centre, Tonatiuh and, once again, Tláloc, are shown as the primordial sources of the life cycle. The god of water gives balance to the distribution of symbols, and there is also a sacrificial stone. It contains twenty glyphs linked to the most important ritual calendar of the Mexica. The base of this section is the image of the foundation of Tenochtitlan and its main lake channels, over which a golden eagle perches on a prickly pear cactus.

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							52	53	56	57				
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84	85	86	87	88	89	90	91		92	93		94		
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107	108	109	110	111										
						112	113	114	115	116		117	118	

On the right, the world of mystery, night, and death is represented. Framed by Quetzalcóatl is the symbol of the moon with a rabbit in its centre; there are stylised images of Chalchiuhtlicue, goddess of water, and – in front of her – her son Tecciztécatl, who is consumed by fire to give life to the moon; also present is Tezcatlipoca, god of the night sky, the moon and stars, accompanied by a skull; and in the middle, Mictlantecuhtli, god of the underworld, and Ehécatl, the invisible and impalpable invocation of Quetzalcóatl, are represented.

In the lower section is a huge frieze; on one side the sacred meaning of war is emphasised, while on the other, priests and warriors parade by, demonstrating piety and a mythical vocation for the so-called *guerras floridas* (flower wars), or Xochiyáoyotl.

Source: Luis Roberto Torres Escalona, 'La dialéctica histórica de Juan O'Gorman en el mural de la Biblioteca Central', *Biblioteca Central. Libros, muros y murales. 50º aniversario UNAM*, 2006.

94
Cadillac Eldorado Northstar. Mexico City. To celebrate the company's 50th anniversary, Cadillac produced 532 units of a new model called Eldorado. 5.61 m long, with a wheelbase of 3.20 m, its engine was a 5.4-litre V8 block, producing 210 CV at 4150 rpm. It was manufactured until 2002.

95
Sculpture of Francisco Pizarro in the gardens of the Colegio Mayor Hernando Colón, Seville. Made to guard the entrance to the Pabellón de Castilla la Nueva during the Ibero-American Exposition of 1929. The motivation of the exhibition was to foster relationships between Spain, Latina America, the United States, Portugal and Brazil. The Protectorate of Morocco and Spanish Guinea were also present.

Francisco Pizarro González, an austere man with business and military training, was born in Trujillo, Extremadura,

Spain, in 1478. Though illiterate, he was said to be intelligent. He was distantly related to Hernán Cortés → 85, and some of his notable ancestors included El Cid, the Visigoth kings and Guifré el Pilós (Wilfred the Hairy).

He founded the city of Panama with Diego de Almagro and Hernando de Luque. In 1532, they reached the northern coast of Peru. They set about conquering Tahuantinsuyo, the Inca name for the four regions that made up their vast empire. Atahualpa had just been crowned Sapa Inca ('Sovereign Emperor') after winning a war to dethrone his brother Huáscar. Already informed of the arrival of the Spanish in the south, he went to meet them. He arranged to meet Pizarro in the Plaza Mayor de Cajamarca, where the Spanish ambushed and captured him. Atahualpa offered Pizarro his sister Quispe Sisa and said he would fill a whole room – *El Cuarto del Rescate* (the Ransom Room) – twice with silver and once with gold (84 tonnes of gold and 164 of silver according to current estimates) in exchange for his freedom, probably the highest ransom in history. Pizarro accepted, but Atahualpa was executed after a mock trial. The next day, Inca storehouses were looted. Pizarro and Quispe Sisa, baptized as Inés Huaylas Yupanqui, went on to have two children: Francisca and Gonzalo Pizarro.

Pizarro took possession of Cuzco, capital of the Inca Empire, in 1533, with the help of the Cuzco clans who had supported Huáscar. In 1535, he founded La Ciudad de los Reyes (The City of Kings), now Lima, capital of the Viceroyalty of Peru, and received the title of Grand Marquis of the Conquest from the Spanish Crown. In 1538, Francisco's brother Hernando Pizarro captured and executed Diego de Almagro after the latter's attempt to retake Cuzco. The 'Almagristas', led by Diego de Almagro's son, Diego de Almagro el Mozo, took their revenge three years later, killing Francisco Pizarro in his

residence in Lima. Today, his remains lie in a chapel in the Cathedral of Lima.

