

NR.2 SEPTEMBER

2000

POLAR RESEARCH IN TROMSØ

EDITORIAL



RECENT DOCTORATES



RESEARCH NOTES



FEATURE



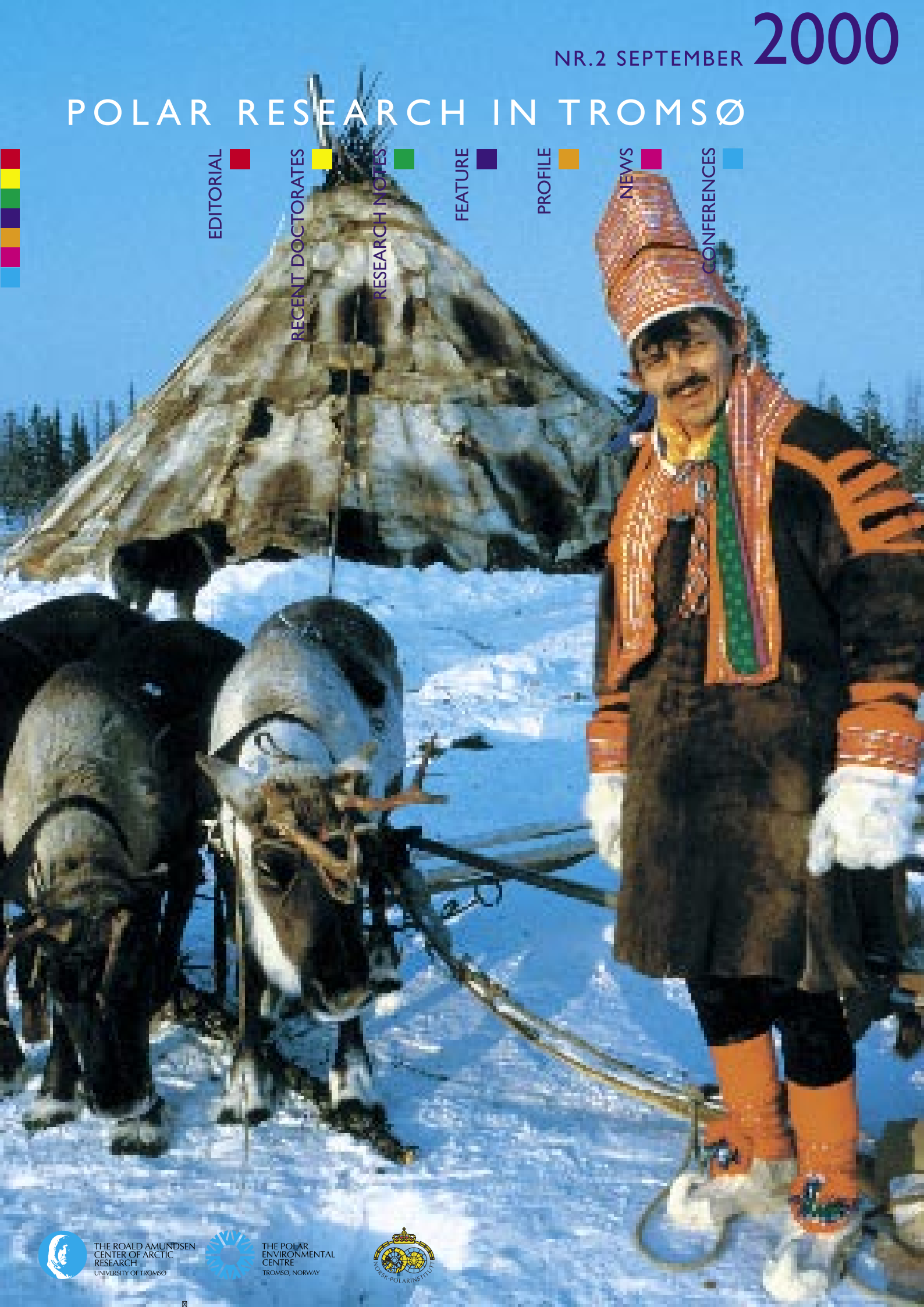
PROFILE



NEWS



CONFERENCES



THE ROALD AMUNDSEN
CENTER OF ARCTIC
RESEARCH
UNIVERSITY OF TROMSØ



THE POLAR
ENVIRONMENTAL
CENTRE
TROMSØ, NORWAY



Svalbard in the focus of Norwegian Arctic Research

There are 10 commercial flights a week from Tromsø to Svalbard (Longyearbyen) and the journey there lasts about 90 minutes. For us in Tromsø, Svalbard - with its huge potential for Arctic research - is on our very doorstep. We are naturally keenly interested in National policy regarding Svalbard as a base for scientific operations.

