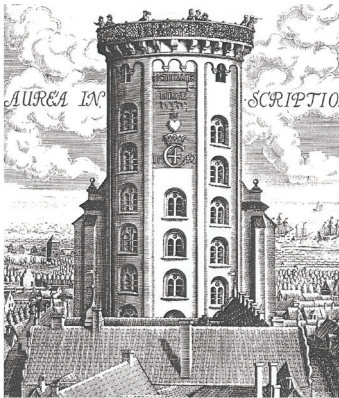
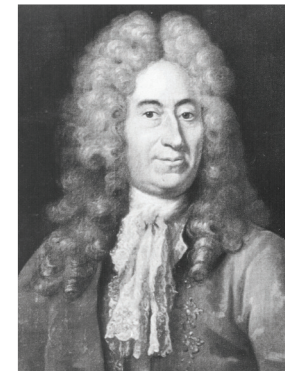
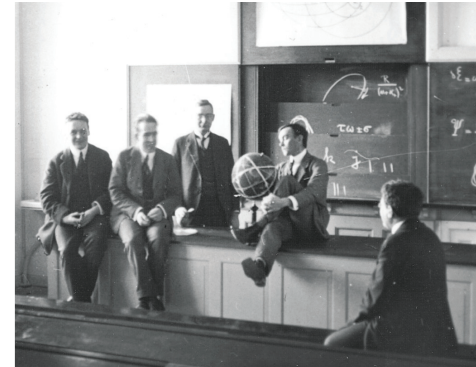


En guide til fysikkens historiske steder i København

A guide to historical sites of physics in Copenhagen



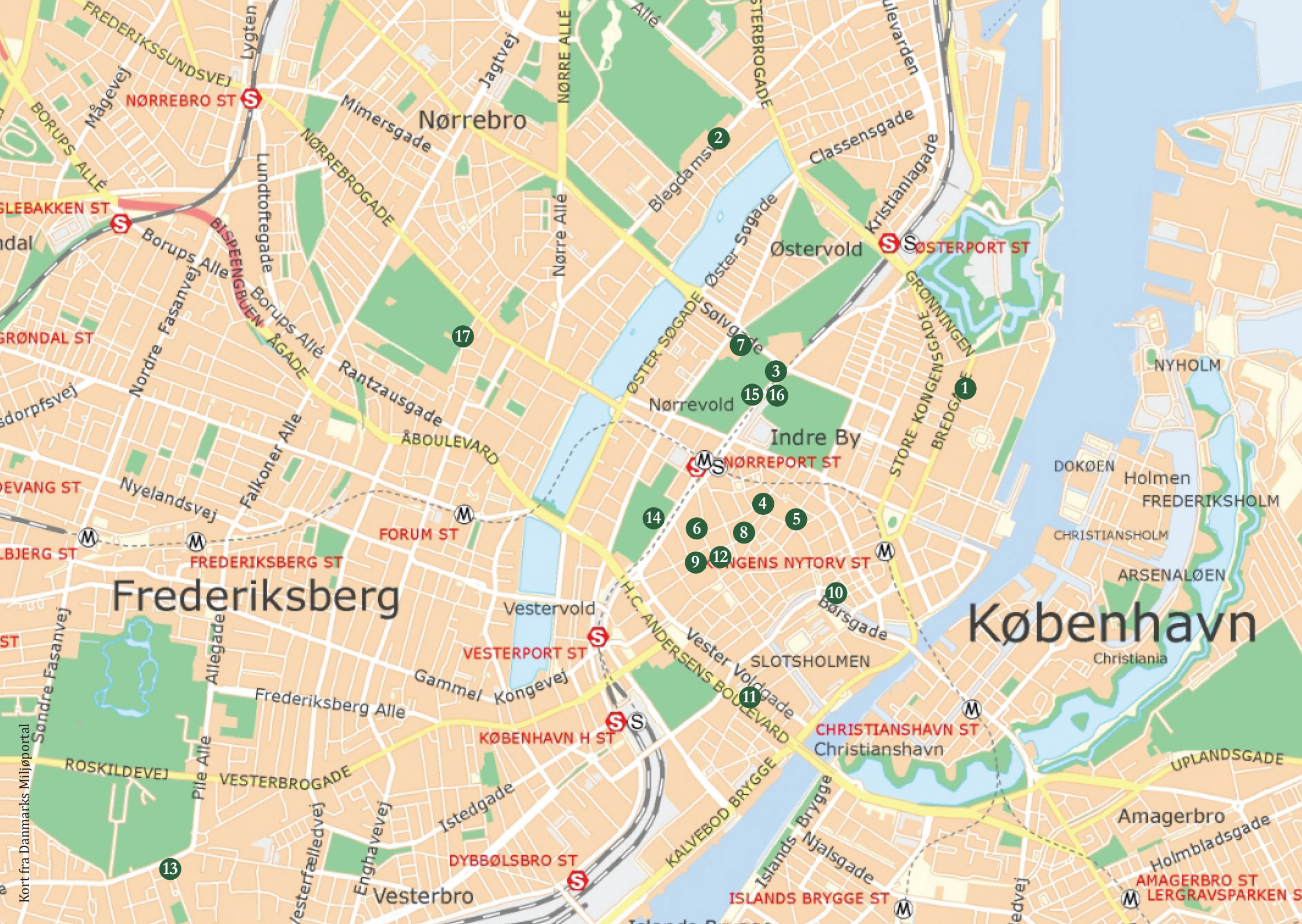
Fysik Tur



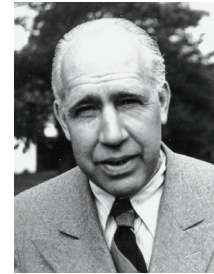
Physics Tour



NIELS BOHR INSTITUTET
KØBENHAVNS UNIVERSITET



Kort fra Danmarks Miljøportal



NIELS BOHR

Niels Bohr (1885-1862), berømt dansk fysiker, som fik nobelprisen for sin atommodel og gjorde revolutionerende opdagelser inden for kvantemekanikken.

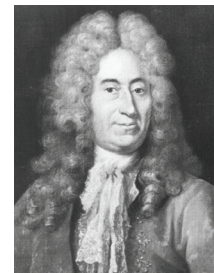
Niels Bohr (1885-1862) was a famous Danish physicist who received the Nobel Prize for his atomic model and made revolutionary discoveries in quantum mechanics.



HANS CHRISTIAN ØRSTED

Den danske fysiker Hans Christian Ørsted (1777-1851) opdagede i 1820 elektromagnetismen.

The Danish physicist Hans Christian Ørsted (1777-1851) discovered electromagnetism in 1820.



OLE RØMER

Ole Rømer (1644-1710) var en dansk astronom, der især huskes for sin opdagelse af lysets endelige hastighed.