96
Voyage on the Guadalquivir River.

97
Monument to Columbus. Madrid, Spain.

98
Intersection of Via Cristoforo Colombo and Via Costantino, Rome, Italy.

99
Paso de Cortés. Nealtican, Puebla, Mexico.

100
Maize's exact time and place of origin is unknown, but its direct ancestor is believed to be *teocintle*. Domesticated in south-central Mexico and Guatemala, the plant's evolution was gradual, with the simplest precursors being formed through point mutations appropriate to the structure of maize. The progressive combination of these mutations produced intermediate plants, identified and selected by prehistoric hunters for domestication, which eventually gave rise to maize as we know it. After the arrival of the Spanish in America, maize was exported to Europe and then the rest of the world.

There are currently believed to be between 220 and 300 races of maize in the Americas. According to a number of authors and institutions, Mexico is home to between 41 and 65 races of maize, and thousands of varieties, making the country one of the most important centres for diversification in the world. Maize covers more than half of Mexico's cultivated land, and is the country's most important crop from an alimentary, economic, political, social, and cultural point of view.

Genetically modified or transgenic maize is that in which – through recombinant DNA technology – one or more genes or recombinant constructs are

inserted which together express proteins of biotechnological interest, or affect metabolic pathways, to induce characteristics of agronomic, alimentary, industrial or economic interest. The planting of GM maize is prohibited in Mexico, but the country imports approximately 11 million tonnes of maize grain, primarily from the United States where GM maize is not segregated.

GM sequences are patented. If a farmer has such sequences in his maize, transmitted by pollination (crossbreeding between GM and non-GM maize), any companies that own the patent can sue him. Through the introduction of patented transgenes, transnational companies take over Mexico's genetic heritage in order to privatise it.

The effect of a gene (or transgene) depends not only on itself, but on its interactions with other genes and proteins, and on the interaction of the transgenic organism with the environment. Maize is incorporating into its cells a herbicide to which its cells are resistant due to genetic modification, a possibly carcinogenic teratogen called glyphosate.

Mexican scientists estimate that if commercial planting is implemented, contamination with GM maize could lead to the loss of native breeds and varieties of maize, developed over the course of thousands of years of cultivation.

Sources: Elena R. Álvarez-Buylla and Alma Piñeyro Nelson (ed.), *El maíz en peligro ante los transgénicos. Un análisis integral sobre el caso de México*, UNAM, 2013, and Elsa Antonieta Gómez Hernández, 'Secuencias transgénicas en alimentos elaborados con maíz. México, un caso de estudio', UNAM, 2017.

101 Voyage on the Guadalquivir River, Spain. Rising in the Sierra de Cazorla, this 657-km river empties into the Atlantic Ocean between the towns of Almonte and Sanlúcar de Barrameda. On the way it crosses the city of Seville. Between the 16th and 18th centuries, it became the main port for cargo ships coming from the Americas.

102 Cabin of Iberia Airbus A332. Flight from Buenos Aires to Barcelona. 4 February 2019.

103 *Primer homenaje a Cristóbal Colón* ('First Homage to Columbus'). José Garnelo. 1892. 300×600 cm. Museo Naval, Madrid, Spain. The painting depicts the arrival of Christopher Columbus, his crew, and the Pinzón brothers on a small island in the Lucayan Archipelago. Columbus christened the island San Salvador. The painting seems to be inspired by Diego Velázquez's *La rendición de Breda* ('The Surrender of Breda') painted in 1634.

104 *Vista de Sevilla* ('View of Seville'). Alonso Sánchez Coello. 16th century. Museo de América, Madrid, Spain.

105 Mask of Chicomecóatl, Mexica goddess of maize and vegetation. Museo Nacional de Antropología, Mexico City.

106 Cadillac Eldorado Seville 4.9 Port Fuel Injection V8. Manufactured from 1991 to 1995.

107 Colossal statue base. Palazzo Altemps, Rome, Italy.

'From the Iseum and Serapeum of the Campus Martius, Rome. All that survives of this statue are the feet on a parallelepiped base and part of the dorsal pillar with a hieroglyphic inscription. The careful execution of the signs and the colossal dimensions of the sculpture suggest that it was a royal figure made in Egypt. It dates to the 3rd century BC, in the early Ptolemaic period.'

Text displayed in the room of the Egyptian Collection

108 Collection of marbles from the Palatine Hill, Rome, Italy.

Ancient marbles collected by Pietro Rosa during excavations between 1861 and 1870. 3 of the marbles come from Italy, 8 from Greece, 2 from France, 9 from Egypt, 6 from North Africa, and 13 from Asia Minor; 7 of them are of unknown provenance.

