PETER I AND THE DEVELOPMENT OF NATURAL SCIENCES IN 18TH CENTURY RUSSIA
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PETER’S I RANGE OF INTERESTS

When Peter first arrived to Europe in 1697, the new horizons opened for the young tsar. You can never comprehend the diversity of the world unless you see it with your own eyes. The thirst for knowledge in Europe led to a growing passion for collecting. In Europe Peter I saw numerous galleries, cabinets and kunstkameras whose owners collected various natural and art objects that represented the world in a thumbnail. Gradually, the richness of collections became a symbol of their owners’ rank, title, power and social status. Crown-bearing collectors competed with each other trying to get hold of rare, unusual and valuable items. Peter was not as much fascinated by rarities and treasures themselves, as by the prospect of using such collections to educate and enlighten people and to study nature. That is why he acquired the best natural-history collections and organized scientific expeditions, such as the famous Siberian expedition of D.G. Messerschmidt in 1719—1727, for a comprehensive study and mapping of the country.

Peter I (1672—1725) wanted to make his country a powerful and flourishing state. To achieve this, an outlet to the sea and a fleet were important conditions. The tsar sent dozens of young craftsmen to different countries to study seamanship and shipbuilding. When in Holland, Peter not only acquired some shipbuilding skills, but also studied anatomy and medicine. He continually extended his knowledge in the sphere of medicine, and mastered various advanced techniques used in Europe. During his visit to Paris, Peter witnessed a successful eye-surgery carried out by doctor who removed a patient’s cataract. Peter immediately asked him to train a Russian doctor. A Parisian anatomist named Duverney demonstrated to the tsar his anatomical models made of wax that could be used to teach medical students. Peter instantly ordered his court physician Robert Areskin to acquire such visual aids to train Russian doctors. Unfortunately, due to some unfavourable circumstances, only one wax model was bought. Peter took interest in all kinds of different activities. While in England, he met Isaac Newton, visited Oxford and invited many different specialists to work in Russia. Many of them came to St. Petersburg and worked here, and one of the city’s embankments is still called the English Embankment. While in Leiden, Peter attended lections read by a famous anatomist named Govart Bidloo (1649—1713). He also visited the Amsterdam anatomical theatre and the unique home museum of the famous anatomist Frederik Ruysch. The tsar met Antonie van Leeuwenhoek, who invented the microscope for his studies of “trifling animals”. He also mastered the skills of a dentist and saw various collections of rarities and botanical gardens. He aspired to introduce Russia to all European achievements of that time.
THE “EMPEROR'S CABINET”

The “Emperor’s Cabinet” contained a number of the tsar’s personal possessions. Most of them were transferred there after Peter’s death in 1725.

Not only Peter’s contemporaries, but also the generations that followed, realized the importance of the great reformer’s activities. Peter’s personal possessions, his clothes, instruments and tools are now real treasures that tell about the life of this very important Russian tsar.

Peter’s working clothes. Holland, late 17th – early 18th century. On loan from the State Hermitage collections

Our exposition contains some of the exhibits that once formed the “Emperor’s Cabinet”.

In showcase #19, at the left side, you can see a festive red caftan made of thin cloth manufactured in Russia and a white under-jacket that once belonged to the tsar. Alongside, you can see galvanic copies of the famous “Scythian gold” (the originals were transferred from the Kunstkamera to the Hermitage in 1859). Other gold items found during the excavations of Scythian tumuli in West Siberia, were given to Peter’s wife Catherine I in 1715 by a merchant N.A. Demidov, the owner of Tagil foundries in Ural Mountains, at the occasion of the birth of Peter, the crown prince. The tsar admired these unusual beautiful objects with images of lions, wild horses, deer, snow leopards, panthers and griffons. So, he ordered M.P. Gagarin, the Governor of Siberia, to search for such objects and deliver them to St. Petersburg. In 1716 over 100 items were sent to St. Petersburg reflecting the life of the Scythian peoples that inhabited Central Asia and Siberia during the ancient times. The tsar’s Siberian collection is, in fact, the oldest archaeological collection in Russia that consists of artistic objects produced by the nomads of Siberia. Today, this collection can be seen in the Hermitage in the Special Treasury.
On the bottom part of the showcase there is a plaster copy of Peter’s death mask made by sculptor Bartholomeo Carlo Rasterlli and a plaster cast of Peter’s right hand tinted in bronze. The original cast in iron was made in 1707 in Lipetsk, where the tsar had left a sand handprint when he laid the foundation stone of the iron foundry.