Ole Rømer (1644-1710) was a Danish astronomer who is especially remembered for his discovery of light's finite speed.



NIELS STENSEN

Niels Stensen (1638-1686) var en dansk anatom og videnskabsmand som grundlagde palæontologien og geologien og gjorde vigtige opdagelser inden for anatomien.

Niels Stensen (1638-1686) was a Danish anatomist and scientist who founded palaeontology and geology and made important discoveries in the field of anatomy.



TYCHO BRAHE

Tycho Brahe (1546-1601), dansk astronom. Så 11. nov. 1572 en ny stjerne, Stella Nova. Grundlægger af den moderne observerende astronomi.

Tycho Brahe (1546-1601), Danish astronomer. On 11th November 1572 he saw a new star, Stella Nova. Founder of modern observational astronomy.



NIELS BOHR'S BARNDOMSHJEM NIELS BOHR'S CHILDHOOD HOME

BREDGADE 62
1260 KØBENHAVN K

1

I 1886 flyttede Niels Bohrs far og mor, Christian Bohr og Ellen Adler Bohr, med deres to ældste børn, Jenny og Niels ind i Bredgade 62, da Christian Bohr blev ansat som lektor på Fysiologisk Institut ved Københavns Universitet. Huset på Bredgade 62 var Niels Bohrs barndomshjem, og han boede her, til han modtog sin doktorgrad i 1911. Som barn gik Niels Bohr på Gammelholm Skole, som lå nogle gader fra Bredgade 62.

I en bygning bag hjemmet lå Christian Bohrs fysiologilaboratorium, og som studerende undersøgte Niels Bohr her væskers overfladespænding. Efter dette arbejde lykkedes det ham i 1907 at opnå en guldmedalje for en prisopgave udskrevet af Det Kongelige Danske Videnskabelige Akademi. Denne opgave blev til Niels Bohrs første publicerede artikel, som blev udgivet på engelsk i 1909 i *Philosophical Transactions of the Royal Society of London*. Artiklen er den eneste, der beskriver Bohrs eget eksperimentelle arbejde.

Huset på Bredgade 62 blev bygget i 1785 til Det Kongelige Kirurgiske Akademi, og i 1948 blev det til medicinhistorisk museum, i dag *Medicinsk Museion*.

Niels Bohr's father and mother, Christian Bohr and Ellen Adler Bohr, moved with their two oldest children, Jenny and Niels into Bredgade 62 in 1886, when Christian Bohr was appointed Associate Professor in the Department of Physiology at the University of Copenhagen. The house on Bredgade 62 was Niels Bohr's childhood home and he lived here until he received his doctorate in 1911. As a child, Niels Bohr attended Gammelholm Grammar School, which was a few streets away from Bredgade 62.

Christian Bohr's physiology laboratory was located in a building behind the family home. Niels Bohr used this laboratory as a student when he studied the surface tension of liquids for a prize essay issued by the Royal Danish Academy of Sciences and Letters. For this work he achieved a gold medal.

This essay became Niels Bohr's first published article, which was published in English in 1909 in *Philosophical Transactions of the Royal Society of London*. The article is the only one to describe Bohr's own experimental work.

The house on Bredgade 62 was built in 1785 for the Royal Danish Academy of Surgery and in 1948 it became a museum of medical history, known today as the *Medical Museion*.



NIELS BOHR INSTITUTET NIELS BOHR INSTITUTE

BLEGDAMSVEJ 17
2100 KØBENHAVN Ø

2

Niels Bohr Institutet på Blegdamsvej 17 blev oprettet til Niels Bohr og indviet i 1921 som Institut for Teoretisk Fysik på Københavns Universitet - fem år efter, at han var blevet udnævnt til professor.

Niels Bohr publicerede sin teori om atomets opbygning i tre artikler i 1913. Niels Bohrs banebrydende atommodel brød radikalt med klassisk fysik, og har siden udgjort grundlaget for vores forståelse af atomerne og for den kvantemekaniske revolution. Al informations-teknologi er således vokset ud af Bohrs opdagelse i 1913. I 1922 modtog Niels Bohr Nobelprisen i fysik for sit arbejde.

Hans arbejde med kernefysik i 30'erne var indirekte forudsætningen for atombomben, og Bohr var - som alle andre rystet over at se, hvad hans arbejde udviklede sig til, og til sin død i 1962 arbejdede han utrætteligt på at skabe en åben dialog mellem alle verdens nationer.

Institutet har siden 1920'erne spillet en bemærkelsesværdig rolle i international forskning og været uformelt mødested for elitefysikere fra hele verden.

I anledning af 80 årsdagen for Niels Bohrs fødsel fik instituttet i 1965 navn efter ham. Niels Bohr Institutet er stadig et internationalt center for fysik, og med over 1000 ansatte og studerende spænder undervisning og forskning over partikelfysik, kvantefysik, nanofysik, geofysik, biofysik og astrofysik.

The Niels Bohr Institute at Blegdamsvej 17 was created for Niels Bohr and inaugurated in 1921 as the Institute for Theoretical Physics at the University of Copenhagen, five years after Niels Bohr was appointed professor.

Niels Bohr published his theory of the structure of the atom in three articles in 1913. Niels Bohr's pioneering atomic model broke radically with classical physics and has since formed the basis for our understanding of atoms and for the quantum revolution. All information technology has also grown out of Bohr's discovery in 1913. In 1922, Niels Bohr received the Nobel Prize in Physics for his work.

His work with nuclear physics in the 30s was the indirect prerequisite for the atomic bomb and Bohr was - like everyone else - shocked to see what his work evolved into and he worked tirelessly to create an open dialogue between all nations of the world until his death in 1962.

The institute has played an important role in international research since the 1920s and has been an informal meeting place for elite physicists from around the world.

In 1965, on the occasion of the 80th anniversary of Niels Bohr's birth, the institute was named after him. The Niels Bohr Institute is still an international centre for physics with over 1000 employees and students with teaching and research ranging across particle physics, quantum physics, nanophysics, geophysics, biophysics and astrophysics.



GEOLOGISK MUSEUM GEOLOGICAL MUSEUM

ØSTER VOLDGADE 5-7
1350 KØBENHAVN K

Det nuværende geologiske museum blev åbnet i 1893 og blev kaldt det mineralogiske museum. Samlingerne på Geologisk Museum har en lang og omskiftelig historie bag sig. Den ældste udstillingsgenstand i huset er et 218 kg tungt stykke trådsølv fra Norge, som blev fundet i 1666. Den stammer fra Kong Frederik III's kunstkammer, som var et af de første 'naturaliekabinetter' i Danmark. Naturalie- eller raritetskabinetter var samlinger af forunderlige og sjældne naturhistoriske genstande, som blev oprettet hos fyrster og fremtrædende borgere i renæssancen og en slags forløbere for vore dages museer.