109 Port of Barcelona, Catalonia.

110 Gothic Monastery of Sant Jeroni de la Murtra, Badalona, Catalonia. Founded in 1416.

On 3 August 1492, Christopher Columbus (1451–1506) began his first voyage to the American continent, financed primarily by the Catholic Monarchs. On 12 October, he sighted the island of Guanahani (which he named San Salvador). He sailed in the West Indies for over two months, establishing contact, and engaging in relations and exchanges, with the local inhabitants. On 15 January, he set out on his return voyage, reaching Seville on 20 March 1493.

On 7 December 1492, King Ferdinand the Catholic was wounded by a peasant, Joan de Canyamars, (subsequently condemned to death) in Barcelona. In April 1493, while the king and queen were recovering from the incident in the Monastery of Sant Jeroni de la Murtra, Christopher Columbus visited them to officially report back about his voyage.

111 Mediterranean Sea.

112 Floquet de Neu (Snowflake; 1964–2003). Barcelona Zoo, 1991.

After shooting his parents to stop them ruining a banana plantation, a farmer captured Floquet de Neu on 1 October 1966 near the banks of the River Ntem in the area of Ekonogoung, Mbini Province, Republic of Equatorial Guinea. Between 1926 and 1968, the country had been a Spanish colony under the name Spanish Guinea. Four days later the young

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						112	113	114	115	116	117	118					

gorilla was sold for 15,000 pesetas (around 90 euros today) to the Catalan primatologist Jordi Sabater Pi, curator of the Ikunde Animal Acclimatization and Experimentation Centre in Bata, which was dedicated to the protection of animals captured in the jungle, and financed by Barcelona Zoo, the Museu Etnològic and the city's municipal institute of parks and gardens.

Spain maintained the colony of what is now the Republic of Equatorial Guinea between 1885 and 1968 under the official name of Territorios Españoles del Golfo de Guinea (Spanish Territories of the Gulf of Guinea). In the mid-19th century it was used as a penal colony for emancipated Cubans, Filipino independence fighters and Spanish republicans and anarchists. In 1960, there were 8,954 white people living there, 3.64% of the population. Barcelona became the nerve centre of Guinean colonial business, including agricultural and forestry exploitation, and the plundering and export of raw materials such as timber, coffee and cocoa. More than 90% of the cocoa exported from Santa Isabel (present-day Malabo) was unloaded at the Moll de la Fusta in Barcelona.

On 1 November 1966, Floquet de Neu was transferred to Barcelona where he lived for eleven months in a flat in the Eixample district owned by veterinarian Roman Luera Carbó, deputy director of the zoo, and his wife, Maria Gràcia. On 19 March 1967, Floquet de Neu was invited to an official audience with the city's mayor, Josep Maria de Porcioles, in his office. It is said that Floquet de Neu marked the occasion by defecating in his chair. He was later incorporated into Barcelona Zoo.

Floquet de Neu, initially named Nfumu Nguí ('white gorilla' in the Fang language), was a western lowland gorilla, a subspecies of the western gorilla (*Gorilla gorilla*), and the only known albinoid gorilla to date. He exhibited the traits and

physical characteristics common to albinism in humans, such as white hair, pink skin, light-coloured eyes, reduced visual perception and photophobia.

On 10 November 1991, he was awarded his Spanish National Identity Card (DNI), becoming in the process the most popular citizen of Guinean origin in Barcelona. He lived for nearly thirty-seven years in a 55 m² cell. He spent his days masturbating and eating his own excrement in front of thousands of visitors, and was the most-photographed animal in the zoo. He died by assisted death after suffering from skin cancer. He fathered 21 children, none of whom were albino. For any of his descendants to be albino, his partner would have to have been a carrier of the albinism gene; for this reason, attempts were made to encourage Floquet de Neu to have sexual relations with his daughters, but he always refused. After his death, his brain and various fluids and tissues were deposited in the recently created Animal Tissue Bank of Catalonia (BTAC), while his reproductive tract tube, where the spermatozoa are stored, was sent to the Institut Universitari Dexeus. Various DNA and tissue samples were deposited at the Universitat Pompeu Fabra; skin samples went to the Universitat de Barcelona; while different parts of his skeleton and skin were given to the Museu de Ciències Naturals. Moulds were made of his face, hands, feet and chest.

Source: Manuel Delgado, Gustau Nerín and Jordi Sant (among others), *Ikunde. Barcelona, metrópoli colonial*, Ajuntament de Barcelona, 2017.

113 Prada Foundation, Milan, Italy. Four-storey building covered in 24-carat gold, in which the foundation's permanent collection is exhibited.