The Norwegian Government's white paper 'Svalbard' (St. mld. Nr. 9 1999-2000, Ministry of Justice) emphasises a central role for science and education in development of Svalbard. In addition, it stresses:

• Svalbard's role as an international research platform and the need to concentrate scientific infrastructure within the settlements at Longyearbyen and Ny-Ålesund,

• the importance of ensuring that all science activities on Svalbard are compatible with regulations for the conservation of the islands, and

• Norway's role as host for international science activities on Svalbard.

Svalbard Science Forum (SSF) is an important adjunct to Norway's role as host nation. SSF (<http://www.forskningsradet.no/fag/andre/ssf/>) co-ordinates science activities and assists scientists who need facilities on Svalbard.

In May this year the Crown Prince, H.R.H. Håkon Magnus, inaugurated a new atmospheric research station on Mount Zeppelin in Ny-Ålesund. A few days later Morten Ruud, the Governor of Svalbard, inaugurated a second antenna at EISCAT Svalbard Radar near Longyearbyen. This antenna was financed by a contribution from Japan, which has now joined EISCAT.

In June, the Norwegian Parliament voted to expand the facilities at UNIS (The University Studies on Svalbard) with the addition of a research centre covering 5000 sq. metres. This centre will provide facilities for several of the research organisations already represented on Svalbard, including the Norwegian Polar Research Institute, EISCAT and the Norwegian Space Centre. The future for both national and international scientific activities on Svalbard seems very promising.



Cover picture: Reindeer herder Johan Mathis Turi, chairman of the Association of World Reindeer Herders which has recently opened its headquarters in Tromsø. Mr. Turi was awarded the Royal Norwegian Ministry of Agriculture 100th Jubilee prize for international work. See Profiles and News. (Photo: Øyvind Ravna)

RECENT DOCTORATES IN POLAR STUDIES AT THE UNIVERSITY OF TROMSØ

1999

Dr. scient.

Persistent organochlorine pollutants in two Arctic gull species, levels and possible biochemical effects.

Espen O. Henriksen
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Dr. artium

Verb phrase syntax in the history of Icelandic.
Thorbjörg Hroarsdóttir

Dr. scient.

Auroral signatures of dayside particle precipitation in the polar cap boundary region: modelling and measurements.
Dag Arne Lorentzen

Dr. scient.

North Atlantic paleoceanography and climate history during the last 70 000 calendar years.
Sveinung Hagen
svehag@statoil.com

Dr. philos.

Comparative aspects of digestion in reindeer.

Svein D. Mathiesen
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Dr. artium

Mot en korporativ reindrift. Samisk reindrift i Norge i det 20. århundre - eksemplifisert gjennom studier av reindriften på Helgeland. [Towards corporatized reindeer husbandry. Saami reindeer husbandry in Norway in the 20th. Century - exemplified by studies of reindeer husbandry in Helgeland].

Bård A. Berg
baberg@sv.uit.no

2000

Dr. philos.

The marine benthic fauna in the region of Tromsø, northern Norway, with particular reference to bristle worms (Annelida: Polychaeta).
Eivind Oug
oug@niva.no

Dr. philos.

Microbial digestion in reindeer and minke whales.

Monica Alterskjær Olsen
monicaao@fagmed.uit.no

Dr. medicinae

Environmental and occupational exposure, life-style factors and pregnancy outcome in Arctic and subarctic populations of Norway and Russia.

