

# The Compass Rose A Northern Orientation Exhibition Guide

## The Middle Ages' Mappae Mundi

«There where nobody would believe  
that anyone could live...»

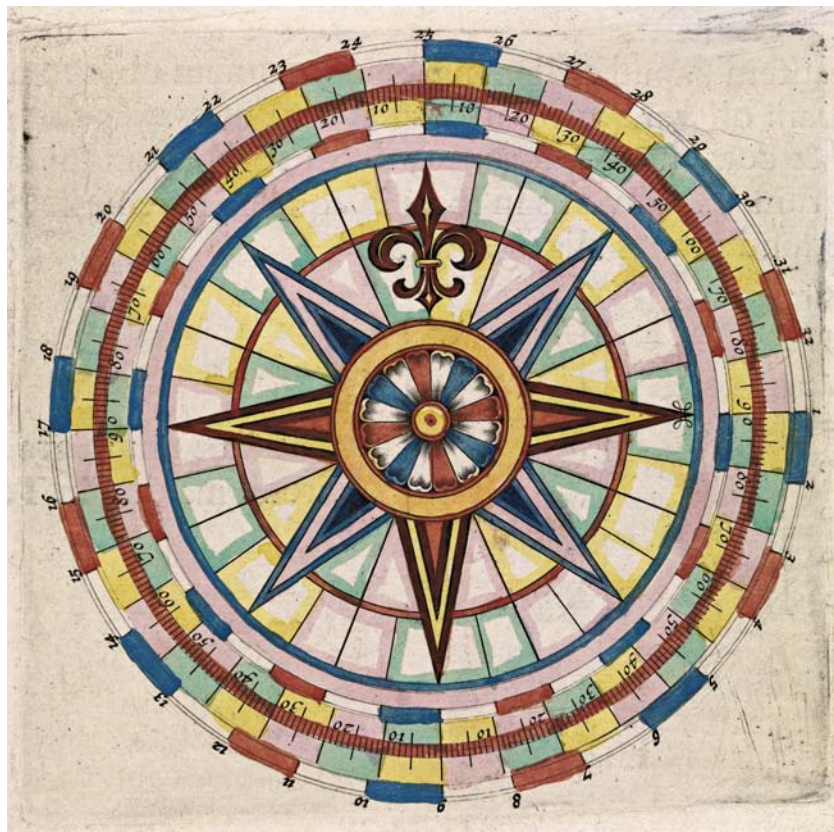
Fiction/ faction

The illusion of the  
perfect map

A truth with  
modifications

Geographic infor-  
mation systems  
of our day

The world  
beneath the  
surface of the  
ocean



Territory Land

Go and make  
disciples of all  
nations...

Cold pantries  
and frozen hunt-  
ing grounds

Nature's  
magnetic  
constitution

«Navigare  
necesse  
est...»

The sound of the Arctic  
The sky in the north  
When the terrain changes

«You are here»

Heaven and earth



National Library of Norway



# Introduction: Have maps ever corresponded with the terrain?

A map is a subjective depiction of a geographic area and is experienced as meaningful and true in its time. Man's mental universe, however, is always undergoing change, in connection with geographic discoveries, cartographic developments and social factors. The current technology is so advanced that we view our maps as being correct, but so did the Englishman who in 1557 wagered his head that the nautical map he had drawn of the northern regions was accurate...

The northern regions have always been the land and sea of both opportunities and challenges. They have attracted explorers searching for new territories, rich natural resources and new knowledge. This frequently poses a threat to the life fundament of the original residents, both humans and animals.

Encounters between different cultures and religions have inspired writers to produce fantastic stories, but they have also been the cause of holy wars and missionary expeditions on the part of the authorities.

The word orienteering comes from the Latin word *oriens* meaning «rising». The sun rises in the east and to orientate oneself means therefore actually to look for the sunrise and in this way determine the location of the east. The maps of the Middle Ages usually had the east at the top; they were oriented towards the east. The current maps are oriented towards the north. The word orientate has lost its original meaning and now the word means to find out where one is, or to reposition oneself so as to move in the right direction.



Willem Blaeu: Regiones sub Polo Arctico, 1662

# Heaven and earth

Throughout Antiquity and the Middle Ages the predominant perception of the world was geocentric. The basic principle was that the earth is a globe, that it is the centre of the universe and that the sun, the moon and all of the planets rotate around it. It was believed that the stars were situated on the outside of a gigantic and rotating sphere around the earth. This image of the world is well suited for the Catholic Church's worldview, with the earth as the centre of God's creation.

## **Globe of the earth, dated between 1757 and 1782**

Benjamin Martin (1705–1782) was a globe and instrument maker. In the 1750s he acquired possession of the printing plates of John Senex, England's great globe maker and Queen Anne's geographer. These globes were made using Senex's printing plates, a number of them with engraved updates. The oldest known globe of the earth was constructed in 1492 by Martin Behaim, the German navigator and geographer for the King of Portugal. The globe was called «erdapfel», earth apple.

## **Celestial globe, dated between 1757 and 1782**

Many globes were created in pairs, an earth globe and a celestial globe. These are often called «twin globes». Just like the earth globes, celestial

globes have a north pole, south pole, equator and degrees of latitude and longitude. The oldest preserved celestial globe is from c.1275, and was made by the astronomer Muhammad ibn Hilal from Mosul in what is now Iraq.

The celestial globe is on loan from the Institute of Theoretical Astrophysics, University of Oslo.

## **Peter Apian: *Cosmographia*, (1524) 1550**

The earth is depicted as being round and is still considered to be the centre of the universe. It was first in 1543, with astronomer Nicolaus Copernicus' book, that the Church and science ceased to be in agreement. Copernicus presented a heliocentric image of the universe, which placed the sun at the centre of our system with the earth rotating around it in the same manner as the other planets.