When Peter arrived to Saandam to work on a shipyard, he immediately replaced his tight caftan with a bostrog jacket (from Dutch, short jacket) popular among Dutch seamen, a Saandam sleeveless jacket made of white linen, and a skipper hat made of woollen threads. Peter wore these simple, comfortable and cheap clothes when working in the shipyards of Saandam and the East-Indian Company in Amsterdam. After his return to Russia, the tsar still ordered practical Dutch jackets that he wore while working on his turning machine (lathe) and when doing other crafts.

Since his early years, Peter was interested in different crafts, and by the time of his first travel abroad he had already mastered fourteen of them. He had a passion for tools, which he acquired himself or ordered from Paris, London and Berlin. Most of the instruments he ordered were astronomical, nautical, geodesic and artillery devices. There’s also an interesting collection of the tsar’s drawing instruments. They are exhibited in the right section of the showcase: a brass bisecting compass, an angle meter, a levelling instrument, a protractor and two measuring compasses. Below them are joiner’s tools: a steel hatchet and a hacksaw with a steel blade.

![Peter’s I skipper hat. Holland, late 17th – early 18th century. On loan from the State Hermitage collections](image1)

![Scalpel from Peter’s I set of medical tools. Europe. 17th century](image2)

![Peter’s I working tools. Europe. Early 18th century. On loan from the State Hermitage collections](image3)
Working on a lathe was Peter’s favourite pastime. The production of wooden and ivory handmade articles was a popular hobby among members of royal families and the nobility in 18th-century Europe. The Russian tsar not only mastered the lathe made in 1678 in Amsterdam, but also tried to surpass his tutors. He made medallions, snuffboxes and caskets, which he gave as presents and which were highly valued by people and viewed as awards. Different cutting chisels are exhibited in this showcase: “an oblique chisel with a cutting” designed for turning convex shapes, “a flat oblique-straight chisel” and “a chisel in the shape of a sharp hook” designed for turning various profiles on cylindrical blanks. Perhaps, Peter used one of these chisels to make a semi-spherical cup from a piece of Karelian birch-tree, which might be a high-quality example of his craftsmanship.

A long iron stripe in the bottom section of the showcase deserves special attention. An inscription on it says: “HIS MAJESTY’S WORK 1724 DL NOVEMBER”. There’s evidence that Peter himself manufactured iron on Miller’s plants located 50 versts (an old Russian measure of distance, about 1.1 km) outside Moscow. Until his last days, the tsar continued to master new skills and crafts.

F.H. Webber, a diplomat from Hannover who served in St. Petersburg since 1714, wrote the following words about Peter: “He never wastes his time and is always occupied with something. Usually (when he is in his residence in St. Petersburg, he participates in the Secret Council at 3 or 4 o’clock in the morning. Then he visits the shipyard and makes arrangements there, and also does some work himself; as he knows this business in all its minutest details. At 9 or 10 he engages himself with working on his turning machine and produces most beautiful articles. <...> He is a great lover of theoretical, mathematical and mechanical sciences and is second to no specialist in this domain”.

PETER AND HIS COLLECTION OF MONSTERS

Peter I is often referred to as the reformer of Russia. His reforms primarily regarded military affairs, shipbuilding and industry. However, they also affected other aspects of the country and people’s lives. Peter attached great importance to the development of science, in particular natural sciences and medicine.
He wanted to educate his people and fought against all kinds of superstitions. Peter knew that since ancient times people could not comprehend the reasons for inborn deformities and associated them with supernatural agencies, so in 1718 he issued a decree that ordered to collect human, animal and bird monsters from around Russia and promised a reward. The text of the decree itself is a denunciation of ignorance: "It is known that it happens sometimes that monsters, freaks, are born among people, animals and birds, that have always in all countries been collected as curiosities, for which an order was issued several years ago, so that such monsters are brought and a payment is promised to those who bring them. Several such monsters have already been brought, in particular two babies, each with two heads, and two with bodies accreted together. However, in such a great state there may be more, but they are concealed by ignorant people who believe that such monsters are born due to devil’s powers through sorcery and evil curses, which is impossible, since the creator of all creatures is the God, and not the devil, and deformities are a result of the mother’s inner injuries, and beliefs and fears during her pregnancy, for which there are numerous examples that what a mother is afraid of leaves signs on the baby, or when she is ill or hurts herself and so on. So this decree is renewed so that people or animal and bird monsters are brought in each town to the commandants, and such people will be rewarded.