Jon Øyvind Odland
joodland@online.no

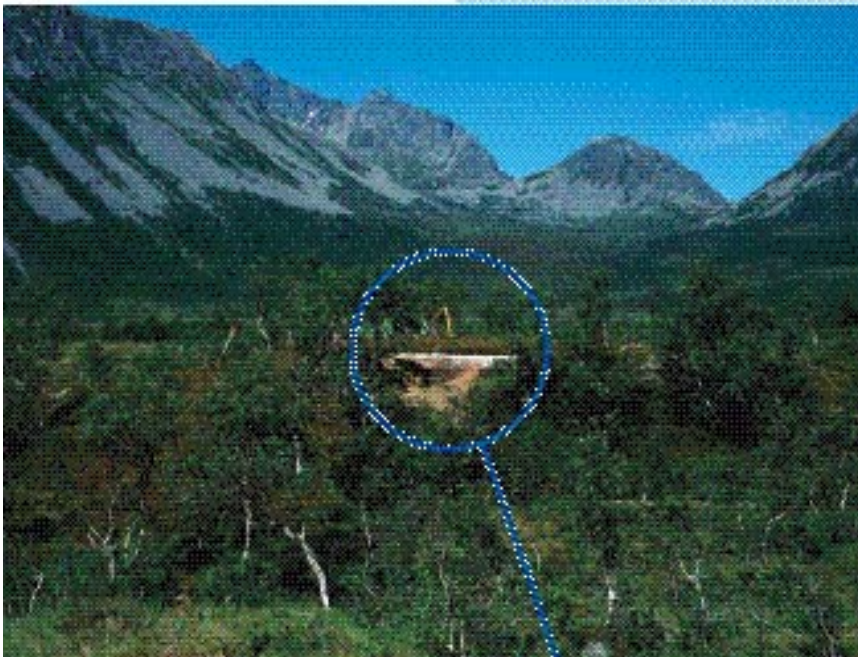
Dr. scient.

Late Palaeozoic Carbonates on the Norwegian Barents Shelf.

Tommy Samuelsenberg
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Men of Iron in the Arctic

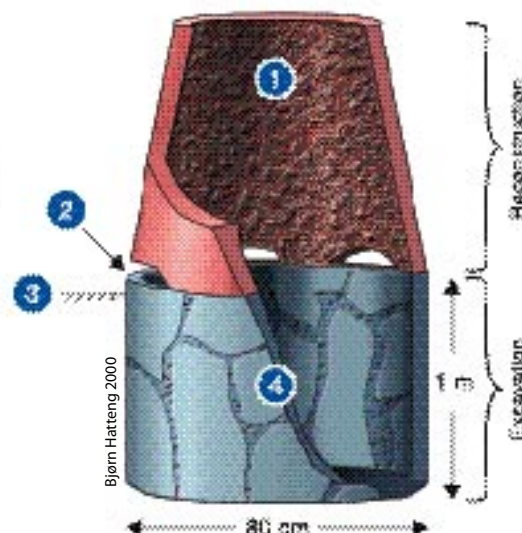
● Iron Age and medieval iron production sites in Northern Norway



Iron production site at Flakstadvåg.

Furnace

- 1 Clay chimney; bog iron ore was converted to iron near the top of the shaft
- 2 Vent holes
- 3 Ground Level
- 4 Stone lined fire pit



Sites of iron production dating from the Iron Age and early medieval have been known in central and southern Norway for decades. There was vigorous activity and the production of iron in Trøndelag (central Norway), for example, greatly exceeded local demand. Until recently, however, no sites were known in northern Norway and it has always been assumed that all iron used here must have been imported.

In 1995, however, an iron production site was discovered at Misvær (see map) and charcoal from this site has been dated to the 13th Century. Two years later a second site was discovered by Roger Jørgensen, Department of Archaeology, Tromsø University Museum (rogerj@imv.uit.no), at Flakstadvåg. The site, excavated in 1998, has been dated to 230-330 A.D.

The location and means of production of iron at Flakstadvåg is similar to the sites in Trøndelag. The 80 cm diameter furnace is located on a dry place near a bog and close to a small stream. Bog iron was found a few meters away. Wood for production had been cut near by. The site has been disturbed and it is not possible to determine whether there had been one or several ovens there or whether production took place over one or several years. Judging from the amount of slag present, however, not less than 113 kg iron must have been produced there.

In 1999 a third late Iron Age or early medieval iron production site was excavated at Hemmestad. The furnace is small (30 cm diameter) and is situated in quite a different location compared to those at Flakstadvåg and the early Iron Age sites in Trøndelag.