## **Galileo Galilei: *Dialogo sopra i due massimi sistemi del mondo* ("Dialogue about the two predominant world systems"), 1632**

Galileo's book is written as a dialogue between three persons: Simplicio is the proponent of the geocentric system; Salvatio is the advocate for the heliocentric system, while Sagredo represents the searching human spirit. Galileo fell into the hands of the Inquisition, was condemned to life imprisonment and was obliged to publicly disclaim his theory that the sun was the centre of the universe.

# Nature's magnetic constitution

Man has navigated at sea using a compass for many centuries. The famous Norwegian scientist Christopher Hansteen (1784–1873) published in 1819 his work *Magnetischer Atlas*, where he illustrates how the magnetic field changes its path in periods. This can sometimes result in certain areas becoming «magnetically neutralised». Some believe that this phenomenon can be a cause of whales swimming off course and beaching.

Today we know that many animals have a built-in «map and compass», and some even have a kind of GPS. They often utilise a combination of a number of senses when navigating, such as their sense of smell and sight. Salmon probably utilise their magnetic sensitivity to find their way in the

ocean, but they also use their sense of smell, especially as they begin to approach their home regions. It has been established that doves use the magnetic field, but has also been observed that they use visual landmarks, such as our current highway network to find their way.

## **Whale illustrations from *Naturgeschichte der Säugetiere*, 1824**

## **H. de la Blanchère: *Nouveau dictionnaire général des pêches*, 1868**

## **Christopher Hansteen: *Magnetischer Atlas gehörig zum Magnetismus der Erde*, 1819**

## «Navigare necesse est...»

Up until the middle of the 18th century it was predominantly Dutchmen, Germans, Englishmen and Frenchmen who made maps of Norway. The reason for this was that these countries were involved with shipping and trade along the Norwegian coast and on the Kola Peninsula. On the maps the coast is schematically depicted with islands in a row and the names of the places that were of trade interest more or less in the correct order. The way in which the coast is presented resembles the subway map of today, where the order of the various stations is the most important information.

**Cornelis Doedsz: Tabula hydrographica, 1610**  
The book was first published in 1589.

**Oslo's rail traffic, 2005**

**Lucas Janszoon Waghenaer: Coste de Noruegue, entre Bergues & le ledder, From Spieghel der Zeevaerdt, 1588**

Waghenaer's nautical map was a formidable success and the maps were published in Dutch, English, French and German for more than 30 years. For a long time the map was simply referred to as the «waggoner», after Waghenaer.

**Anonymous drawing: Norlandia**

Hand-drawn map of the Nordland coast from the mid-18th century. The sailing route is indicated by the dotted line and both warships and fishing vessels are depicted.

**Johannes and Gerard van Keulen: Coastal profiles of the coast of Finnmark from De nieuwe groote lichtende zee-fakkel, 1716–1753**

Mariners used sailing descriptions and coastal profiles together with nautical maps for navigating.



Lucas Janszoon Waghenaer: Coste de Noruegue, entre Bergues & le ledder, from Spieghel der Zeevaerdt, 1588

## Cold pantries and frozen hunting grounds

The northern regions were considered Europe's inhospitable, remote outlands, rich in resources and wildlife that was not to be found elsewhere. The seas held an abundance of fish and sea mammals and the forests were full of exotic animals. There was bustling activity along the Norwegian coastline with its large and small trading towns where European merchants bought and sold furs, live animals, whale and fish, and dried fish in particular. The Barents Sea is the home of the world's largest cod population and fishermen have harvested from it for more than a thousand years.

In 1975 Norway and the Soviet Union agreed to collaborate in the management of the cod stock. The Norwegian-Russian fishing commission fixes total quotas and distributes them according to stipulated distribution keys. During the Cold War this was a rare example of an East-West collaboration in the northern regions.

### **Sebastian Münster: Schonlandia XIII Nova Tabula, 1540**

On this map, «Terra noua siue de Bacalhos», bacalao country, is marked out on a continent in the west, and stockfish is marked out just off of Northern Norway.

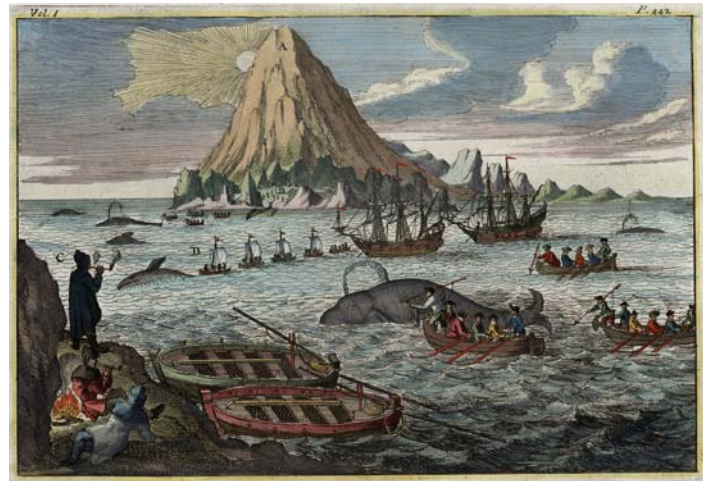
### **Le Stockfish Norvegién, published by the Directorate of Fisheries in Bergen**

«The country would be uninhabitable for Christian people if the fish catch, which is extremely abundant, did not attract people to settle down there, in that this Species of fish, which in common vernacular is called stockfish, is so valuable that due to its quality it is exported to almost all foreign Christian people.»

From Archbishop Erik Valkendorf: Finmarkens Beskrivelse, ("Description of Finnmark") c.1520.