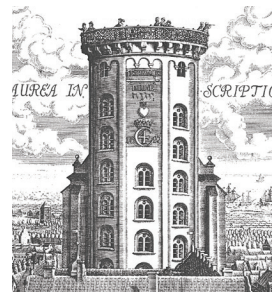
Københavns Universitet fik først sin egen naturhistoriske samling, *Universitetets Nye Naturaltheater*, i 1772. Siden blev samlingen udvidet og skiftede navn og adresse flere gange. Den geologiske del af samlingen fik under navnet Mineralogisk Museum sit eget hus i 1893 og blev i 1976 til Geologisk Museum. I samlingen findes de zirkoniumrige norske mineraler, som i 1922 blev brugt af George de Hevesy og Dirk Coster, da de i deres arbejde på Niels Bohr Institutet identificerede grundstof 72, Hafnium, latin for København.

Geologisk Museum er dekoreret indvendigt af maler Oscar Matthiesen i 1916. På væggen ved trappen kan man se en freske af den danske videnskabsmand Niels Stensen, også kendt som Steno. Under billedet står: *Nicolau Stenoni geologiae parenti honoris causa* – Til ære for Niels Stensen, geologiens fader.

The current Geological Museum was opened in 1893 and was originally called the Mineralogical Museum. The collections of the Geological Museum have a long and chequered history. The oldest object in the building is a 218 kg piece of wire silver from Norway, which was found in 1666. It originates from King Frederik III's cabinet of curiosities, which was one of the first 'natural history cabinets' in Denmark. Natural history or curio cabinets were collections of strange and rare natural history objects that were collected by princes and prominent citizens during the Renaissance and were precursors for modern museums.

The University of Copenhagen first acquired its own natural history collection, *The New Natural Theatre of the University*, in 1772. The collection has since been expanded and changed its name and address several times. The geological part of the museum got its own building in 1893 under the name the Mineralogical Museum and became the Geological Museum in 1876. In the collection are the zirconium rich Norwegian minerals, which were used in 1922 by George de Hevesy and Dirk Coster at the Niels Bohr Institute to identify element 72, Hafnium, Latin for Copenhagen.

The interior of the Geological Museum was decorated by the painter Oscar Matthiesen in 1916. On the wall by the stairs you can see a fresco of the Danish scientist Niels Stensen, also known as Steno. Under the picture reads: *Nicolau Stenoni geologiae parenti honoris causa* – In honour of Niels Stensen, the father of geology.



RUNDETÅRN THE ROUND TOWER

KØBMAGERGADE 52A
1150 KØBENHAVN K

Rundetårn er bygget i årene 1637 til 1642 og huser Europas ældste fungerende observatorium. Det blev bygget af Christian IV, og arkitekten bag formodes at være Hans Van Steenwinckel den yngre eller måske kongen selv. Observatoriet skulle blandt andet bruges til at iagttage og opdage kometer og til almanakudgivelse, og Rundetårn var i mere end 200 år centrum for dansk astronomi. Desuden håbede man via observationer af stjernehimlen at kunne forbedre landets søfartsnavigation. Den første leder af observatoriet blev Tycho Brahes elev, den på det tidspunkt 80-årige Christen Sørensen Longomontanus. Longomontanus havde forinden foreslået at bygge et observatorium på Valby bakke for at undgå byens lys og røg. Alligevel blev det af forskellige årsager besluttet at bygge Rundetårn inden for voldene.

Observatoriet havde sin storhedstid under Ole Rømer, som var ledende observatør fra 1685 til 1710, og det oplevede en sidste blomstring fra 1777 til 1815 under matematiker Thomas Bugge. I længden blev Rundetårns beliggenhed midt i København dog for stort et problem, og i midten af det 19. århundrede var det forfaldent og udsvarende. Man flyttede i 1861 observatoriet til Østervold, og i 1929 indrettede man i stedet et 'folkeobservatorium' på toppen af tårnet. Folkeobservatoriet er stadig i dag på udvalgte dage åbent for offentligheden.

The Round Tower was built in the years 1637 to 1642 and is the oldest functioning observatory in Europe. It was commissioned by Christian IV and the architect is believed to have been Hans Van Steenwinckel the younger or perhaps the King himself. The observatory was supposed to observe and discover comets and was responsible for publishing almanacs. The Round Tower was the centre of Danish astronomy for more than 200 years. In addition, it was hoped that observations of the night sky would help improve the country's maritime navigation. The first director of the observatory was Tycho Brahe's pupil, the then 80-year-old Christen Sørensen Longomontanus. Longomontanus had previously proposed to build an observatory in Valby to avoid the city lights and smoke.

The observatory had its heyday under the direction of Ole Rømer, who was the Chief Observer from 1685 to 1710, and it experienced a final bloom from 1777 to 1815 under the direction of the mathematician Thomas Bugge. However, in the long run the Round Tower's location in the middle of Copenhagen was too big a problem and by the middle of 19th century was dilapidated and obsolete. The observatory was moved to Østervold in 1861 and in 1929 a 'public observatory' was set up on top of the tower instead. The public observatory is still open to the public on select days.



NIELS STENSENS FØDESTED NIELS STENSEN'S BIRTHPLACE

KLAREBODERNE
KØBMAGERGADE
1115 KØBENHAVN K

Niels Stensen, også kendt som Nicolaus Steno, blev født i 1638 i et hus, som lå på hjørnet af Klareboderne og Købmagergade. Huset er ikke bevaret, men en mindeplade med indskriften "Her fødtes Niels Stensen 1638-1686 Anatom Geolog Biskop" er sat op på muren ved krydset. Hans far, Steen Pedersen, var guldsmed og leverandør til Kong Christian IV. Stensens mor, Anna Nielsdatter, hjalp med at drive forretningen, som overgik til hende efter Steen Pedersens død i 1645.

Efter tre års studier i medicin ved Københavns Universitet fra 1656 til 1659 tog Stensen på studierejse i Europa, og han fuldførte sit medicinstudie ved universitetet i Leiden, Holland. Han gjorde i sin forholdsvis korte karriere som videnskabsmand en række banebrydende opdagelser. I løbet af sit ophold i Holland opdagede han både tårekanalen og ørespytkirtlens udførselsgang, 'Stensens Gang'. Niels Stensen kaldes desuden 'geologiens fader' og er kendt som grundlægger af palæontologien via studier af fossilerede hajtænder. Han bidrog også med vigtige opdagelser inden for mineralogien. I 1667 konverterede han til katolicismen og efter en kort ansættelse som professor i anatomi ved Københavns Universitet (1672-1674), forlod han i 1675 endegyldigt naturvidenskaben og blev samme år præsteviet i Firenze. Siden blev han også bispeviet i Hannover og døde i 1686.