114 The selling of trainers by African migrants in the city of Barcelona, Catalonia. Records show

that between 2011 and 2018, 111,169 migrants and displaced persons landed on the coasts of Andalusia. In 2018, the arrival of 58,569 people in 1,775 boats was documented, and 2,242 people reportedly lost their lives in the attempt. In total, there have been more than 7,000 deaths over the last twenty years. This figure rises to 18,000 if we count deaths that have not been officially verified. Between 2018 and 2020, around 123,800 people arrived by sea in 4,533 boats.

115 The Islamic State Organization (الدولة الإسلامية في العراق والشام), also called Islamic State Group, Islamic State (IS), Islamic State of Iraq and Syria (ISIS), Islamic State of Iraq and the Levant (ISIL) and Daesh (Arabic acronym) is defined as a terrorist organization by the United Nations (UN). Daesh defines itself as a theocracy and insurgent paramilitary group of a fundamentalist jihadist Wahhabi nature. The group's ideology coincides with that of radical Salafist Islam, a strict, puritanical form of Sunni Islam. Daesh promotes religious violence and regards dissenting Muslims as infidels or apostates. It originated in 1999 as the Organization for Monotheism and Jihad (جماعة التوحيد والجهاد), pledged allegiance to Al-Qaeda and took part in the Iraqi insurgency following that country's invasion by US-led Western forces in 2003. In June 2014, from its base in the city of Mosul, the group rebranded itself 'Islamic State' and proclaimed the establishment of a caliphate, led by a politico-religious leader in accordance with Islamic or Sharia law. Islamic State controlled a territory between the states of Syria and Iraq and claimed to have the full support of the Muslim world.

On 26 February 2015, one day after burning thousands of books in the libraries of Mosul, Islamic State posted a video showing the destruction of objects inside Mosul Museum. On 7 March

2015, the organization used bulldozers to destroy the archaeological site of Dur-Sharrukin → 116.

116

Gilgamesh. Louvre, Paris, France. Sculpture located in the throne room of the Palace of Sargon II – king of Assyria between 721 and 705 BC – located near the present-day city of Khorsabad, Iraq. During French excavations carried out in 1844, the monumental complex of Dur Sharrukin → 115 was discovered and 26 boxes containing antiquities from the site were subsequently transported to Paris. On 21 May 1855, another 235 crates bound for Paris were being sailed down the Tigris River when the convoy was attacked and the majority of the pieces sank into the river. They have not yet been located and are only known to us from drawings made in situ.

Gilgamesh – possibly king of the Sumerian city of Uruk (present-day Warka, Iraq) in around 2750 BC – is the protagonist of the *Epic of Gilgamesh*. Considered to be one of the most ancient literary works in the world, the odyssey recounts the titular hero's exploits with his beloved friend Enkidu, and Gilgamesh's desperate search for immortality following Enkidu's death.

117

Gate of All Nations, Persepolis, Iran.

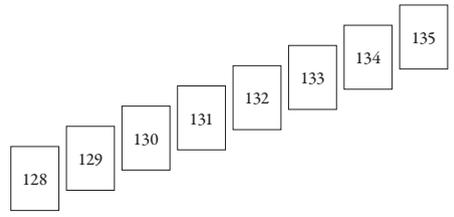
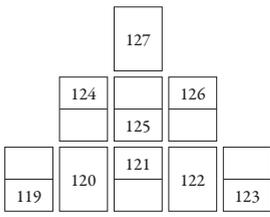
118

Replica of one of the lamassu statues (𐎎𐎗𐎒) in the workshop of reproduction company Factum Arte, in Madrid, Spain. Made with a high-resolution scanner at the British Museum in order to reunify different objects from the original excavation site, currently exhibited separately in museums all over the world. The original sculpture guarded the entrance to the throne room of Ashurnasirpal II in Kalkhu (present-day Nimrud), Iraq.

Ashurnasirpal II reigned between 883 and 859 BC as the

third king of the Neo-Assyrian Empire. Famous for his conquests and brutality, Ashurnasirpal II moved the capital from Assur to Kalkhu, 30 km south of the present-day city of Mosul. In 879 BC, he ordered construction of a 24,000 m² palace known as The Palace of Ashurnasirpal II. After the fall of Assyria in 612 BC, the palace was abandoned and buried for almost two and a half thousand years. In 1845, British archaeologist Austen Henry Layard discovered it and began excavations which would last until 1957, when the General Directorate of Antiquities of Iraq took over the project. During this period, the reliefs that dominated the walls of the structure were removed from the site and distributed among at least 76 museums around the world (of which 36 were in the United States and 13 in the United Kingdom).