### **Dried cod recipe**

Ever since the Viking era, people have dried fish in Norway. Drying food is one of the oldest methods of preservation known to man and dried fish has a shelf life of several years. Norwegian dried cod or stockfish as it is called in German has long been a popular food in many countries, also in tropical regions.



**Jens Munk: An Account Of a most Dangerous Voyage Performed by the Famous Captain John Monch, In the Years 1619, and 1620. By the special Command of Christian IV, King of Denmark, Norway, 1732**

**Johan Isaksen Pontanus: Rerum et urbis Amstelodamensium historia. Amsterdam, 1614**

**Johann B. Homann: Balaenarum Walfische, 1730-40**

### **Organisation of a whale factory vessel for flensing of whales on the open sea.**

At the beginning of the 1900s, Norway modernised and improved the efficiency of whaling radically. Here is a sketch of a whale factory vessel from the whaling company Melsom & Melsom.

### **Copy of cartouches from the 17th century cartographers Blaeu and de Wit.**

Fur products were just one of many symbols that represented power and privilege in Europe in the 17th century and they were as such a fundamental element in the social hierarchy of the time. Live, exotic animals were a status symbol and were often used as gifts among the nobility and royalty. From Norway it was particularly the reindeer that was viewed as exotic and exciting.

### **Haus der mode, Wien 1941**

Also in modern times fur has been an exclusive status symbol.

**Paul Gaimard Voyages en Scandinavie en Laponie au Spitzbergen et aux Féro. Vol. III Paris 1845**

# Go and make disciples of all nations...

«Go therefore and make disciples of all nations!» - from the Christian Great Commission

The Sami people have been subjected to attempts at conversion to Christianity ever since the Middle Ages. Their pre-Christian faith was a kind of pantheism with features of shamanism. It was open to other denominations, as well as deities and rituals from other religions, and many Samis took part in Christian rituals such as christening and Holy Communion, while continuing to practice their own religion. This mixture of religious faiths became a problem at the beginning of the 18th century, when pietism required a personal and fervent Christian faith.

**Jan Huygen van Linschoten: Nordenkart ("Map of the Nordic Region"), 1594/95, published in the book *Voyagie, ofte Schip-Vaert*, 1601**

The map comes from the Dutchman Jan Huygen van Linschoten's travel description. In the illustration fields there are drawings of Samoijedes and

their gods, called «Der Samoiedenis afgoden». The Samoijedes were the people that lived furthest northwest in Asia.

**Hartmann Schedel: Map of Northern Europe, 1493**

At the very top in the north on the map the word «wildlappen» ("Wild Lapp") is written and it indicates the land region eastward toward Greenland.

**D.N.L. Finnemissionsforbund (The Norwegian Lutheran Sami Mission Federation)**

**Norges samemisjon (The Norwegian Sami Mission), diploma**

Norges Finnemisjonselskap (The Norwegian Sami Mission Society) was founded in 1925, and was a merger of the Finnemisjon (Sami Mission) (1888) with the Norwegian Lutheran Sami Mission Federation (1910). The name was changed to Norges samemisjon in 1966. The Mission Society has worked among the Sami people in Russia since 1992.



Jan Huygen van Linschoten: Nordenkart ("Map of the Nordic Region"), 1594/95



## There where nobody would believe that anyone could live...

The Norwegian archbishop Erik Valkendorf writes in *Finmarkens Beskrivelse* ("A Description of Finnmark") from 1520:

"The winter in Finnmark starts on 14 September, reaches its climax in the end of March and does not release its grasp until 17 June. The rain is worse than in other parts of the Nordic region, and strong, relentless winds blow, driving crafts aground." It was not just the climate that made the area uninhabitable. "From remote caves in the cliff walls, unhappy and terrible screams can be heard from souls being purged of sin."

The clergyman Knud Leem, who lived in Finnmark 200 years later, communicated another impression of the life and nature in the north. He lived with the Sami people and gathered a large body of ethnological material about living conditions and the mentality. *Beskrivelse over Finnmarkens lapper* ("A Description of the Finnmark Lapps") was published in 1767, and was widely disseminated.

The Samis who lived in the northern areas of Europe are, on the other hand, not described in Reiersen's and Monrath's ethnographic work *Fuldstændigt Billed-Galleri over alle Nationer* ("A Complete Picture Gallery of all Nations") from 1837. The Sami people were Europeans and therefore not exotic, like the Eskimos who lived towards the

northeast in North America and the Samojedes who lived in upper Asia towards the northwest.

**Johan Reinert Reiersen: Fuldstændigt Billed-Galleri over alle Nationer, i Afbildninger med udførlig Beskrivelse: udarbejdet efter de bedste og nyeste engelske, franske og tyske ethnographiske Verker, 1834–1837** ("Complete Picture Gallery of all Nations, Illustrations with extensive detail; produced on the basis of the best and most recent English, French and German ethnographic Works")

See a digital version of the entire work at [www.nb.no](http://www.nb.no)

**Henry A. Chatelain: Representations des Lapons, c. 1714**

These two plates are part of a series of six hand-coloured copperplate engravings with a total of 22 motifs from Sami culture (tools, traditional clothing, religious customs, hunting and fishing methods, etc).

**36 selected plates from Knud Leem: Description of the Finnmark Lapps, their language, way of life and former idol worship, explained through many copperplate engravings, 1767**

The engravings are hand coloured and have been reworked by an unknown artist. See a digital version of Knud Leem's work at [www.nb.no](http://www.nb.no)

## The Middle Ages' mappae mundi – a history of the world in pictures

It is a modern myth that people in the western part of Europe in the Middle Ages believed that the world was flat. The Hereford map and other world maps, mappae mundi, depict those parts of the earth that were known and inhabited with a downward projection onto a circular surface. The knowledge about the world was for the most part limited to the northern hemisphere.