Niels Stensen, also known as Nicolaus Steno, was born in 1638 in a house near the corner of Klareboderne and Købmagergade. The house is not preserved, but a commemorative plaque with the inscription "The birthplace of Niels Stensen 1638-1686 Anatomist Geologist Bishop" has been placed on a wall at the intersection. His father, Steen Pedersen, was a goldsmith and purveyor to King Christian IV. Stensen's mother, Anna Nielsdatter, helped run the business, which was passed on to her after Steen Pedersen's death in 1645.

After studying medicine for three years at the University of Copenhagen from 1656 to 1659, Stensen departed on a study tour around Europe and completed his medical studies at the University of Leiden in the Netherlands. In his relatively short career as a scientist he made a number of groundbreaking discoveries. During his stay in the Netherlands, he discovered both the tear duct and the duct of the parotid gland, "Stensen's Duct". Niels Stensen is also called the "Father of Geology" and is known as the founder of palaeontology through the study of fossilized shark teeth. He also contributed to discoveries in mineralogy. In 1667, he converted to Catholicism and after a brief appointment as a professor of anatomy at the University of Copenhagen (1672-1674), he left science for good in 1675 and in the same year he was ordained priest in Florence. He was later consecrated bishop of Hannover and died in 1686.



HANS CHRISTIAN ØRSTED HANS CHRISTIAN ØRSTED

NØRREGADE 21
1164 KØBENHAVN K

Hans Christian Ørsted var søn af en apoteker fra Rudkøbing på Langeland. I 1793 rejste han til København for at studere, og han var usædvanligt dygtig. H.C. Ørsted var meget interesseret i naturvidenskab, men dengang fandtes hverken fysik eller kemi som selvstændige fag ved Københavns Universitet. Han studerede derfor farmaci og bestod sin eksamen i 1797.

Efter studierejser til Berlin og Paris begyndte han i 1804 at undervise ved Københavns Universitet, og i 1817 blev han udnævnt til professor i fysik. I 1819 flyttede han ind i Nørregade 21, som også rummede universitetets fysik- og kemilokaler.

Hele sit liv søgte H.C. Ørsted efter de større sammenhænge. Han ville især gerne vide, hvordan naturens forskellige kræfter er forbundet, og som fysiker var Ørsted sikker på, at der var en sammenhæng imellem de elektriske og de magnetiske kræfter.

Inden en af sine forelæsninger besluttede han, at han ville prøve at demonstrere den sammenhæng. Han ville forsøge at få en stærk elektrisk kraft til at påvirke en magnet. Under denne forelæsning i 1820 opdagede han foran de studerende elektromagnetismen, hvilket sendte chokbølger gennem den naturvidenskabelige forskningsverden.

Bygningens auditorium eksisterer ikke længere, men den nuværende bygning på stedet bærer indskriften: *I et hus på dette sted opdagede fysikeren Hans Christian Ørsted elektromagnetismen i året 1820.*

Hans Christian Ørsted was the son of a pharmacist from Rudkøbing on Langeland. In 1793, he travelled to Copenhagen to study and he was exceptionally gifted. H.C. Ørsted was very interested in science, but at that time neither physics nor chemistry were separate subjects at the University of Copenhagen. As a result, he studied pharmacy and passed his exam in 1797.

After study trips to Berlin and Paris, he began to teach at the University of Copenhagen in 1804 and in 1817 he was appointed professor of physics. In 1819, he moved into Nørregade 21, which also housed the university's physics and chemistry laboratories.

All of his life H.C. Ørsted sought after the greater connections. He especially wanted to know how the various forces of nature were connected and as a physicist Ørsted was sure that there was a relationship between the electric and the magnetic forces.

Before one of his lectures he decided that would try to demonstrate this relationship. He would try to get a strong electric force to influence a magnet. During this lecture in 1820 he discovered electromagnetism in front of his students, which sent shockwaves through the scientific community.

The building's auditorium no longer exists, but the present building on the site bears the inscription:

In a house at this location the physicist Hans Christian Ørsted discovered electromagnetism in the year 1820.



POLYTEKNISK LÆREANSTALT COLLEGE OF ADVANCED TECHNOLOGY

SØLVTORVET
SØLVGADE 83
1307 KØBENHAVN K

7

Polyteknisk læreanstalt, i dag *Danmarks Tekniske Universitet*, blev oprettet i 1829 i 'union' med Københavns Universitet. Det betød, at undervisningen i fysik, kemi og matematik var fælles, og H.C. Ørsted, som var rektor for Polyteknisk Læreanstalt, underviste i fysik.

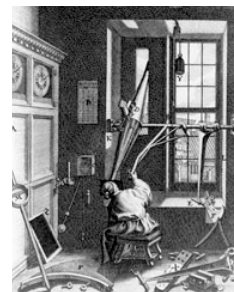
Læreanstalten fik først lokaler i universitetets bygninger i Studiestræde, som også rummede 'Fysisk Samling' samt i Sct. Peders Stræde. Også Københavns Universitets kemilaboratorium i gården mellem de to bygninger blev en del af rammerne for den nye undervisningsinstitution. Oprettelsen af Polyteknisk Læreanstalt var godt nyt for fysikken, som var et ret overset fag - et slags appendiks til medicinstudiet. H.C. Ørsted, som havde været leder af den komité, som skulle grundlægge Polyteknisk Læreanstalt, spillede derfor en stor rolle i, at fysikfaget nu fik en selvstændig position ved Københavns Universitet.

I 1890 blev den polytekniske læreanstalt flyttet fra Studiestræde til Sølvgade 83, og det var her Niels Bohr tilbragte det meste af sin tid som studerende. Fra 1912 til 1920 var Polyteknisk Læreanstalt også Bohrs arbejdsplads - først som underviser og fra 1916 som professor i teoretisk fysik. Det lille værelse, han havde til sin rådighed, og som han delte med sin hollandske assistent H. A. Kramers, lå på øverste etage med udsigt til Botanisk Have.

The Polyteknisk Læreanstalt (College of Advanced Technology), today the *Technical University of Denmark*, was established in 1829 in "union" with the University of Copenhagen. This meant that physics, chemistry and mathematics were taught jointly and H.C. Ørsted, who was the rector of the Polyteknisk Læreanstalt, taught physics.

The Læreanstalt had rooms in the university buildings in Studiestræde, which also housed the "Physical Collection", and in Sct. Peders Stræde. The University of Copenhagen's chemistry laboratory in the courtyard between the two buildings was also part of the setting for the new educational institution. The establishment of the Polyteknisk Læreanstalt was good news for physics, which was a rather neglected subject, a kind of add-on to the medical school. H.C. Ørsted, who had been the head of the committee to establish the Polyteknisk Læreanstalt, therefore played a major role in the field of physics gaining an independent position at the University of Copenhagen.