"Materials for the History of the Emperor’s Academy of Sciences" for 1772 say: "The monster — two-headed calf — sent from the governor’s office of Smolensk must be given to Mister Wolff, Member of the Academy, so that, if he considers this monster worth being preserved in the Kunstkamera together with other monsters, he orders Commissar Bukhvostov to stuff it and place in the Kunstkamera."
in the amount of ten roubles for human, five roubles for animal and three roubles for bird dead monsters, and for live monsters a hundred roubles for human, fifteen roubles for animal and seven roubles for bird monsters; and if it is something very unusual, more will be given, and if something not much different from usual, then less”.

After this decree was issued, dead babies with various anomalies were regularly delivered to the Kunstkamera. By the time the Museum’s first catalogue titled “Musei Imperialis Petropolitanis” was published in 1742, it contained 46 “monsters” already. Although in the times that followed less and less monsters were brought to the Kunstkamera, evidence has preserved of some new arrivals. Thus, 130 years later, an exhibit titled “five embryos on one placenta” was received. The collection of animal monsters was also replenished regularly.
**VARAN [showcase #12].** Varans are the largest of all modern lizards. They are predators and consume various animals: insects, snakes, tortoises and different rodents. Varans protect themselves with sharp teeth and a rigid tail. Desert or grey Varans are spread in Africa, South-West Asia and in Central Asia including South Kazakhstan. When confronted by people, Varans blow out their bodies, hiss and try to bite. They beat their tails hard on their sides, thus making it difficult to seize them. People use the skins of large varans, and in some regions also eat their meat.

► Desert monitor lizard. Stuffed animal. On loan from the Zoological museum collections

**UNICORN HORN (NARWHAL TUSK) [showcase #12].** Narwhal tusk was the most longed-for and cherished item for any collector. It was believed that it staved off plague, served as an antidote and protected its owner from hired killers. In the Middle Ages, the unicorn was depicted as a white horse with a spiral horn growing from its forehead. Narwhal tusks were sometimes given for this mythical creature’s horn. When sailors managed to get narwhal tusks, they sold them to merchants and pharmacists for everybody’s profit. Peter’s father also possessed this rarity.

► Unicorn. An illustration from a tract by K. Gesner, a Swiss naturalist, titled «Historiae animalium» (A History of Animals), 1551

▼ Narwhal tusk. On loan from the Zoological museum collections
GIANT BOURJOIS
(GIANTS AND DWARFS)

In the 17th—early 18th centuries everything unusual was in fashion, and many European sovereigns kept “monsters” at their courts. Today we can still see portraits of some of them. For example, famous painter Velázquez portrayed Sebastian Morra — a dwarf who lived at the Medici’s court. There’s also a double portrait of little Prince Balthazar Carlos with the “monster” child that belonged to the same author, as well as numerous portraits of “monsters” by Coello, Durer and Bosch.

There was also high demand for giants, as they were used as bodyguards. There’s evidence that King of Prussia Friedrich Wilhelm I, who collected giants from all over the world, asked Peter I to send him giants from Russia, which Peter did. A Scotsman named Peter Henry Bruce, a professional military man and a relative of Jacob and Roman Bruce, who were prominent public figures in Peter’s times, started his service in Russia in 1710 and later wrote in his memoirs: “This winter I was ordered to train 30 grenadiers that are to be sent to the King of Prussia as a present. They were gathered from around the tsar’s domains, and they are 6 feet 6 inch to 6 feet 9 inch tall [i.e. from 198 to 206 cm] without footwear. They were trained, armed and equipped according to the Russian traditions, and were dressed in a uniform and headdresses. Among them was an Indian man who once used to groom elephants, a Turkish man, two Persians and three Tatars. Taking into account the fact that the King of Prussia is sent people from all around Europe, one can claim with certainty that no other sovereign in the world has an army that consists of representatives of so many nations”.