On 12 April 2015, Islamic State → 115 militants released a video in which they hammered, demolished and eventually blew up several parts of the archaeological site of Nimrud and the Palace of Ashurnasirpal II. According to the Government of Baghdad, 90% of the ancient city of Nimrud was destroyed. In September 2019, the Factum Foundation transferred two facsimiles of the lamassu statues to Iraq.



119
Metal recycling plant.

120
Otaru (小樽市), Hokkaido Prefecture, Japan.

121
Old Tjikko → 9. 2017.

122
La Virgen del Cerro ('The Virgin of the Mountain'). 18th century. Casa Nacional de Moneda (National Mint), Potosí, Bolivia. The fusion of two worlds – Inca and Christian – represents the mountain as a crowned Virgin Mary, a mountain goddess, Mother Earth, and a Christianised Pachamama. She is crowned by the Eternal Father, the Son and the Holy Spirit, escorted by the archangels Michael and Gabriel. Beneath the clouds, the god Inti (the sun) and the goddess Quilla (the moon) are in attendance. In the lower part of the painting is Huayna Cápac, emperor of the Incas, who, in 1462, reached the place now occupied by the city and was amazed at the sight of the mountain. The discovery of silver at Cerro Rico → 91 in 1544 by Diego Hualpa is depicted, as are a pope, cardinal and bishop. On the right is Emperor Charles V, a Knight of the Order of Santiago, and the benefactor. In the centre there is a circle containing the city of Potosí, economic hub and centre of world power, or the world at the feet of the wealth of the mountain.

123
Tsunami debris from the 2011 Pacific coast earthquake. Matsushima (松島町), Miyagi Prefecture, Japan.

124
View from the summit of Cerro Rico → 91, Potosí, Bolivia.

125
Pyramid of Cestius, Rome, Italy. 12 BC. 30 x 30 m at the base and 36.4 m high. Egyptian-style tomb of Gaius Cestius Epulon.

126
Egyptian statue of the 27th Dynasty. 525–404 BC. Basalt.

Museo di Scultura Antica
Giovanni Barracco, Rome, Italy.

127
Analytical instrument, prepared with a sample of gases emitted by the Aso San supervolcano → 34. Research Institute of Earthquake and Volcano Geology (IEVG), National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan.

128
Portrait of Mambondambo. 1911. The inscription reads: *'De la tribu des Budja, né a Dundusana, région de la Mongala, district des Bangala'* ('From the Budja tribe, born in Dundusana, Mongala Region, Bangala District'). Musée royal de l'Afrique centrale, Tervuren, Belgium.

129
Colossal statue base. Palazzo Altamps, Rome, Italy.

130
Transporte indígena por caminos de montaña ('Indigenous transport on mountain roads'). Mountain road leading from Puerto Las Juntas to La Ceja, in the province of Antioquia, Colombia. 11 June 1802. Archivo General de Indias, Seville, Spain.

131
Slave sale document, signed in Boa Esperança, Brazil, 27 December 1860. Brasiliana Itaú Collection, São Paulo, Brazil.

132
Brussels, Belgium. 21 July 2009. National holiday commemorating the investiture of Leopold I (first Belgian monarch) in 1831.

133
Transporte indígena por caminos de montaña. → 130

134
Man with six-camera backpack for mobile mapping and 3D photographing of city streets.

135
Omegon Ritchey-Chretien Pro RC 406/3250 Truss OTA telescope, used for observing the star Stephenson 2-18 → 185.



136
Persimmon. Can Bres, Gaserans, Catalonia.

137
Rotavapor. Equipment for controlled evaporation of substances at low pressure and temperature. Laboratory of the Institut Català de Nanociència i Nanotecnologia (ICN2), UAB, Bellaterra, Catalonia.

138
Pepper. Robots created by Aldebaran Robotics. Tokyo, Japan.

139
Reconstruction of the Serapeum of the Canopus of Hadrian's Villa, a residence built in Tivoli, Italy, by Emperor Hadrian between 117 and 138 AD. The Serapeum is an architectural complex dedicated to the Greco-Egyptian deity Serapis.

140
Gemasolar. Concentrated solar thermal power plant with molten salt thermal storage system. Seville, Spain.

141
Telenoid. Robot created by the laboratory of Professor Hiroshi Ishiguro (石黒浩). Osaka, Japan.

142
Sistine Chapel, Vatican City. Frescoes painted by Michelangelo between 1508 and 1512.

143
Odeillo solar furnace, France. Laboratory for research into the concentration of solar radiation and the behaviour of materials subjected to extreme temperature conditions. This is done by means of the physical principle of concentration of rays by reflecting mirrors.