Western European world maps from the 8th to the 15th century are often simple, circular-shaped diagrams, where the land areas are surrounded by water. The maps can be divided into different climatic zones or be tripartite T-O maps. The T

is inside the circle and each side represents the parts of the world that were known of at the time: Europe, Africa and Asia. The primary objective of a mappae mundi was not to show precise coastlines and situate place names with the help of degrees of latitude and longitude; they were intended to illustrate God's creation.

**The Hereford map, ca 1300**

The map hangs on the wall of the Hereford cathedral in England. It is 1.59 meters high and 1.34 meters wide. The Hereford map is the only one of the large wall maps from the Middle Ages that has been preserved in its entirety. Historical and

## The Middle Ages' mappae mundi...

mythological events are interwoven and images of fantastic animals and birds with strange functions are testimonies of the Middle Ages' perception of nature. We can find fragments of this fantastic iconography in maps from as late as the 16th century.

The Hereford map is depicted by permission from The Hereford Mappa Mundi Trust.

### The earthly paradise with the four rivers:

The Europeans of the Middle Ages believed that the Garden of Eden was a geographic reality. The Garden of Eden was a round island surrounded by water, at the easternmost point of the world. East was the most important cardinal point and was therefore put at the top of the map. According to the Bible it was in this garden that Adam and Eve were created and from there they were driven out into the wilderness. The world's four great rivers each had their source in Paradise. The four rivers flowing out from the top of the earth we find again on Gerhard Mercator's North Pole map from 1595. The North Pole, Polus Arcticus, is depicted as an island where the land area surrounding it is divided up by four large rivers. This map image of the Arctic is also included on Mercator's map of the world from 1569. At approximately the same time the historian and Jesuit Guillaume Postel wrote that paradise was located on an extremely high mountain at the North Pole. The favourable climate gave humans, animals and plants eternal life.

**Simea:** Just southeast of the location of Noreya on the Hereford map there is a figure resembling an ape, above which the word "Simea" is written. A legend recorded at the end of the 14th century, tells of how there lived in the outermost part of the northeastern sea a "simea people". If one understands this word as being Latin, it can be translated as "an ape-people". If "simea" is a Norse word, it can be a description of the region – sveia or suiones: Sweden. The ape, which is placed in the area east of Norway, indicates that the mapmaker understood "simea" as being a Latin word. In the corner of the cartouche of Ortelius' map from 1570, there is an ape that greatly resembles the one depicted on the Hereford map. Is it sitting here in the Nordic region because somebody mixed up Latin and Norse a few centuries before, and therefore confused Sweden with an ape?

**Pygmies:** The words *Pigmei hic habitant*, "There are pygmies living here", are written on the north-eastern land area encircling the North Pole both on Mercator's map from 1595 and on Abraham Ortelius' map from 1570. According to the German 16th century cartographer Jacob Ziegler, pygmies came from the North Pole on pillaging raids to Greenland. As much as 200 years earlier, the English monk Nicholas de Linneas told of meetings with pygmies in the northeastern part of the North Pole's land areas. On the Hereford map the pygmies stay in the mountains in India, near the Garden of Eden. Here we see pictures of two pairs of pygmies with helmets and shields. Olaus Magnus' story about the Nordic people from 1555 also tells of the pygmies being a quarrelsome people. Here there is a picture from Greenland in which a pygmy wearing a helmet fights with a much larger person. On the picture from Hartmann Schedel's *Liber chronicarum*, a description of the world from 1493, the pygmies are battling with cranes. The story of the small people's bloody battle against the huge birds is also found in Homer's the *Iliad*, which was first written down c.700 BC.

**One footed beings:** According to Eirik Raude's saga from the 14th century, it was a one-footed being who killed Eirik's son while they were raiding an area northwest of Greenland. They followed the one-footed being, but it hopped away from them and disappeared into the water. On the Hereford map there is a one-footed being situated in the east. Hartman Schedel writes in his richly illustrated description of the world from 1493 that the one-footed being lived in Ethiopia and that it moved so quickly that it could capture wild animals and while it was resting the foot served as a parasol.

**Ulisse Aldrovandi: Monstrorum historia, (1642) 2002**

**Scott D. Westrem: The Hereford Map, 2001**

**Gerhard Mercator: Septentrionalium Terrarum descriptio, 1595**

**Abraham Ortelius: Septentrionalium regionum descriptio, 1570**

**Hartmann Schedel: Liber chronicarum, 1493**  
A full colour version from Koberger's workshop.

## The illusion of the perfect map

It is difficult to imagine a perfect map. The problems that arise if one attempts to create a copy of the landscape have been described by Lewis Carroll in a passage in the book *Sylvie and Bruno*

Concluded from 1893. The dialogue below is between the book's English first-person narrator and the German professor «Mein Herr».

«What a useful thing a pocket-map is!» I remarked.  
«That's another thing we've learned from *your* Nation,» said Mein Herr, «map making. But we've carried it much farther than *you*. What do you consider the *largest* map that would be really useful?»  
«About six inches to the mile.»  
«Only *six inches!*» exclaimed Mein Herr. «We very soon got to six *yards* to the mile. Then we tried a hundred yards to the mile. And then came the grandest idea of all! We actually made a map of the country, on the scale of *a mile to the mile!*»  
«Have you used it much?» I enquired.  
«It has never been spread out, yet,» said Mein Herr. «The farmers objected: they said it would cover the whole territory, and shut out the sunlight! So we now use the country itself, as its own map, and I assure you it does nearly as well.»