In 1890, the Polyteknisk Læreanstalt moved from Studiestræde to Sølvgade 83, and it was here that Niels Bohr spent most of his time as a student. From 1912 to 1920, the Polyteknisk Læreanstalt was also Bohr's workplace as a teacher and from 1916 as a professor of theoretical physics. The small room he had at his disposal, which he shared with his Dutch assistant H. A. Kramers, was on the top floor overlooking the Botanical Gardens.



OLE RØMER OLE RØMER

STORE KANNIKESTRÆDE 16
1169 KØBENHAVN K

8

Ole Rømer begyndte som 18-årig sine studier ved Københavns Universitet. Her blev han assistent for professor Erasmus Bartholin og lærte astronomiske observationer. I 1671 rejste han til Paris, hvor han blev i 9 år og specialiserede sig i mere og mere nøjagtige målinger af Jupiters måners omløb og formørkelser. Observationerne gjorde, at han i 1776 fandt frem til, at lyset ikke udbreder sig øjeblikkeligt, men faktisk har en bestemt, målbar hastighed. Han kaldte det for *lysets tøven*.

I Paris blev han optaget ved det fornemme Académie Royale des Sciences. I 1681 blev Rømer kaldt hjem til Danmark. Han blev kongens matematiker og professor i astronomi ved Københavns Universitet og dermed leder af observatoriet i Rundetårn. Rømer forblev i Danmark til sin død, og han nåede i denne tid at opfinde flere vigtige astronomiske instrumenter, at effektivisere det danske mål- og vægtsystem, at blive foregangsmand for Fahrenheits temperaturskala, at få bygget et privat observatorium og at blive en betydningsfuld embedsmand.

Her på Store Kannikestræde 16 finder man en mindeplade for Ole Rømer med ordlyden:

Her laa indtil 1728 den professor-residens, hvor Ole Rømer professor i astronomi, politimester i København boede til sin død 19 September 1710.

Ole Rømer began his studies at the University of Copenhagen as an 18 year old. He became an assistant to Professor Erasmus Bartholin, who was instrumental in Rømer's choice of astronomy as a focus of his studies. In 1671, he travelled to Paris, where he stayed for 9 years and specialised in more and more accurate measurements of the orbits of Jupiter's moons and eclipses. The observations led to his discovery in 1776 that light does not disperse instantaneously, but has a specific, measurable speed. He called this *the hesitation of light*.

In Paris, he was accepted by the Académie Royale des Sciences. In 1681, Rømer was summoned home to Denmark. He became the Royal Mathematician and Professor of Astronomy at the University of Copenhagen and thus the head of the observatory in the Round Tower. Rømer remained in Denmark until his death and in this time he managed to invent several important astronomical instruments, modernised the Danish weights and measures system, became a standard bearer for Fahrenheit's temperature scale, built a private observatory and became an important official.

Here on Store Kannikestræde 16 is a commemorative plaque for Ole Rømer with the text:

Here stood until 1728 the professorial residence where Ole Rømer, Professor of Astronomy, Chief of Police for Copenhagen, lived until his death, 19th of September 1710.



H.C. ØRSTED H.C. ØRSTED

STUDIESTRÆDE 6
1455 KØBENHAVN K

I 1801 foretog H.C. Ørsted sin første studierejse til udlandet blandt andet for at gennemføre studier i kemi og fysik. I Paris besøgte han den nyoprettede "École Polytechnique", som på det tidspunkt var en basisuddannelse i de naturvidenskabelige fag matematik, fysik og kemi for kommende ingeniører. Besøget gjorde stort indtryk på Ørsted, som i sin tænkning og i sit virke allerede fokuserede på tværfaglighed, også natur- og humanvidenskaberne imellem.

Omkring midten af 1820'erne havde man planer om at oprette en avanceret håndværksuddannelse i København. H.C. Ørsted blev formand for den komité, der skulle stå for arbejdet, og under Ørsted blev det besluttet, at den nye læreanstalt skulle være videnskabeligt og teoretisk fremfor praktisk funderet. Skolen fik navnet *Polyteknisk Læreanstalt* og skiftede senere navn til Danmarks Tekniske Universitet eller DTU (1994). H.C. Ørsted var rektor fra 1829-1851. Polyteknisk Læreanstalt lå fra 1829 til 1890 i Studiestræde 6, hvor Ørsted selv boede fra 1924 og til sin død.

Ved indgangen til gården finder man en marmorplade med følgende tekst:

Hans Christian Ørsted boede her som professor ved universitetet fra oktober 1824 til sin dødsdag den 9de marts 1851.

In 1801, H.C. Ørsted took his first study trip abroad to pursue his studies in chemistry and physics. In Paris he visited the newly created "École Polytechnique", which at that time was a basic education in the natural sciences, mathematics, physics and chemistry for future engineers. The visit made a big impact on Ørsted, who already had an interdisciplinary approach in his thinking and in his work, including between the sciences and humanities.

Around the middle of the 1820s there were plans to create an advanced technical education in Copenhagen. H.C. Ørsted was the chairman for the committee responsible for doing so and under Ørsted it was decided that the new institute should be based on the scientific and theoretical rather than practical. The school was called the Polyteknisk Læreanstalt (College of Advanced Technology) and later changed its name to the Technical University of Denmark or DTU (1994). H.C. Ørsted was the rector from 1829-1851. From 1829 to 1890, the Polyteknisk Læreanstalt was located at Studiestræde 6, where Ørsted also lived from 1924 until his death.

At the entrance to the courtyard is a marble plaque with the following text:

Hans Christian Ørsted lived here as a professor at the university from October 1824 to his death on the 9th March 1851.



NIELS BOHR'S FØDESTED NIELS BOHR'S BIRTHPLACE

VED STRANDEN 14
1061 KØBENHAVN K

Niels Bohr blev født her d. 7. oktober 1885 og boede de første par måneder af sit liv i dette hus. Ved Stranden 14 var en del af den fornemme 'Gustmeyers Gård' og Niels Bohrs mor, Ellen Adler Bohr, boede her fra hun var 13 år gammel med sine søskende og sine forældre, David Baruch Adler og Jenny Adler. David Baruch Adler var en driftig handels- og bankmand og politiker og Ellen Adler Bohrs søster, Hannah Adler, blev i 1892 en af Danmarks to første kvindelige fysikere. I 1893 stiftede hun Danmarks første fællesskole, hvor drenge og piger blev undervist sammen, H. Adlers Fællesskole.

