Liebieghaus
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Press release

Machine Room of the Gods
How Our Future Was Invented

Extended until 21 January 2024
Liebieghaus Skulpturensammlung

Frankfurt am Main, 24 July 2023. The Liebieghaus Skulpturensammlung is devoting an exhibition to one of the most exciting connections in the history of mankind – the connection between art and technology. It is a global narrative, full of cryptic fables, myths and visions, fictive and real innovations and outstanding masterworks. The exhibition "Machine Room of the Gods: How Our Future Was Invented" will shed light on the history of the sciences in antiquity and the Arabic and Asiatic cultures and their influence on the development of art. Technology and art were closely intertwined in antiquity. The Greek term *techne* stands for all "arts" – engineering, construction, et cetera. Primarily, it concerns the knowledge and study of the human mind. Scientific research was pursued with the aim of advancing the human civilization and culture. Whether the pyramids by the ancient Egyptian mastermind Imhotep, the mechanical automata and animated sculptures described by the Greek author Heron or experiments with the first camera obscura by the Arab mathematician Alhazen – they all exemplify how scientific and artistic work go hand in hand.

The Frankfurt exhibition will feature 96 prominent objects from international museum collections such as the Museo Archeologico Nazionale in Naples, The Metropolitan Museum of Art in New York, the Musei Capitolini in Rome and the Kunsthistorisches Museum in Vienna, as well as from the Liebieghaus Skulpturensammlung's own holdings, including the *Statuette of Imhotep* (Egypt, 332–30 BC), the *Statue of Athena* (Roman, AD 1st c.), the *Statue of Icarus* (Roman, AD 1st c.), the *Wallpainting with Hephaestus* (Pompeii, AD 1st c.), the *Portrait of the philosopher Aristotle* (Roman, AD 1st–2nd c.), a *Universal Astrolabe* (by Aḥmad ibn as-Sarrāǧ, Syria, 1328–1329) and the *Apollo Kithara* (by Jeff Koons, 2019–2022). The multimedia exhibition architecture will transform the entire Liebieghaus into a museum in which art and science of more than five millennia come to life.

"The exhibition at Frankfurt's Liebieghaus offers an unobstructed view of ancient science and its influence on the history of culture. In antiquity we can observe how science was the point of departure for a conception of a fantastical future technology – much as we know it today from the science fiction genre. With masterpieces from the Liebieghaus collection and prominent loans, we provide a kaleidoscope-like view of the exciting connection between art and technology over a period of five millennia. On this occasion, the Liebieghaus is moreover celebrating a world premiere – the decryption of the sensational Antikythera mechanism, one of the first computers used to calculate the planetary constellations and see into the future", says Dr. Philipp Demandt, director of the Liebieghaus Skulpturensammlung, about the show.

The exhibition is being carried out with support from the Art Mentor Foundation Lucerne, the Gemeinnützige Kulturfonds Frankfurt RheinMain GmbH and the Freunde der Tat des Städelschen Museums-Vereins e. V.

Prof. Dr. Vinzenz Brinkmann, the exhibition curator and head of the Liebieghaus Department of Antiquities and Asia, explains: "People of all ages were evidently aware of how important the natural sciences and technology are for art, except in the 20th century. Until then, no one was bothered by the unity of technology

and aesthetics, which in the ancient, Arabic and Asiatic cultures was taken for granted. Then, however, that unity was mistakenly dissolved. To do justice to art and its history, the gap must once again be closed. Our exhibition contributes to that cause by bringing together a network of artists and scientists of different disciplines to present their latest research and achievements in the field of the history of science."