## Fiction/ faction

Live images from remote areas were one of the earliest attractions of film. In connection with scientific investigations and voyages of discovery, also the northern regions were visited with a film camera. Roald Amundsen's expeditions were a breakthrough for the long documentary film in the 1920s, and his and others' dramatic experiences in the tough climate inspired also fictional films in the years that followed. The northern lights and the midnight sun were a source of fascination both as scientific observation and as romantic, inspiring images. In travel films, map sketches were used illustrating the travel route along with observations of idyllic wildlife and everyday life.

The Samis' life and daily customs in the north also received a lot of attention from an early point in

time. There are a number of film versions of J.A. Friis' book *Laila*, which put life on the tundra in a melodramatic perspective. The zoologist Per Høst also brought his camera along on a journey north to document animal life and nature. His interest in and depiction of different ethnic groups brought us even closer to the Sami people than previously, although in a somewhat dramatised form. The northern regions have on several occasions been described in conjunction with occupation of the land areas. One showed the difficult living conditions for those living there, or how visitors could not handle the rough natural and climatic conditions. During recent decades, representatives of the Sami population have described their own lives, myths and history on film, often with a critical perspective regarding their own past and living conditions.

# A truth with modifications

In the 15th century Western Europe rediscovered Ptolemaeus (c. 90-150 BC), an astronomer and geographer from Alexandria. Up to this point, the Middle Ages' encyclopaedia and religion-oriented wheel map had been the standard means of depicting the world. The rediscovery resulted in a new way of drawing maps and is viewed as the beginning of the development leading up to our world map of today. Before all the threads were gathered and a standard depiction took shape, Norway and the Nordic region were portrayed in different ways, with regard to shape, orientation and perspective. The map of any given period is viewed as the «true» and «correct» representation of reality.

## Nicolaus Germanus: Ulm Ptolemaeus, 1482

The Turks conquered Byzantine in 1453, but as early as from the end of the 14th century Christians fled from the East towards the West. Because of these refugees Western Europe gained knowledge of Ptolemaeus' work. The original no longer exists; only copies that were stored in Byzantine

monasteries have been preserved. The monk Nicolaus Germanus was among those who produced maps in the Ptolemaeus style of areas that had not originally been covered by Ptolemaeus' records. Among the maps he published in 1482 there is a map of the Nordic region, the first known printed map of this region. Norway is given here an east-west orientation.

## Olaus Magnus: Carta Marina, 1539

Large wood engraving map printed from nine plates. Based on the use of symbolism, Carta Marina appears to have been produced during a period of transition. Norway has been turned around into the correct position, while the map has a number of the myths and stories of the Middle Ages. As an example, just beneath the compass rose at the top one can see St. Brendan, the saint for travellers and seamen, and his companions, where they have gone on land onto what they believed was an island but which turned out to be a sea monster. The map shown is a copy of a facsimile from 1949.



Nicolaus Germanus: Ulm Ptolemaeus, 1482

## A truth with modifications

### **Jan Jansson: Regni Norvegiæ Nova et Accurata descriptio i Atlas Novus, 1658**

Jansson was based in Amsterdam and was the publishing house Blaeus' largest competitor. Jansson had a branch in Copenhagen and from 1647 also the privilege of operating a bookstore with a printing house in Stockholm. This enabled him to stay up to date on new place names in the Nordic region. On this map Kristiansand, founded in 1641, is indicated.

### **Ove Andreas Wangensteen: The Kingdom of Norway divided into its four dioceses, namely Aggershuus, Christiansand, Bergenhuus and Trondhiem, and supporting deaneries, 1761**

This is the first printed map of all of Norway that is published by a known Norwegian cartographer. One important improvement here is that the Sperillen River empties out into the Tyri fjord, and thereby became a part of the Drammen watercourse. On previous maps the river was shown flowing into Østfold.

### **Jacob Ziegler: Map of the Nordic region, 1532 or 1536**

The printed versions had eight maps, of which seven depict Palestine and surrounding countries while one depicts the Nordic region. The hand-drawn and printed maps of the Nordic region are not wholly identical, and this reflects the development in the geographic knowledge in the 1530s about the Nordic region.

### **Andreas Bure: Suecia, Dania et Norvegia 1640 in Jan Blaeus' Atlas Maior, 1662**

Mathematician, astronomer and cartographer Andreas Bure was commissioned in 1603 by the Swedish King Karl IX to make a map of the Nordic region. His large map of the Nordic region was

completed in 1626, and it would come to set the standard for a new generation of maps of the Nordic region. Throughout the 17th century a number of Dutch map publishers printed maps of the Nordic region that were based on Bure's map.

### **Willem Blaeu: Regiones sub Polo Arctico, 1662**

### **Jacob Ziegler: Map of the Nordic region, 1532 or earlier**

The hand written book *Palestina* contains, oddly enough, a chapter with a map of Schondia, Scandinavia. The book is believed to be Ziegler's manuscript for his subsequent printed book publications in 1532 and 1536. Ziegler acquired his information from the Norwegian archbishop Erik Valkendorf and from his successor Olav Engelbrektsson, and otherwise from the Swedish archbishop Johannes Magnus, Olaus Magnus' brother.

### **Picture of Norwegian evening weather forecast map from the early 1960s**

This was how we were accustomed to seeing Norway depicted...

Photo: NRK with Håkon Messel

### **Sami Nordkalott Map, 1990**

Here the Scandinavian peninsula is depicted seen from north to south. The world looks different depending upon point of view and perspective. In order to highlight this, one has in some cases in more recent times begun implementing other orientations on the map than that of the north at the top. Modern geographic information systems make possible flexible and individual solutions; the earth can be spun around and the information available can vary, which results in new and different angles and orientations.

## Geographic information systems of our day

Modern maps are more than static, two-dimensional paper products that are used to find one's way or illustrate political borders. Data-based geographic information systems make it possible to break maps down to their individual components, perform searches in them and create visualisations, either as traditional maps or in three dimensions and over time. The communication tech-

nology of today makes it possible for just about anyone to create their own map or add information to existing maps and share maps with others. The result is that maps have developed into dynamic and multi-dimensional tools that give us the opportunity to understand the world in which we live in increasingly more complex ways.