På husets facade findes en mindetavle med indskriften:

*"I dette hus fødtes atomfysikeren
Niels Bohr 7.10.1885".*

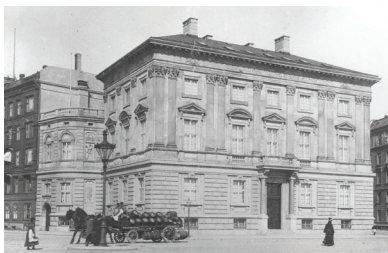
Tavlen blev afsløret i 1960 i anledning af Niels Bohrs 75 års fødselsdag.

Niels Bohr was born here on the 7th October 1885 and lived in this house for the first few months of his life. Ved Stranden 14 was part of the stately 'Gustmeyers Gård' and Niels Bohr's mother, Ellen Adler, lived here from the age of 13 with her siblings and her parents, David Baruch Adler and Jenny Adler. David Baruch Adler was an enterprising businessman, banker and politician and Ellen Adler Bohr's sister, Hannah Adler, became one of Denmark's first two female physicists in 1892. In 1893, she founded Denmark's first co-educational school, H. Adler's Coeducational School, where boys and girls were taught together.

On the façade of the house is a commemorative plaque with the inscription:

*"The nuclear physicist Niels Bohr
was born in this house 7.10.1885".*

The plaque was unveiled in 1960 on the occasion of Niels Bohr's 75th birthday.



**DET KONGELIGE DANSKE
VIDENSKABERNES SELSKAB
THE ROYAL DANISH ACADEMY OF
SCIENCES AND LETTERS**

DANTES PLADS
H.C. ANDERSENS BOULEVARD 35
1553 KØBENHAVN K

Det Kongelige Danske Videnskabernes Selskab blev stiftet i 1742 og har siden spillet en vigtig rolle i dansk videnskab. Historiker Hans Gram og lensgreve Johan Ludvig Holstein tog initiativ til oprettelsen af selskabet, som fik Kong Christian VI som protektor. Målet var at fremme dansk videnskab og at styrke samarbejdet mellem videnskaberne. I 1774 blev Kong Christian VII protektor for selskabet og fra 1838 fungerede Kong Christian VIII som selskabets præsident.

Siden 1866 har selskabet været delt op i to videnskabelige klasser, den humanistiske og den naturvidenskabelige. Selskabet stod i løbet af det 18. og 19. århundrede for udarbejdelsen af den første egentlige ordbog over det danske sprog og for de første nøjagtige, topografisk opmålte kort over Danmark. I 1808 blev H.C. Ørsted medlem af selskabet og i 1815 blev han valgt til sekretær for bestyrelsen, hvilket i dag svarer til generalsekretær. Denne funktion beholdt han til 1851. Selskabet flyttede i 1899 til bygningen her, som blev opført af brygger J. C. Jacobsen til Carlsbergfondet og Videnskabernes Selskab. I 1917 blev Niels Bohr medlem, og fra 1939 til sin død i 1962 var han præsident for selskabet, som Dronning Margrethe d. II i dag er protektor for.

The Royal Danish Academy of Sciences and Letters was founded in 1742 and has since played an important role in Danish science. Historian Hans Gram and Count Johan Ludvig Holstein took the initiative to establish the society, which had King Christian VI as protector. The aim was to promote Danish science and to strengthen co-operation between the sciences. In 1774, King Christian VII became protector of the society and from 1838 King Christian VIII served as the society's president.

Since 1866 the society has been divided up into two classes, the humanities and the natural sciences. Over the course of the 18th and 19th centuries, the society oversaw the first proper dictionary of the Danish language and was responsible for the first accurate topographical maps of Denmark. In 1808, H.C. Ørsted became a member of the society and in 1815 he was elected secretary of the board, which today corresponds to the General Secretary. He retained this position until 1851. In 1899, the society moved to the building here, which was built by the brewer J. C. Jacobsen for the Carlsberg Foundation and the Academy of the Sciences and Letters. In 1917, Niels Bohr became a member and from 1939 until his death in 1962 he served as the president of the society, which Queen Margrethe II is the protector of today.



**VOR FRUE KIRKE, OLE RØMER
CHURCH OF OUR LADY, OLE RØMER**

VOR FRUE PLADS
1165 KØBENHAVN K

Da Ole Rømer døde i 1710 blev han stedt til hvile ved en statsbegravelse i Vor Frue Kirke. Denne kirke brændte ned til grunden under Københavns bombardement i 1807. I den nuværende Vor Frue Kirke er hans grav markeret af en sten med gravskriften:

Ole Rømer
XXV.IX.MDCXLIVXIX:IX.MDCCX
Han maalte lysets hast.

Ole Rømer studerede ved Københavns Universitet og lærte astronomiske observationer. I 1671 rejste han til Paris, hvor han specialiserede sig i nøjagtige målinger af Jupiters måners omløb og formørkelser. Observationerne gjorde, at han i 1776 fandt frem til, at lyset ikke udbreder sig øjeblikkeligt, men faktisk har en bestemt, målbar hastighed. Han kaldte det for *lysets tøven*.

I 1681 vendte han hjem til Danmark, og foruden at fungere som kongelig matematiker for Kong Christian V og at bestride posten som professor i astronomi ved Københavns Universitet var han i begyndelsen af 1680'erne involveret i adskillige vigtige byplanlægningsprojekter, som blandt andet omfattede kloakering, gadebelysning, brandsikring af byen og renovation af brolægningen i de københavnske gader. Han stod også for en vigtig ombygning af Københavns vandforsyning og konstruerede et effektivt pumpesystem til en ny tørdok, som gjorde det muligt at reparere og bygge skibe med den nyeste teknologi.

When Ole Rømer died in 1710 he was laid to rest in a state funeral in Vor Frue Kirke (Church of Our Lady). This church burned to the ground during the bombardment of Copenhagen in 1807. In the current Vor Frue Kirke his grave is marked by a stone with the epitaph:

Ole Rømer
XXV.IX.MDCXLIV XIX:IX.MDCCX
He measured the speed of light.

Ole Rømer studied at the University of Copenhagen and learned how to make astronomical observations. In 1671, he travelled to Paris, where he stayed for 9 years and specialised in more and more accurate measurements of the orbits of Jupiter's moons and eclipses. The observations led to his discovery in 1776 that light does not disperse instantaneously, but has a specific, measurable speed. He called this *the hesitation of light*.

In 1681, he returned to Denmark and in addition to acting as the Royal Mathematician for King Christian V and holding the position as professor of astronomy at the University of Copenhagen, he was involved in several important urban development projects, including a sewage system, street lighting, fire protection of the city and renovation of cobbles in the streets of Copenhagen. He was also responsible for a major refurbishment of Copenhagen's water supply and constructing an efficient pumping system for a new dry dock, which made it possible to build and repair ships using the latest technology.