144
Mount Nakadake (阿蘇山中岳), inside the Aso San supervolcano (阿蘇山) → 34, Kumamoto Prefecture, Japan.

145
Popocatepetl volcano, located 72 km southeast of Mexico City. It reaches a height of 5,500 m a.s.l. At the base of the volcano

– around 3,600 m a.s.l. – there is a mountain pass called Paso de Cortés that gives access to the Valley of Mexico. The name of the pass commemorates the fact that, after leaving Cholula, Hernán Cortés → 85 took this pass on his way to the city of Tenochtitlan in 1519.

146
Exploding gas.

147
Image of an organic sample of Old Tjikko → 9. Highly anisotropic, with a very porous and unstable morphology. Electron microscope visualization at a magnification of 3 μm.

148
Image of an organic sample of Old Tjikko → 9. Highly anisotropic, with a very porous and unstable morphology. Electron microscope visualization at a magnification of 2 μm.

149-150
Old Tjikko → 9. 2021.

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151
 Repliee S1. Robot built at Professor Hiroshi Ishiguro's (石黒浩) Systems Innovation Laboratory, Osaka University, Japan. It was designed in 2013 to play the lead role in an adaptation of Kafka's *The Metamorphosis*, directed by Oriza Hirata in Yokohama in 2014.

152
 Self portrait of Djonga Bismar, Congolese artist in residence at the Institute for Human Activities, founded and directed by Renzo Martens. The sculpture is made out of cocoa from the Congo and manufactured in the Netherlands.

153
 Sculpture of Leopold II → 19. Brussels, Belgium.

154
 Brussels, Belgium. 21 July 2009. National holiday commemorating the investiture of Leopold I (first Belgian monarch) in 1831.

155-156
 Palace of Justice, Brussels, Belgium → 19.

157
 Gold and tumbaga sculpture, part of the Quimbaya Treasure found in Colombia in 1890 by a gang of *huaqueros* (tomb robbers). Historically, the name 'Quimbaya' corresponds to one of the numerous indigenous chiefdoms in the Middle Cauca (the region that came to be known as Quimbaya Province), that developed between 500 BC and the 6th century AD. Today, the term refers to the various pre-Columbian styles of ancient Caldas, northern Valle del Cauca, and southern Antioquia. The treasure is dated between the 5th and 6th centuries and consists of 433 pieces of gold and tumbaga, with a total weight of 21,224 grams.

In 1892, on the occasion of the 4th Centenary of the Discovery of America, celebrated in Madrid, Spain, Colombia considered exhibiting the recently-found treasure. Instead, the president of the republic, Carlos Holguín, donated it to Queen María Cristina in gratitude

for her arbitration of a border dispute between Colombia and Venezuela, in which she favoured the former. The queen, in turn, donated it to the collection of the historical heritage of the Spanish state. Today it is exhibited in the Museo de América de Madrid.

In 2017, the Colombian constitutional court ordered the Colombian executive, through its foreign ministry, to activate all the necessary diplomatic mechanisms in its relationship with Spain to ensure that the pieces are returned to Colombia. The ruling was based on Article 63 of the constitution, whereby the nation's cultural and ethnic assets are inalienable, imprescriptible and exempt from seizure.

158
 The most important coltan deposits in the Democratic Republic of Congo (DRC) are inside gorilla habitats. Gorillas are frequently displaced and hunted as a source of food by miners, causing their population to decline significantly. Research by the Wildlife Conservation Society estimates that in the last thirty years the eastern lowland gorilla has lost 77% of its total population. The number of gorillas in Kahuzi-Biega National Park is estimated to have declined by 87% in less than thirty years. Three decades ago the endemic gorilla population was approximately 16,900 individuals. Today, only an estimated 3,800 of this subspecies remain in the wild. The unstoppable decimation of rainforests – cut down to build more mines and mining villages – is especially alarming considering that the DRC is home to 100 million hectares of rainforest and that, according to Greenpeace, Central Africa's forests retain 8% of the planet's carbon.

Photograph of a scene from the Sony PlayStation® 2 game *King Kong*.