# The world beneath the surface of the ocean

## The mapping program MAREANO

MAREANO maps the depth, seabed condition, biological diversity and wildlife types, and pollution in the sediment of Norwegian coastal and marine areas. The program is to provide answers to questions such as:

- What are the features of the landscape on the Norwegian continental shelf?
- What is the seabed composed of?
- How is the biological diversity distributed on the seabed?
- What is the connection between the physical environment, biological diversity and biological resources?
- How are pollutant emissions stored in seabed sediments?

The program is headed by the Institute of Marine Research in collaboration with the government agency Geological Survey of Norway (NGU) and the Norwegian Hydrographic Service. It is funded by the Ministry of Fisheries and Coastal Affairs, the Ministry of the Environment and the Ministry of Trade and Industry through national budget allocations. See [www.mareano.no](http://www.mareano.no) for more information.

## MAREANO's work methods

MAREANO provides a unique image of biological diversity through the use of different data collection tools that ensure good documentation of all types of seabeds.

This is how the mapping takes place:

1. The Hydrographic Service supplies detailed maps of seabed topography based on measurements using a multibeam echo-sounder for the area to be mapped.
2. NGU creates maps of seabed types based on an interpretation of acoustic signal strength from a multibeam echo-sounder.
3. The Institute of Marine Research and NGU choose, on the basis of this data, observation points for the documentation of sediment, seabed fauna and environmental toxins through videos and taking samples.

The seabed on the Norwegian continental shelf is extremely heterogeneous – and imposes difficult technical requirements on sample taking. The seabed types vary, but some common main types are:

- Soft, hydrous mud in sedimentation basin
- Hard-packed clay with gravel, stones and hard-packed moraine clay
- Scree
- Sand
- Gravel
- Rock base

With the exception of mud, clay and sand without large stones, it is difficult to take seabed samples from

these environments. This makes it necessary to use video documentation. The video rig Campod has been designed to address MAREANO's specific requirements and is an important tool in connection with mapping.

In places the depths can vary from 200 to 2500 metres within very short distances. This type of large topographic variation calls for close, meticulous observations and is therefore time consuming.

Stations for taking samples and video observations are chosen on the basis of depth-maps produced according to Norwegian Hydrographic Service measurements that are taken using a multibeam echo sounder. These measurements provide extremely detailed information about the depth and about the seabed's acoustic features, which give indications of whether the seabed is composed of rock, sand, clay, etc. NGU produces seabed type predictions on the basis of this.

## 3D visualisations of the seabed off the coast of Lofoten – the Barents Sea

The seabed landscape in the Lofoten/ Barents Sea area is varied and dramatic. Landscape formations such as large banks, valleys («abysses»), continental shelf edge and deep gorges on the continental slope are all found within small areas. These landscape formations have an impact upon the distribution of currents, sediment types such as mud, sand, gravel and boulder, and therefore also the animal life of the seabed. It is therefore important to find out as much as possible about the seabed's three-dimensional composition. MAREANO has first mapped seabed depths using a so-called multibeam echo-sounder, which sweeps the seabed with sound waves and produces a composite surface depth map. This map is transferred to computers, which convert all of the individual measurements into a three-dimensional terrain surface, which is illuminated by an artificial sun. The shadow effects from the artificial sun highlight even the smallest of variations in the terrain and make it possible to identify sand flats, moraine ridges and in some cases coral reefs.

The three dimensional data is used both directly for analysis and as a visualisation tool as well – to show the type of exciting landscape found on the seabed and to develop an understanding of correlations. This film is an example of the latter. MAREANO has put the 3D data into an advanced visualisation program that makes it possible to fly above the seabed. In the future, the company is planning to offer this as a user-managed interactive service over the Internet, available to the public through [www.mareano.no](http://www.mareano.no).

## The sound of the Arctic

The Arctic is more than just the cold sea and land areas around the North Pole. For some time the area has also functioned as a symbolic source of inspiration for musicians and composers. Nonetheless, it was first towards the end of the 1980s that the term «Arctic music» came to be widely used. Simultaneous to Mari Boine's breakthrough with her hybrid world music with Sami roots, an electronic underground music community emerged in Tromsø in connection with the radio program "The Beat-service Radio Show".

Through its open, cool soundscape and extensive

use of ethnic elements and sounds from nature, Tromsø artists such as Bel Canto and Biosphere (Geir Jenssen) along with Mari Boine, took part in defining the modern sound of «Arctic» for an international audience.

Although «arctic music» today has virtually become a music journalism cliché, we have chosen four soundtracks by artists who can all be said to have been inspired by the nature and landscape north of the polar circle.

Can you feel a cold wind ...?

## North

Look more frequently to the north. Walk into  
the wind, your cheeks will be rosier.  
Find the rugged trail. Stay on it.  
It is shorter.  
The north is best.  
The winter's flaming sky, the summer night's  
miraculous sun.  
Walk into the wind. Climb mountains.  
Look to the north.  
More frequently.  
This country is long.  
Most of it lies to the north.

Rolf Jacobsen's poem "Nord" ("The North") from  
the collection Nattåpent ("Night Open") 1985.