A tour of the exhibition

Mounted throughout the presentation of the Liebieghaus collection, the exhibition offers captivating dialogues between Liebieghaus works and loans from international museum holdings. **The tour of the show covers a period of more than five millennia.**

Our knowledge of European antiquity comes above all from the cultures of Egypt and the Middle East. The Greeks and Romans developed it further, enhancing it in the process with philosophical thought. As there were hardly boundaries but merely spheres of influence, scientific experience spread across entire regions and new knowledge emerged. Yet that development ended in late antiquity wherever the sciences were suppressed for religious reasons. Wars, crusades and the influence of the Christian church in Western Europe posed a threat to the knowledge amassed by antiquity. In the Arabic-Islamic cultural region, on the other hand, the accomplishments of the ancient sciences and philosophy were translated and developed further. From the eighth to the fifteenth centuries, Baghdad, Cairo, Samarqand and Damascus were centres of knowledge with prominent scholars and universities in the Arabic sphere. Only gradually did their insights trickle to Europe, where they would ultimately meet with a resounding response in the Renaissance.

Scientific research programmes were already being pursued with unequalled energy in the third millennium BC. The construction projects in Egypt and the Near East (Mesopotamia) required chemical research to meet the great demand for refined materials, but also reliable measuring methods to ensure structural precision. For the latter purpose, but also for the measurement of time and the prediction of the future, the in-depth study of celestial mechanics was indispensable. Astronomy would pave the way to fundamental insights in mathematics and geometry. The exhibition illustrates these developments – for example with a Babylonian tablet bearing the Pythagorean theorem, which was already part of human knowledge four thousand years ago.

We find depictions of fictive high technology in Greek mythology. As far back as the seventh and sixth centuries BC, Homer and other authors wrote of golden robots equipped with artificial intelligence and standing at the service of the gods. Ancient written sources describe the inventions of Hephaestus and Daedalus: spaceships, flying machines, androids, robots, automata and high-tech weapons. The exhibition features, among other works, a *Wall Painting with Hephaestus* in his smithy, forging weapons for the Greek hero Achilles in the presence of Thetis (Pompeii, AD 1st c.), a *Statue of the Greek Mythological King Ixion*, who was mounted on a wheel-shaped spaceship for his transgressions (Roman, 1st half of AD 2nd c.) and a figure of Daedalus's son *Icarus*, who flew too close to the sun with wings constructed by his father and plunged to his death in the sea (Roman, AD 1st c.). The Greek Titan Prometheus is even supposed to have made man: carrying a technical construction plan to realization, he produced a machine.
The famous Roman marble copy of the *Statue of Athena* by the bronze sculptor Myron (AD 1st c.) is likewise on view in this section. Athena stands for enlightenment, research, art and technology more than any other figure in Greek mythology. The Liebieghaus moreover has in its holdings the only extant large-scale *Portrait of the Macedonian King Alexander the Great* (150–50 BC). The work of Egyptian alabaster comes from Alexandria and depicts a figure who, in his thirst for power, benefited from science in general and from its teacher Aristotle

in particular. It was in this spirit that the epoch-making research institute "Library of Alexandria" was founded soon after the king's death.
The earliest mechanical apparatuses date back to around 500 BC—and reached an initial culmination in the years 300 BC to AD 100. Although only few of those devices have come down to us, we know something about their original mechanics from ancient texts. Philo of Byzantium (3rd to 2nd c. BC) and Hero of Alexandria (AD 1st c.) provide us with 'construction manuals' for models used in physical experiments as well as for mechanical wonderworks, animated sculptures and automatic theatre stages. Close cooperation with the Metropolitan Museum of Art in New York has yielded a 3D model of two bronze statues: the two figures of children chasing a partridge were presumably once part of a cinematographic wonder wheel. Also on view at the Liebieghaus are the spectacular findings from the French excavations by the team around Françoise Villedieu (CNRS Aix-en-Provence) at the *Domus Aurea* (AD 64). Emperor Nero's extravagant Roman palace boasted a large and luxurious banquet hall that, powered by a recently rediscovered mechanism, rotated beneath an artificial starry sky in the manner of a turntable stage.

For ancient humans, the world consisted of the Earth, the planets and the fixed stars. It was thought that each heavenly body – whether sun, moon, planet or star – was attached to its own transparent spherical shell and revolved around the stationary Earth. This conception is known as the geocentric view of the world. The exhibition presents an experimental replica of a so-called *Sphaira* by the universal genius Archimedes of Syracuse (ca. 287 to 212 BC). Driven by weights or waterpower, the apparatus showed the correct positions of the planets and fixed stars from the terrestrial perspective at any given time. The modern version of the antique sphaira is the armillary sphere. In European art, this precious astronomical instrument often appears in sculptures depicting Atlas as the bearer of the heavenly vault.