Peter I also paid tribute to the fashion of collecting dwarfs and giants.

“After His Majesty had graciously arranged for the dwarfs’ wedding, it was eventually scheduled for November 24th, 1710. In the morning of the wedding day, the bride and groom were married in a Russian serf church. In front of the procession walked a well-dressed marshal dwarf with a marshal’s baton. He was followed by the dressed-up bride and groom, then his Royal Majesty accompanied by several ministers, princes, boyars, officers, etc., and then the male and female dwarfs, 72 in total”. This is how this wedding was described by a German author, who anonymously published his impressions of the young city of St. Petersburg in Frankfurt and Leipzig in 1718.
During his visit to France in 1717, Peter invited a giant and strongman named Nicolas Bourjois to Russia. The tsar met him on April 18th on a fair in Calais, where Bourjois demonstrated his great height (227 cm) and strength. The giant’s powerful chest and wide shoulders impressed Peter greatly, and his frank face and blue eyes won the tsar’s sympathy. Peter invited Bourjois to serve in Russia and offered him good pay. “I’m sending you a French dwarf”, joked Peter in a letter to his wife. In Russia, the giant became Peter’s footman, and could often be seen on the footboard at the back of the tsar’s carriage. The tsar found Bourjois a Finnish bride who was also extremely tall, and they got married on February 22nd, 1720. The tsar hoped that their children would also be exceptionally tall and strong.

Bourjois lived in Russia for seven years. The giant died in St. Petersburg in 1724 of a heart attack and his body was dissected. His skin was prepared to make a dummy, and many of his organs were preserved. However, only the giant’s skeleton and heart have survived until our days. A portrait of Bourjois painted by G. Gsell is kept in the Russian Museum. On the reverse side of the canvas there is an inscription that says “A strong bloke”. A copy of this portrait can be seen in showcase #15.

ANATOMICAL THEATRE

People have always been trying to comprehend the mystery of the human body, but for many centuries anatomy had been a banned science. Dissection of dead bodies was prosecuted by all world religions. Claudius Galenus (131—201 BC) of Pergamum, who was an acknowledged authority in anatomy, wrote his scientific works basing on dissection of pigs and monkeys. Only as late as in the 16th century dissection of dead bodies to educate medical students became a regular practice in Italy. In 1594 the first anatomical theatre was built in Padua that could accommodate up to 300 spectators. Dissections were not only scientific events, but also grand ceremonies which began with processions headed by the Chancellor of the University followed by professors and teachers of medicine, for whom seats were reserved in the
first row. Representatives of the city government also sat there. The second and the third rows were allotted to medical students, and the rest of the seats were occupied by the townspeople. Dissections attracted great interest, and many physicians from different countries came here to participate in them.

Among them we should mention a Flemish anatomist named Andreas Vesalius (1514—1564). He is often referred to as the founder of modern human anatomy, and there are hardly any other scientific domains that owe so much to a single man’s genius. He was born in the family of a pharmacist at the court of Charles V. Since his early age, Andreas was interested in medicine and tried to study anatomy by dissecting dead criminals’ bodies that he stole from gallows. When this was revealed, Vesalius, to avoid punishment, had to leave Paris where he was studying. It was in Padua that he finally could conduct his work openly, and at the age of 23 he became a Professor of surgery there. In 1542 Vesalius wrote his great work titled *On the Structure of the Human Body*, where he corrected over 200 mistakes made by Galenus and described human skeleton, muscles and inner organs in full detail.

In 1628 William Harvey (1578—1675) from England described blood circulation. For centuries people had been thinking that blood moves back and forth along blood vessels and gets from one cardiac chamber to the other. Vesalius discovered that the septa between the cardiac chambers did
not let blood through. Valves were discovered in blood vessels, due to which blood can only flow in one direction. The concept of blood circulating around the body and getting from one cardiac chamber to the other through lungs, seemed inconceivable at that time. For young physicians, Vesalius and Galenus were heroes who dared to question and debunk the established false concepts.