CARLSBERG ÆRESBOLIG CARLSBERG HONORARY RESIDENCE

GAMLE CARLSBERGVEJ
2500 VALBY

13

Carlsberg blev grundlagt i 1847 af brygger Christian Jacobsen. Bryggeri og lager blev opført uden for voldene i Valby, og fra 1854 havde Jacobsen også sin bolig her. Ifølge Christian Jacobsens testamente skulle villaen på Carlsberg stå til rådighed som bolig for sønnen Carl, som Carlsberg er opkaldt efter. Ved sønnens død skulle boligen "overdrages som fri-bolig på livstid til en ved sin virksomhed i videnskab, litteratur, kunst eller på anden måde af samfundet fortjent mand eller kvinde".

Beboerne skulle vælges af det Kongelige Danske Videnskabernes Selskab og driften fik Carlsbergfondet ansvaret for. Æresboligens mest prominente beboer var Niels Bohr, som boede her fra 1932 til sin død i 1962. Villaens sidste beboer døde i 1995, og æresboligen blev lavet om til *Carlsberg Akademi*, som rummer Carlsbergfondets conferencecenter og en lejlighed til midlertidig brug for prominente gæsteforskere. Jacobsens villa er nabo til Carlsberg Laboratorium, som blev grundlagt i 1875, så man kunne lave sin egen kemiforskning til gavn for bryggeriet.

Carlsberg Besøgscenter på Gamle Carlsbergvej 11, 2500 Valby, er åbent for besøgende fra 10.00-16.00 tirsdag til søndag. Besøgscetret består af et bryggerimuseum og et udstillingscenter, og rundvisningen giver et glimt af æresboligen.

Carlsberg was founded in 1847 by the brewer Jacob Christian Jacobsen. The brewery and warehouse were built outside the ramparts in Valby and Jacobsen also had his residence here from 1854. According to Jacobsen's will, the villa at Carlsberg was to be available as a residence for his son Carl, who Carlsberg was named after. After his son's death, the residence was to be 'transferred as a residence for life to a deserving man or woman who has been of service to science, literature, art or society in general'. The residents were to be selected by the Royal Danish Academy of Sciences and Letters and the Carlsberg Foundation was to be responsible for its upkeep. The Honorary Residence's most prominent occupant was Niels Bohr, who lived here from 1932 until his death in 1962. The villa's last resident died in 1995 and the honorary residence was converted into the *Carlsberg Academy*, which includes the Carlsberg Foundation conference centre and an apartment for temporary use by prominent guest researchers.

The Jacobsen villa is next door to the Carlsberg Laboratory, which was founded in 1875, so they could perform their own chemical research for the benefit of the brewery.

The Carlsberg Visitor Centre at Gamle Carlsbergvej 11, 2500 Valby, is open to visitors from 10:00 to 17:00, Monday to Sunday. The visitor centre consists of a brewery museum and an exhibition centre, and the tour provides a glimpse of the honorary residence.



STATUE AF H. C. ØRSTED STATUE OF HANS CHRISTIAN ØRSTED

ØRSTEDSPARKEN
NØRRE VOLDGADE
1358 KØBENHAVN K

14

Ørstedsparken er opkaldt efter videnskabsmanden H.C. Ørsted og hans bror, Anders Sandøe Ørsted, som var en betydningfuld politiker og advokat samt Danmarks statsminister fra 1842-1848.

Ørstedsparken blev anlagt i årene 1876-1879 på en del af den gamle bys voldanlæg, og i midten ligger en sø, som tidligere var en del af anlæggets voldgrav. Parken ejes af Københavns kommune og er udsmykket med en række skulpturer og monumenter.

På en høj, der vender ud mod Nørre Voldgade, står statuen af H.C. Ørsted fra 1876. Statuen af J. A. Jerichaus blev rejst for donerede midler efter initiativ af blandt andre H.C. Andersen, som havde været fysikerens nære ven.

Statuen er placeret på en fire meter høj sokkel, og nederst er der statuer af de tre Norner, den nordiske mytologis skæbnegudinder. De symboliserer her fortiden, nutiden og fremtiden. Ørsted selv demonstrerer sin revolutionerende opdagelse af elektromagnetismen.

Ørstedsparken is named after the scientist H.C. Ørsted and his brother, Anders Sandøe Ørsted, who was a prominent politician and lawyer, as well as Denmark's prime minister from 1842-1848.

Ørstedsparken was built in the years 1876-1879 on part of the old city ramparts and in the middle is a lake, which was previously part of the defensive moat. The park is owned by the City of Copenhagen and is decorated with a number of sculptures and monuments.

On a hill, facing Nørre Voldgade, stands the statue of H.C. Ørsted from 1876. The statue by J. A. Jerichaus was erected using funds donated for the initiative. Among the donors was H.C. Andersen, who had been a close friend of the physicist.

The statue is placed on a four-meter high pedestal and at the bottom there are statues of the three Norns, the Norse Fates. They symbolise the past, present and future. Ørsted is demonstrating his revolutionary discovery of electromagnetism.



OBSERVATORIET PÅ ØSTERVOLD THE ØSTERVOLD OBSERVATORY

ØSTER VOLDGADE 3
1350 KØBENHAVN K

I 1861 blev Københavns Universitets observatorium flyttet fra Rundetårn til nye bygninger på Øster Vold. Rundetårns placering midt i byen var med tiden blevet for stor en hindring for observationer. Støv- og røgpartikler, lys og vibrationer fra den stigende trafik på Købmagergade forstyrrede observatoriets instrumenter, og det gamle observatorium var generelt i en sørgelig forfatning. Et nyt observatorium havde meget længe været tiltrængt, og Ole Rømer havde af samme årsag sit eget private observatorium allerede fra ca. 1700.

Observatoriet på Østervold og de nye instrumenter, som blev indkøbt, kom til at koste næsten det halve af, hvad der normalt var Københavns Universitets årsbudget. Blandt andet anskaffede man den 5,5 meter lange Merz-refraktor, som dengang var den bedste astronomiske kikkert på markedet. Den anbragte man på et meget stærkt fundament af mursten, som nåede helt ned til den grundflade, voldene var bygget på.

Allerede omkring år 1900 var byen trods anstrengelserne dog kommet for tæt på, og i 1953 – forsinket af verdenskrigene – blev observatoriet flyttet til Brorfelde. I dag benyttes bygningen af Københavns Universitet.

Foran Østervold Observatorium står en statue af astronomen Tycho Brahe.

In 1861, the University of Copenhagen Observatory was moved from the Round Tower to new buildings at Østervold. The Round Tower's location in the middle of the city eventually became too big a hindrance for observations. Dust and smoke particles, light and vibrations from the increasing traffic on Købmagergade disturbed observatory instruments and the old observatory was generally in poor condition. A new observatory had been long overdue and for this same reason Ole Rømer had his own private observatory from around 1700.