159
 Detail of the interior columns of the Palace of Justice → 19 in Brussels, Belgium.

160
 Patrice Lumumba → 19 Square in Brussels, Belgium.

161
 Tejo de oro → 85.

162
 Boulevard Léopold II → 19, Brussels, Belgium.

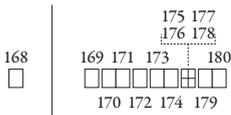
163
 Two perfectly matched cushion-cut diamonds. Each one weighs 20 ct and they are light yellow in colour. They are valued at 550,000 dollars. Diamond cutting and polishing workshop, Antwerp, Belgium.

164
 Riotinto. Mineral deposit in Huelva, Spain, mined for copper since the 3rd millennium BC. Between the 8th and 6th centuries BC, silver was also mined. Between the 1st century BC and the 5th century AD, the Romans diversified production and improved mining techniques. During their occupation they left around 6.6 million tonnes of waste after the extraction of silver and other minerals.

Today, Riotinto is still an important copper deposit. The company Atalaya Mining holds the concession for development and exploitation of the mine until 2035. It has reserves of 197 million tonnes of ore, of which 0.42% – 822,000 tonnes – is copper. The mining operation sets a production rate of 9.5 million tonnes of processed ore per year. In 2020, the mine reached an all-time production record of 55,890 tonnes of copper in concentrate form. Earthworks of 37.7 million tonnes of rock were carried out. The company's turnover that year was 236.8 million euros.

Photographs of Atalaya Mining's open-pit copper mine.

165-167
 Riotinto → 164.



181



182
183

184 185 186 187

168

Diamond made in a laboratory from carbon extracted from the ashes of a deceased human.

169

Culture of modified HeLa cells. In 1951, a tissue sample was taken from the patient Henrietta Lacks (1920–1951) – without her permission – for the study and research of her disease. After her death, her cells were cultured in the laboratory for scientific use and they began to reproduce indefinitely. Today, Henrietta Lacks' cells remain alive and are used in thousands of laboratories around the world. They have been outside her body longer than they have been in it. It is estimated that the total weight of cells cultured to date would exceed 50 million tonnes.

170

Barcelona, Catalonia. 2020.

171

SARS-CoV-2 virus in a Vero cell → 19. A virus is the smallest known acellular infectious agent. It can measure between 10 and 1500 nm and consists of RNA or DNA molecules surrounded by protein capsids or lipid envelopes. It is a complex structure capable of performing two of the functions attributed to living things: interacting and reproducing. It cannot replicate on its own and needs host cells from other organisms. The scientific community debates whether a virus is a micro-organism and, therefore, whether it is alive or not. It is arguably the simplest form of life in existence, located on the threshold between living and inert matter.

The SARS-CoV-2 (Severe Acute Respiratory Syndrome CoronaVirus 2) virus was detected for the first time on 12 November 2019. It can cause acute respiratory illness and severe pneumonia in humans. Within a few hours, the virus is able to colonise the human body and cells, as well as our space and habitat. The disease caused by the virus has been designated Covid-19 (Coronavirus disease 2019).

The common ancestor of coronavirus, scientifically known

as *Orthocoronavirinae*, is thought to have emerged in the 9th century BC. To date, 45 species of coronavirus have been recorded. Between 1890 and 1899, the virus generated a new mutation that affected humans for the first time. In 1967, June Almeida and David Tyrrell, after making several electron microscopic observations and detecting a viral particle surrounded by a glycoprotein in the form of spicules resembling the sun's corona, coined the word 'coronavirus' for the first time.

Photograph taken with an electron microscope at a magnification of 20 µm.

172

Study of the use of 3D guides for coracoid autograft positioning in the Latarjet procedure. Cadaveric study.

Latarjet surgery is used when there are recurrent dislocations and instabilities in the shoulder joint. A piece of bone is cut from the scapula, located quite close to the joint, and lowered into the anterior area of the glenoid (the part of the scapula that articulates with the humerus), to which it is fixed with two screws. Once the operation has been carried out, this bone prevents the joint from moving forward and dislocating.

Intervention carried out by doctors Joan Miquel Noguera, Laura Valls Bartrolí, Raquel Martínez Torregrosa and Andrés Barja Rodríguez, in collaboration with Ferran Fillat Gomà and Alfonso Rodríguez Baeza.

173

Telomeres are nucleoprotein complexes at the ends of chromosomes within the nucleus of the body cell. Their function is to protect the integrity of the genetic information contained in DNA. Each time cells divide, telomeres shorten slightly, which is considered one of the indicators of ageing. The Telomeres and Telomerase Group at the Spanish National Cancer Research Centre (CNIO), led by Dr María A. Blasco, has shown that preventing the shortening of telomeres by activating their lengthening enzyme, telomerase, prolongs longevity without side effects.