The discovery of the so-called Antikythera mechanism was a sensation. A hundred and twenty years ago, sponge divers found several clumps of oxidized bronze in an ancient Greek shipwreck. The many stages of research undertaken since then have brought the nature of the find to light: it is quite likely the highly complex gear drive of an astronomical instrument (3rd to 1st c. BC). Concluded only a few months ago, the research project by mathematician Tony Freeth and his team yielded results that are here presented to the public in elaborate media installations.

Ancient philosophy and the sciences of past millennia underwent their first rebirth in the Arabic-Islamic cultural region long before the so-called Italian Renaissance of the fifteenth century. In the period from the eighth to the thirteenth centuries, known as the "Golden Age of Islam", ancient writings were translated to gain access to knowledge. Scientists of various ethnicities taught and carried out research in Baghdad and other centres of the Arabic-Islamic world—with far-reaching consequences. Observatories were built in Baghdad, Maragheh, Ray (Teheran) and Samarqand with the aim of studying and documenting the celestial mechanics over extended periods of time. The exhibition showcases precision measuring instruments such as the *Universal Astrolabe* by Aḥmad ibn as-Sarrāǧ (1328–1329), but also—thanks to the accomplishments of Frankfurt's Institute of the History of Arabic-Islamic Sciences under the direction of Fuat Sezgin—various models and replicas of scientific installations and instruments.
The famous Islamic engineer al-Jazari furthered the development of complex models, automata and clockworks known from ancient writings. In his *Book of Knowledge of Ingenious Mechanical Devices* published in 1205, he described the function of two devices for the measurement of time, the so-called *Beaker Water Clock* and *Elephant Clock*. The latter is depicted in a 1315 drawing by Farrukh ibn 'Abd al-Latif. Physical experiments carried out in Baghdad and Arab Spain moreover led to a scientific breakthrough in the understanding of light: Abbas ibn Firnas (ca. 810–887), Al-Kindi (d. ca. 873), Ibn Sahl (ca. 940–ca. 1000) and Alhazen (ca. 965–after 1040) revolutionized the theory of optics and proved the true character of the ray of light.

The scientific and philosophical activities of the Indians preceded those of the Greeks. Indian scholars – first and foremost Aryabhata (AD 476–ca. 550) and Brahmagupta (AD 598–ca. 665) – laid the groundwork for modern astronomy and mathematics. Aryabhata calculated the relationship between the lunar orbit and the Earth's rotation, for example, and pursued the heliocentric conception of the world. **The Indian cultural sphere bordered ancient China, which was connected to the Near East and the Mediterranean region by way of the Silk Road.** Complex art technologies such as the production of porcelain came out of China. And it was not Johannes Gutenberg (ca. 1400–ca. 1468) who invented book printing with movable type, but Bi Sheng (972–1052) from China, who fashioned the characters out of porcelain.

The arts and sciences flourished in the European Renaissance – thanks in good part to the patronage of Cosimo (1389–1464) and his grandson Lorenzo de' Medici (1449–1492). With the help of Byzantine scholars, for instance, Cosimo amassed a research library in Florence. This institution continued a great tradition encompassing such illustrious examples as the Library of Alexandria, the manuscript collections of Byzantium, the House of Wisdom in Baghdad and the universities of Samarqand.
Based on findings by Islamic astronomers, Nicolaus Copernicus (1473–1543) spoke out in favour of the heliocentric worldview that had been discussed by scholars since antiquity. The telescope – a new invention at the time – helped prove the correctness of the idea that not the Earth but the sun is at the centre of the planetary orbits. In the enlarged image of the heavens, Galileo Galilei (1564–1642) observed that Venus, for example, undergoes various phases of illumination by the sun. Johannes Keppler (1571–1630) recognized that the planetary orbits are elliptical in shape and Isaac Newton (1643–1727) later supplied the calculation basis for that conception.