# The sky in the north

## The Northern Lights

The Northern lights have fascinated humans throughout the ages and have been the source of an abundance of legends and myths. In the course of the 19th century it was established that the northern lights have a connection with sunspot activity and that they are accompanied by enormous electric currents in near outer space. Today we know that the northern lights are the result of electrically charged particles that are ejected from the sun and sail through space at speeds of up to a thousand kilometres per second, before they penetrate the earth's magnetic field and hit the upper atmosphere. Northern lights research is today an important branch of the physics connecting astrophysics, plasma physics and nuclear physics. The northern lights are most frequently seen in «the northern lights oval», which is located about 23 degrees from the magnetic pole on the night side of the earth and 15 degrees from the pole on the day side. The width of the oval on the night side is around 5–10 degrees, depending upon the solar activity, and it covers thereby Troms and Finnmark.

## Constellations

The constellations we use today have come predominantly from the ancient Greeks. Of the Norse constellations virtually the only one that we know of now is Karlsvognen (the Big Dipper), which the Vikings imagined was the god Tor's chariot. One can locate the North Star, also called the Polar Star or Stella Polaris, by extending the line from the star Dubhe, which is the back wheel and the seventh star in the constellation Karlsvognen. The

North Star is therefore always indicated by star number seven. In Latin seven is «septem» and in many old maps the word «septentrionalis» signifies the northern regions.

## Fridtjof Nansen: Karlsvognen (the Big Dipper), 1911

Vignette from the book Nord i Tåkeheimen: utforskning av jordens nordlige strøk i tidligere tider. ("The north in Tåkeheimen: an investigation of the earth's northern regions in former eras") Beneath is the following text: «Bortom soleglad og stjernene som bader sig i vest, går min færd, til livets stjerne synker.» ("To sail beyond the sunset, and the baths/ Of all the western stars, until I die.") (Alfred Lord Tennyson).

## Henrik Greve Blessing: northern lights, 1896

Blessing was a physician on board the Fram on the journey across the Arctic Ocean. His sketches of the northern lights are from winter observations in 1896.

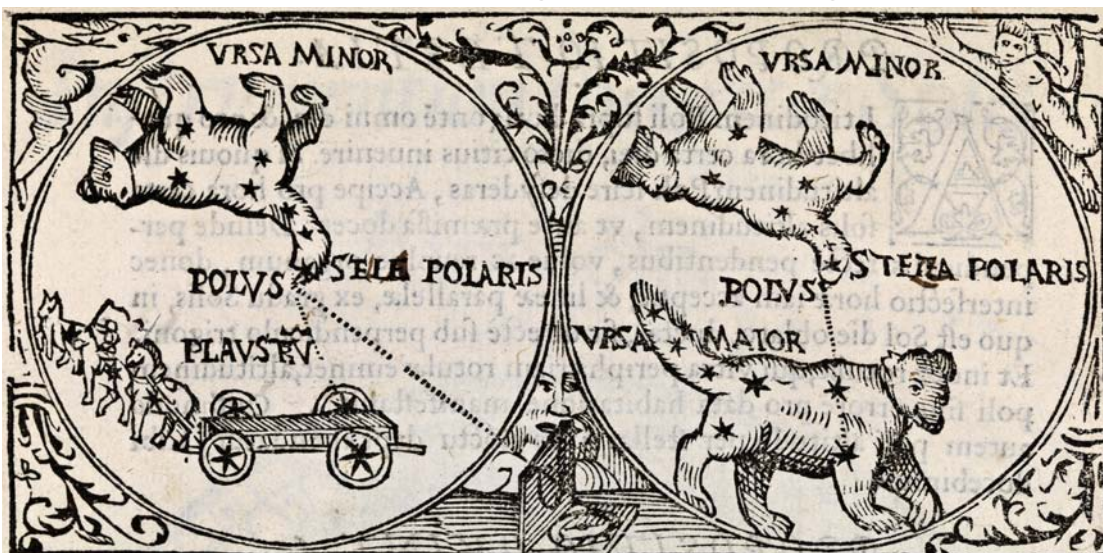
## Peter Apian: Double hemisphere with constellations from Cosmographia (1524) 1550

## Paul Gaimard: Voyages en Scandinavie, en Laponie au Spitzbergen et aux Férøe, 1845

Northern lights, Bossekop in Finnmark, 19 January 1839

## Lise Myhre: Nemi - monsters and meteors, 2005

Illustrated version of André Bjerke's poem "Natten" ("The Night")



Peter Apian: Double hemisphere with constellations from Cosmographia (1524) 1550

# Voyages north

## **Nordland – Finmark – Spitsbergen, 1907**

The cover shows key elements of tourists' experience of «The North»: the midnight sun, majestic mountains, bird life and fishes.

## **Paul Du Chaillu: The land of the midnight sun: summer and winter journeys through Sweden, Norway, Lapland and Northern Finland, 1888**

Starting in the 1880s Brits, Germans, Americans and Frenchmen came to Norway to experience the midnight sun. Du Chaillu played an important part in profiling Norway as a travel destination.

## **Norvège. Au pays du soleil de minuit et aux fjords, 1912**

On the map we can see steamship routes from England, France and Germany. On the journey north, tourists celebrated their crossing of the

Polar Circle, and visited North Cape and Svalbard.

## **The Sportsman's route, 1897**

Organised trips to Svalbard became more and more popular starting in the 1890s. Hunting, exotic wildlife experiences and hopefully a trip out onto the pack ice were trip highlights.

## **Carl Barks: Luck of the North. Signed lithograph from 2000; recreation of an oil painting from 1973 illustrating a comic strip story by Barks from 1949**

The comic strip story with the same title was published in Norwegian in a special edition in 1952 entitled Donald Duck på Grønland ("Donald Duck in Greenland"). In the English original the plot is set in Alaska. The story is considered a classic and has been reissued several times.



## **When the terrain changes**

The polar regions of the world are viewed by experts as being capable of providing early indications of global climate changes. The animation is taken from a NASA study of global warming in the Arctic regions, which was published in 2003 in the American Meteorological Society's Journal of Climate. It illustrates the changes in the ice cap's surface area in the North Pole during the period from 1979 to 2001.