In early 17th century the first microscopes were created. They were presumably invented by the Dutch instrumentmakers Hans and Zacharias Jansen and Antonie van Leeuwenhoek (1632—1723). Leeuwenhoek manufactured fine lenses that were 3 mm thick and allowed him to examine capillary vessels and nerve vessels. He was the first man to see infusoria and microbes. Frederik Ruysch used his microscopes for his anatomical researches.

![Anatomical Theater of Amsterdam. Drawing from the collection of the City Archive of Amsterdam, the Netherlands](image)

The Anatomical Theater of Amsterdam opened in 1691. In the middle there was a table, and around it there were eight circles with benches. F. Ruysch worked here for many days. On the ceiling of the dome there are coats of arms of leaders of the guild of surgeons and in the center there is a large coat of arm of F. Ruysch.

![William Harvey (1578—1657), an English physician, founder of physiology and embryology, author of the blood circulation theory. A portrait by John Riley, the scholar’s contemporary](image)
BARBUS BARBUS FISH SKELETON [showcase #16]. Barbus Barbus is a freshwater fish found in Europe. It got its name for two pairs of feelers located on the sides of its mouth and on the upper jaw. It prefers river depths with stone bottoms. Barbus Barbus feeds itself with small river animals: roe and young fish. Sometimes it jumps out of the water and swallows insects flying low above the water surface.

STURGEON [showcase #17]. Sturgeons differ from other types of fish by the fact that a resilient chord without vertebrae forms their skeleton. Sturgeons, except for starlets, are found only in the northern hemisphere, in Europe, Northern Asia and North America. They are long-livers and can be quite big in size. The largest starlet ever caught weighed 16 kg and was 125 cm long. Sturgeons can be even larger, and there is evidence that a huge sturgeon was delivered to the Kunstkamera, and its skeleton was cleared and “tied” by anatomist Johann Georg Duvernoy.

In this showcase you can see a relatively large stuffed sturgeon that was caught in a Siberian river.
THE FIRST ANATOMISTS
OF THE ACADEMY OF SCIENCES

Impressed by European natural history collections and kunstkameras, Peter I lay in 1718 the foundation stone of the building of the St. Petersburg Kunstkamera that was to accommodate the museum, but also an observatory, an anatomical theatre, a cabinet of physics and a library. This building was to become a palace of sciences. Before, there had not been a building that answered so many purposes, and Peter’s Kunstkamera was the first building in the world designed specifically for preservation and display of museum collections. The Kunstkamera also was to house the meetings of the Academy of Sciences established in 1724 at the tsar’s order. Peter chose one of the most important and most beautiful places in the city for the Kunstkamera — the spit of the Vasilievsky Island.

Foreigners developed the first composition of the Academy of Sciences. Nine of the thirteen members of the Academy were German scholars. One of them wrote in a letter to his friend: “We have an excellent library at our disposal, a rich chamber of naturalia, a münz-cabinet, our own print shop and engraving machine, and everything necessary for the development of sciences. Correspondence for scientific purposes is free of charge. I’m sure that no other academy or university enjoys such privileges”. Another German who was invited to work in St. Petersburg wrote: “However, the establishment for anatomy here does not yield to the one in Paris. Because since Professor Duvernoy’s from Tübingen, who luckily escaped death in the sea, came here, he has had in the last three months as many dead bodies as he needs, and he has dissected already more than a dozen. Among them, one was very rare. Having extracted the embryo from its mother’s womb, he made some very important observations. I am sure that if many German medical students knew what possibilities there are here to study anatomy, they would rather come here through Lübeck with fewer expenses, then to Amsterdam to Ruysch or to Paris. Professor Duvernoy has successfully shown the main thoracic duct, which is normally hard to find, and injected it with quicksilver.”

A young anatomist named Johann Georg Duvernoy (1691—1759) who came to St. Petersburg with his student Josias Weitbrecht (1702—1747) from Tübingen University

Laurentius Blumentrost (1692—1755) was the first President of the St. Petersburg Academy of Sciences and Peter’s I court physician. He was born in Russia, in the family of tsar’s Alexey Mikhailovich’s court physician. He received his education in Europe, and learned from F. Ruysch and J.G. Duverney.
conducted dissections of dead human bodies and rare animals in the anatomical theatre. They not only recorded all of their observations, but also taught Russian students and read lectures.