We still do not know how widespread iron production was in northern Norway during the Iron Age or early medieval. Localising iron production sites requires both skill and a lot of luck. Six years ago no sites were known: now we have three. This is probably just the beginning.

Giant submarine slides

For most of us, 'ocean' means strong winds and big waves while we don't generally expect that much happens at the sea floor. In fact, this is not the case at all. The sea floor is a vigorous, dynamic environment where various processes affect sediments at depths of several thousand meters.

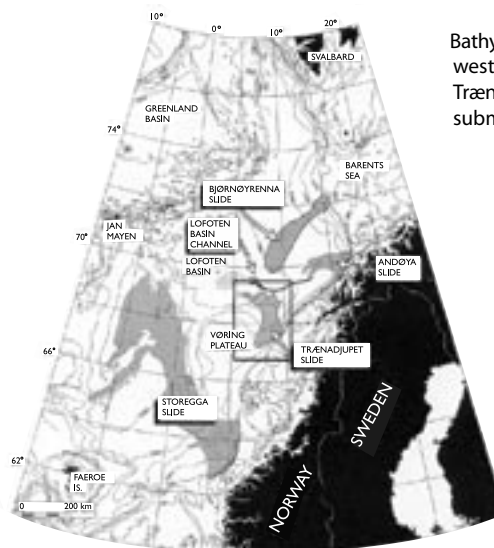
One of the most spectacular phenomena are the great avalanches of mud and rubble which move across the sea floor known as giant submarine slides. Giant? One of these, the Trænadjupet Slide, located at 68° N on the continental slope of northern Norway (see map), covers an area of 14,100 km² which is about one third of the area of Denmark. This slide forms a prominent depression on the sea floor where sediments have been transported up to 200 km from the shelf break into the deep ocean.

Dr. Jan Sverre Laberg (jansl@ibg.uit.no) and Prof. Tore Vorren at the Department of Geology, University of Tromsø, have studied the Trænadjupet Slide as part of the EU-funded ENAM programme (European North Atlantic Margin: Quantification and modelling of large scale sedimentary processes and fluxes) using the Towed Ocean Bottom Instrument (TOBI) of the Southampton Oceanography Centre, UK. TOBI is a high-resolution side-scan sonar which produces sea-floor images of much higher resolution than has previously been available. It is now possible to study submarine slides almost at the same level of detail as onshore land-slides.

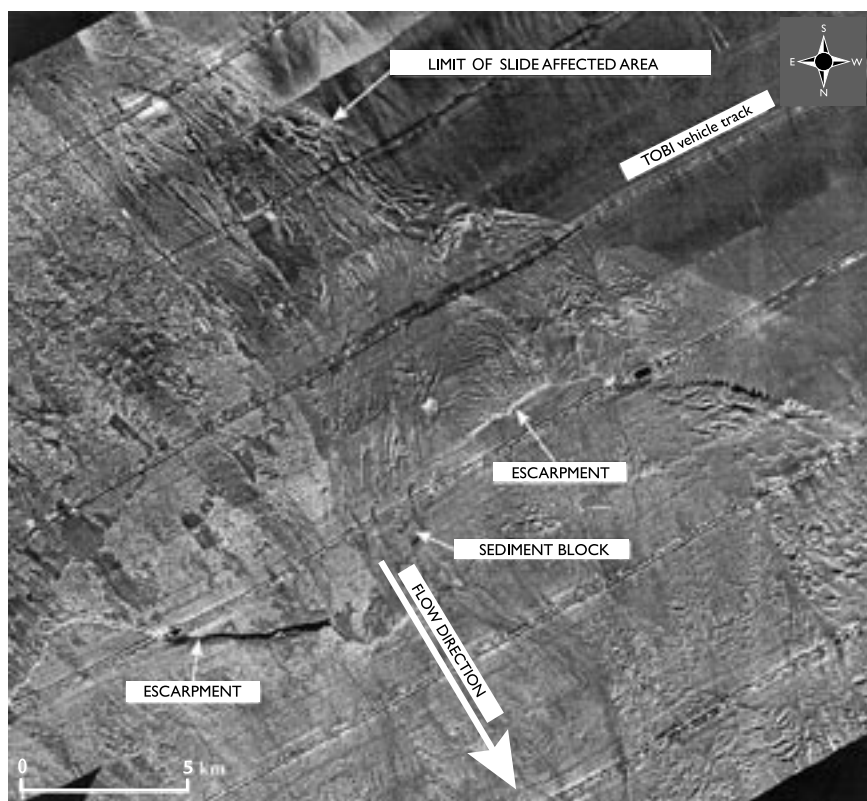
The Trænadjupet Slide (Figure) is more than 4,000 years old. It was probably triggered by one large or a series of several small earthquakes. The earthquakes in this area were most likely caused by the crustal uplift of Fennoscandia following the melting of the Fennoscandian ice sheet. Knowledge of these phenomena permits better assessment of the risk of giant submarine slides and is crucial for offshore and coastal activities in northern European and Arctic areas.