NASA's studies show that the ice cap is shrinking by 9% each decade. The melting over the past 20 years has progressed eight times faster than the average for the last 100 years. This can lead to

ocean currents and the salt content of the ocean changing, with the consequences this will have in turn for the ocean and the resources we can take from it. The ice melting also leads to the opening up of new transport routes for shipping traffic.

Through use of satellite technology it has been possible to collect, interpret and disseminate geographic information in a manner that was not possible previously. The individual images in this animation are visualisations based on the results of measurements of the surface temperature on the North Pole, recorded by satellites.

# Exhibition colophon

**Concept and head curators:**

Benedicte Gamborg Briså, Bente Lavold

**Exhibition consultants:**

Karin Hansen Barth, Yngvil Beyer, Daniela Büchten, May Ruth Faust, Richard Gjems, Øivind Hanche, Espen Karlsen, Anne Melgård, Sara Östlund- Nilsson, Bjørg Dale Spørck, Edgar Ytteborg

**Exhibition production and design:**

Cecilie Rasch-Halvorsen

**Technical curators:**

Jina Chang, Chiara Palandri, Wlodek Witek

**Exhibition carpenters:**

Petter Halvorsen, Ketil Rønning

**Producer AV:**

Sondre Larssen

**Animation:**

Sondre Larssen and Cecilie Rasch-Halvorsen

**ICT:** Inger E. Tveide

**Lighting:** Ola Hansen

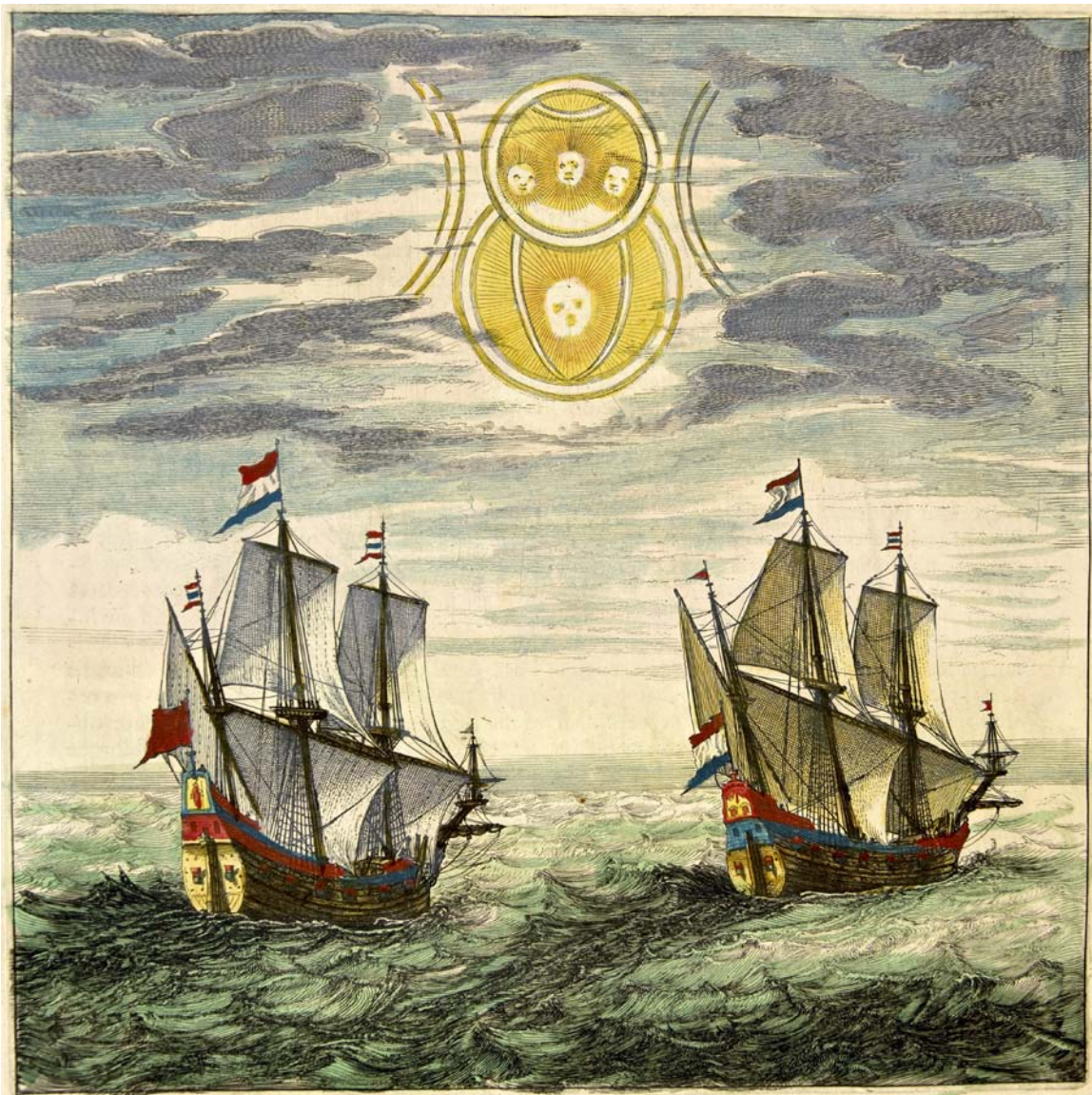
**Graphic design:** Melkeveien designkontor

**Northern lights projection:** Morten Skallerud

**GIS animation:** MAREANO

**Other contributors:**

Are Vidar Boye Hansen, John Durham Peters, Lynn Rosenstrater, NUPI ([www.hvorhenderdet.no](http://www.hvorhenderdet.no))



From Willem Blaeu: Atlas Maior, 1662