The Østervold Observatory and the new instruments that were purchased came to cost almost half of the University of Copenhagen's annual budget. One of the new purchases was a 5.5 meter long Merz refractor, which was the best telescope on the market at the time. This was placed on a very solid brick foundation, which reached all the way down to the base of the ramparts it was built on.

However, despite their best efforts, by around 1900 the city was moving too close and in 1953 – delayed by the world wars – the observatory was moved to Brorfelde. Today the building is used by the University of Copenhagen.

In front of the Østervold Observatory stands a statue of the astronomer Tycho Brahe.



ROSENBERG SLOT OLE RØMERS PLANETMASKINER ROSENBERG CASTLE OLE RØMER'S PLANETARY MACHINES

ØSTER VOLDGADE 4A
1350 KØBENHAVN K

På Rosenborg Slot, som huser de danske kongelige samlinger, finder man i kælderen et Ole Rømer-værelse. Her udstilles blandt andet nogle af den danske astronom Ole Rømers mange sofistikerede opfindelser, som ofte var langt forud for deres tid.

I 1671 rejste Ole Rømer til Paris, hvor han specialiserede sig i nøjagtige målinger af Jupiters måners omløb. Observationerne gjorde, at han i 1776 fandt frem til, at lyset ikke udbreder sig øjeblikkeligt, men har en bestemt, målbar hastighed. Han kaldte det for *lysets tøven*.

Under sit ophold ved det prestigefulde Académie Royale des Sciences i Paris skabte Rømer flere forskellige 'planetmaskiner', som var mekaniske modeller af himmellegemers bevægelser om hinanden. Modellerne kunne bruges til undervisning og udregning af fremtidige observationer, og Ole Rømer nåede at fremstille fem forskellige typer under sit ophold i Paris. Den første planetmaskine, Ole Rømer byggede, viser planeternes baner om Solen. Dog kredser Solen om Jorden, og den er således en model af Tycho Brahes verdensbillede, som Rømer ellers ikke tilsluttede sig.

Han byggede også et 'jovilabium', som viste Jupiters måners rotation om planeten, et 'saturnilabium' og et egentligt planetarium, som viser alle planeternes rotation om Solen. Jovilabiet og saturnilabiet gik tabt under Københavns brand i 1728, men det ægte planetarium og en formørkelsesmaskine kaldet et 'ekslipsarium' er udstillet i kælderen på Rosenborg Slot.

In the basement of Rosenborg Castle, which also houses the collections of the Danish Royal Collections, there is an Ole Rømer room. Exhibited here are some of Rømer's numerous sophisticated inventions, which were often far ahead of their time.

In 1671, Ole Rømer travelled to Paris, where he specialised in accurate measurements of the orbits of Jupiter's moons. The observations led to his discovery in 1776 that light does not disperse instantaneously, but has a specific, measurable speed. He called this *the hesitation of light*.

During his stay at the prestigious Académie Royale des Sciences in Paris, Rømer developed several different 'planetary machines', mechanical models of the movements of celestial bodies around each other. The models could be used for teaching and for calculations of future observations, and Ole Rømer managed to produce five different types during his stay in Paris. The first planetary machine Ole Rømer built shows the orbits of the planets around the Sun. Though the Sun orbits around the Earth and is a model of Tycho Brahe's worldview, which Rømer did not agree with.

He also built a Jovilabe, which showed the orbits of Jupiter's moons around the planet, a Saturnilabe and a proper planetarium, which shows the orbits of all of the planets around the sun. The Jovilabe and Saturnilabe were lost in the Copenhagen fire of 1728, but the real planetarium and an eclipse machine called an Eclipsarium are on display in the basement of Rosenborg Castle.



ASSISTENS KIRKEGÅRD ASSISTENS CEMETERY

KAPELVEJ 2
2200 KØBENHAVN N

Assistens Kirkegård blev etableret til byens fattige borgere i 1760 som supplement til kirkegårdene i det ældre København. Fra slutningen af 1700-tallet blev kirkegården også gravplads for de rige og berømte. Den er blevet udvidet flere gange, og nogle områder er stadig i brug i dag. Kirkegården er dog mest en historisk kirkegård, hvis mange gravsteder og monumenter i dag er en kilde til viden om 200 års dansk begravelsespraksis.

Niels Bohr, hans far Christian Bohr og hans bror, matematikeren Harald Bohr ligger begravet her i et familiegravsted. Gravstedet er udsmykket med et monument af J.F. Willumsen – en grå søjle med en ugle øverst. Søren Kirkegaard, H.C. Andersen og H.C. Ørsted, som var en nær ven af Andersen, ligger også begravet her.

Ved hovedindgangen på Kapelvej 2 findes et informationskontor, som har kort over kirkegården. Niels Bohr er begravet i sektion Q, H.C. Ørsted i sektion E, Søren Kirkegaard i sektion A og H.C. Andersen i sektion P.

Assistens Cemetery was established for the poor citizens of the city in 1760 as a supplement to the cemeteries in the older parts of Copenhagen. From the late 1700s, the cemetery was also the burial place of the rich and famous. It has been extended several times and some areas are still in use today. However, the cemetery is primarily a historic cemetery, whose many graves and monuments are a source of knowledge about 200 years of Danish burial practices. Søren Kirkegaard, H.C. Andersen and H.C. Ørsted, who was a close friend of Andersen, are buried here.

Niels Bohr, his father Christian Bohr and his brother, the mathematician Harald Bohr are also buried here in a family grave. The grave is adorned with a monument made by J.F. Willumsen – a granite pillar with an owl on top.

At the main entrance on Kapelvej 2 there is an information centre that has maps of the cemetery. Niels Bohr is buried in section Q, H.C. Ørsted in section E, Søren Kirkegaard in section A and H.C. Andersen in section P.

RELATEREDE MUSEER UDENFOR CENTRUM AF KØBENHAVN MUSEUMS OF RELATED INTEREST BEYOND THE CENTRE OF COPENHAGEN

KROPPEDAL MUSEUM (OLE RØMER MUSEET)
Tåstrup. <http://www.kroppedal.dk/>

TYCHO BRAHE MUSEET
Hven. <http://www.tychobrahe.com/>

DANMARKS TEKNISKE MUSEUM
Helsingør. <http://www.tekniskmuseum.dk/>

STENO MUSEET
Århus, Jylland. <http://www.stenomuseet.dk/>

ENERGIMUSEET
Bjerringbro, Jylland. <http://www.energimuseet.dk/>

HAUCHS FYSISKE KABINET
Sorø Akademi, Sjælland. <http://www.awhauch.dk/>