The exhibition also takes a look at the Age of the Enlightenment, presenting among other works the 1780 *Bust of the Scholar Jean-Jacques Rousseau* by Jean-Antoine Houdon. With the invention of automated and programmed processes that would become ever more important for production, the eighteenth century laid the groundwork for the later economic upturn. On display in the show is a *Model of a programmable loom* constructed by Jacques de Vaucanson in 1746. Programmed with the aid of punch cards, this device contributed decisively to the development of the textile industry.

The example of the Liebieghaus sculpture *Maria Immaculata* of 1688 by Matthias Steinl sheds light on how Christianity used images of Greek and Roman antiquity in its writings, charging them with new meaning in the process. The Christian Woman of the Apocalypse bears direct reference to the Greek cult image of Artemis at Ephesus—a statue possessing numerous symbols of the heavens including a crescent moon, the sun and signs of the zodiac. The figure's biblical interpretation as the Virgin Mary floating on a crescent moon transformed the apocalyptic vision into a salvific symbol that was carved in wood and disseminated by the hundreds.

The tour of the exhibition ends with the *Apollo Kithara* (2019–2022) by the artist Jeff Koons, a figure based on an ancient marble statue of the musicmaking Apollo in the British Museum. While on the one hand drawing quite specifically on certain aspects of the research on ancient statuary polychromy carried out by the Liebieghaus Skulpturensammlung, Koons's work also offers a contemporary answer to the longing of antiquity and the Arabic-Islamic cultural sphere to breathe life into sculpture by way of robot-like motion.

Machine Room of the Gods: How Our Future Was Invented

Exhibition dates: 8 March to 10 September 2023 – extended until 21 January 2024

Curator: Prof. Dr. Vinzenz Brinkmann (Head of the Department of Antiquities and Asia, Liebieghaus Skulpturensammlung)
Project management: Jakob Salzmann, assistant curator (Department of Antiquities and Asia, Liebieghaus Skulpturensammlung)

Location: Liebieghaus Skulpturensammlung, Schaumainkai 71, 60596 Frankfurt am Main
Opening hours: Tue, Wed 12.00 pm–6.00 pm, Thu 10.00 am–9.00 pm, Fri–Sun 10.00 am–6.00 pm, closed Mondays
Information: liebieghaus.de

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Admission: 12 €, reduced 10 €, admission free for children under 12. Tickets are also available in the online shop at shop.liebieghaus.de.

Catalogue: A catalogue published by the Deutscher Kunstverlag will accompany the exhibition (296 pages, German and English editions) with 18 contributions by Lis Brack-Bernsen, Vinzenz Brinkmann, Tony Freeth, Ulrike Koch-Brinkmann, Adrienne Mayor, Martina Müller-Wiener, Effie Photos-Jones, Oliver Primavesi, Roshdi Rashed, Jakob Salzmann, Shiyanthi Thavapalan and Françoise Villedieu. Sales price for German museum edition 35 €, English bookshop edition 45 €.

Audio guide app: The audio guide accompanies visitors through the long history of science and technology. From antiquity to the industrial age, it brings the deep link between technical inventions and art to life with the aid of outstanding objects. Available in German, the one-hour app contains audio tracks and images on some 20 installations within the exhibition. Starting at the end of March, it will be available free of charge for the iOS and Android operating systems and conveniently downloadable onto smartphones, for example at home or within Liebieghaus WiFi range. From the end of March, the audio guide will be available for hire at the museum for 5 € (8 € for two).

General guided tours of the exhibition: Spectacular scientific findings, technical achievements and mythical tales: taking place every Friday and Saturday, the guided tour of the exhibition offers a unique perspective on the arts and sciences as two disciplines conceived of as one in antiquity, as well as their influence on the history of culture. Tickets (for admission and tour combined) are available in the online shop at shop.liebieghaus.de for 15 €.

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Cultural partner: hr2-kultur

Social media: The Liebieghaus Skulpturensammlung is communicating the exhibition on social media with the hashtag #Liebieghaus.

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