The CNIO group has developed a gene therapy that promotes telomerase synthesis, resulting in mice that live 24% longer without developing cancer or other age-related diseases.

Photograph taken at the CNIO Telomeres and Telomerase Group Department in Madrid, Spain.

174

SARS-CoV-2 virus. Photograph taken with an electron microscope at a magnification of 500 nm.

175-176

Reservoir. Switzerland.

177

Reservoir. Japan.

178

Retaining wall. Japan.

179

X-ray of my skull.

180

Human remains.

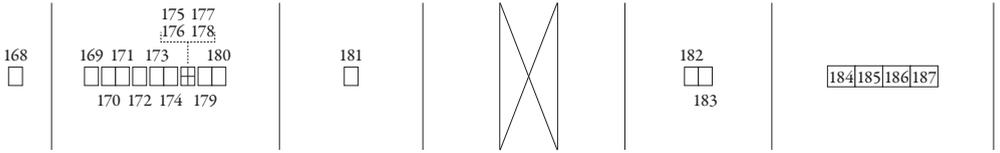
181

Following the discovery of nuclear fission towards the end of 1938, a number of scientists devoted themselves to studying this phenomenon through the interaction of neutrons with uranium nuclei. In 1939, Leó Szilárd, Eugene Paul Wigner, and Albert Einstein, among others, received a preliminary loan from the US government to carry out in-depth research into nuclear energy with a view to developing the atomic bomb.

The uranium-235 atomic bomb is a device that produces a huge amount of explosive energy by means of nuclear reactions. It works by fissioning heavy atomic nuclei into lighter elements by bombarding them with neutrons which cause a chain reaction upon impact.

On 6 August 1945, US president Harry S. Truman ordered for an atomic bomb to be detonated over the Japanese city of Hiroshima during World War II. The attack is estimated to have killed 166,000 people.

Photograph of a tree along the banks of the Ota River (太田川), Hiroshima, Japan.



182
 Scientific research with Wistar rats (*Rattus norvegicus*), an exogenous albino rat species developed in 1906 at the Wistar Institute (Philadelphia, United States) for use in biological and medical research.

183
 MELiSSA (Micro-Ecological Life Support System Alternative) pilot plant. External laboratory of the European Space Agency (ESA), located at the Universitat Autònoma de Barcelona (UAB), established as part of a research programme on life support technologies, with the aim of facilitating long-duration manned space missions.

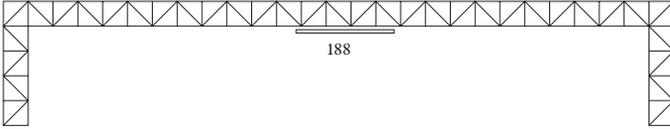
It is the only laboratory in Europe created for the demonstration of Closed-Circuit Life Support Systems. It is a regenerative artificial ecosystem involving production of edible material from higher plants and microalgae, revitalisation of the atmosphere for respiration, water recovery and recycling of waste – faeces and urine – generated by the crew, and plant growth. The MELiSSA project ideally aims for 100% recycling of chemical elements, i.e. a fully self-sustaining ecosystem with no replenishment required. This presents a significant challenge in terms of process, control, stability, safety and robustness.

184
 Rose.

185
San Girolamo nello studio ('Saint Jerome in his Study') painted by Antonello da Messina between 1474 and 1475. Rome, Italy.

186
 Fire.

187
 Sun. Barcelona, Catalonia.
 31 December 2019.



188

Stephenson 2-18 is the largest star known to us. It is located about 18,900 light-years from earth, and according to calculations, its radius is 2,154 times that of the sun. To carry out this estimate it is necessary to know the temperature of the surface of the star, as well as its bolometric luminosity (luminosity that takes into account the absolute magnitude of the electromagnetic spectrum). By means of the Stefan-Boltzmann law concerning the radiation of a black body, the radius of the star can be obtained.

$$L = 4\pi R^2 \sigma T^4$$

$$R = \sqrt{\frac{L}{4\pi\sigma T^4}}$$

$$= \sqrt{\frac{440.000 \cdot 3,846 \times 10^{26} \text{W}}{4\pi \cdot 5,67 \times 10^{-8} \text{W} \cdot \text{m}^{-2} \cdot \text{K}^{-4} \cdot 3.200^4 \text{K}^4}}$$

$$= 1,5 \times 10^{12} \text{m} = 2.154 R_{\odot}$$

[Source: Roger Prat Baucells]



Un árbol es un árbol.

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