In 1728 the first scientific journal in Russia began to be published in the Latin language. It was titled Commentarii Academiae scientiarum Petropolitanae and contained articles written by Duvernoy and Weitbrecht, who soon became a well-known physiologist. In 1747-1758 a Dutch physicist named Abraham Kaau-Boerhaave (1715—1758) worked in the Russian Academy of Sciences. He wrote a dissertation titled About Monsters that was published in St. Petersburg. He also trained Alexey Protasov, who defended his doctoral thesis in 1763 and became the first Russian anatomist of the St. Petersburg Academy of Sciences.

A world-famous scholar, philosopher and naturalist named Christian Wolff (1679—1754) who was Leibniz’s student and follower, wrote to Leonard Eiler who was going to Russia to work in the Academy of Sciences: “You are now going to the scientists’ paradise”.

MARIA SYBILLA MERIAN AND THE GSELLS

Maria Sybilla Merian (1647—1717) was born in Germany in an artist’s family. Since her early years she was keen on embroidery and bred silkworm herself to get silk. While observing the insects, she discovered the phenomenon of metamorphosis: egg — larva — pupa — adult. Later she published her Book about Worms with beautiful watercolour illustrations. In 1691 Maria Sybilla came to Amsterdam where she studied the insects from Seba’s and Ruysch’s collections. Eight years later she sailed to South America where she lived in Suriname for more than two years with her daughter Maria Dorothea. This journey resulted in a book titled Metamorphosis of Surinamese Insects Drawn from Life and Life-Sized and Described by Maria Sybilla Merian (Metamorphosis insectorum Surinamensium). She dedicated this book (published in 1705) to “all curious and studious observers of nature”.

▼ Front page of the Kunstkamera’s first printed catalog titled «Musei Imperialis Petropolitani»

Cataloging of the Kunstkamera’s collections was an important mission that many members of the Academy of Sciences participated in. Natural-scientific collections were described in the three parts of the catalog’s first volume published in 1742—1745 in the Latin language.
In the next several years, Maria Sybilla Marian, researcher and artist, worked on her book *Book about Worms*, two volumes of which were published in Amsterdam in 1713 and 1714. Her daughter prepared the third volume for publication, as Maria Sybilla got paralyzed. She died on January 2nd, 1717, before the third volume was published. Her daughter Maria Dorothea, who accompanied her to Suriname, finished this work.

Peter I bought a collection of Maria Sybilla’s watercolours. The Expenses Book for 1717 says that on January, 2nd the tsar ordered to pay an Amsterdammer named Georg Gsell (Maria Sybilla’s son-in-law) 3000 guilders for two large books (254 pages) with inset “glassing sheets” where “different flowers, and also butterflies, flies and various other creatures were painted with high artistic mastery.”

The above-mentioned Georg Gsell (1673—1740), an artist and antiquarian, was an acknowledged connoisseur of art, and often consulted Peter when he acquired paintings. Most probably, Georg invited the tsar to his house to see his mother-in-law’s watercolours. The tsar not only bought them, but also invited Gsell and his wife Dorothea Maria to St. Petersburg to teach art and painting to young people. In October 1717 the Gsells came to St. Petersburg where they lived for the rest of their lives. They taught painting and worked in the Kunstkamera. Maria Dorothea can be referred to as the Museum’s first designer and decorator. Her husband Georg assisted anatomists by making detailed drawings during the dissections. Georg Gsell also created over 20 religious paintings for the Peter-and-Paul Cathedral and the Lutheran Church of St. Peter, and numerous portraits.
BUTTERFLIES [showcase #15]. In memory of Maria Sibylla Merian, in this showcase we have displayed butterflies: wonderful creatures that this talented artist captured with great accuracy in her inimitable drawings. As we cannot display Surinamese butterflies, this showcase contains insects collected around St. Petersburg and in the south of Russia. On the left, you can see swallowtail butterflies, azures, large tortoiseshells, and wood-admirals found around St. Petersburg. On the right there are moths, sibyls and various meadow and steppe butterfly species. Almost all of these butterflies are harmless, except for some noctuidae and white butterflies that can blight crops. For any collector, though, these creatures with velvety bright wings are a great joy.

▲ Collection of butterflied. On loan from the Zoological museum collections