Publication

Laberg, J.S. and Vorren, T.O. The Trænadjupet Slide, offshore Norway - morphology, evacuation and triggering mechanisms. *Marine Geology* (in press).



Bathymetric map of the Norwegian-Greenland and western Barents Sea showing the location of the Trænadjupet, Storegga, Andøya and Bjørnøyrenna submarine slides.



Sea-floor image of Towed Ocean Bottom Instrument side-scan sonar image covering the upper, western part of the Trænadjupet Slide. A prominent escarpment up to 100 meter high can be followed from the lower left part of the figure across the slide. A large sediment block is also shown.

THE TOBI INSTRUMENT

The TOBI side-scan sonar system is an instrument towed behind a vessel which sends out sound beams (at frequencies of 30 and 32 kHz) on the port and starboard sides, respectively. The beams are very narrow in the fore and aft direction but very broad in the across-track direction (6 km). The instrument builds an acoustic image based on the level of acoustic 'backscatter' (reflected sound) returned from the ocean floor. This backscatter depends on the topography and composition of the sea floor. High level of acoustic energy is displayed by light grey tones and low level energy is indicated by dark grey to black tones. Features characterised by a pronounced relief and which can be followed across more than one swath width (e.g. escarpments) may be displayed in light grey tones (facing the sonar) and black tones (shadow) depending on the direction of the sonar signal relative to the feature.

It's blubbery cold for minke whales in winter!

Why do harp seals (*Phoca groenlandica*) live all year round and breed in the icy Arctic oceans while minke whales (*Balaenoptera acutorostrata*) are migrants which visit the Arctic only in summer? Unlike the seals, minke whales migrate south in autumn and give birth and spend the winter in warmer, less productive waters. Dr. Petter Kvadsheim (petterk@fagmed.uit.no) and his colleagues at the Department of Arctic Biology, University of Tromsø, believe at least part of the explanation lies in differences in the quality of blubber insulation in the two species.

The temperature of the high Arctic oceans is about 0°C. This, in itself, is not very cold but water has 23 times higher thermal conductivity and 3000 times higher heat capacity than air. For animals like whales and seals, which maintain a constant body temperature of approximately 36°C, cold oceans therefore represent potentially the most demanding thermal environments on earth.



The icy water of the Arctic oceans represents a formidable thermal challenge for warm blooded animals. Harp seal mother and her newborn pup in the pack ice off Greenland. (Photo: Lars Folkow).



The blubber layer of an adult minke whale is approximately 5 cm thick over most of its body ...



... harp seals, which are only about 1/40th as large, have a similar depth of blubber. (Photos: Petter Kvadsheim)

Minke whales and harp seals differ greatly in size. An average sized minke whale weighs about 4000 kg compared to only about 100 kg for a harp seal. This, you might think, gives whales a thermal advantage. Animals produce heat in each unit of volume of their body tissue but they lose it from each unit of surface area. Large animals have lower surface-to-volume ratios and, therefore, have a greater capacity for producing and a smaller tendency for losing heat than small ones. Consequently, we usually expect large animals to be more comfortable in cold environments than small ones.

The practical consequences of this for minke whales and harp seals are quite straight-

forward. If we assume that both species produce heat at the average resting rate for mammals, minke whales, being 40 times heavier, produce 14 times more heat. Yet their surface area is only 11 times greater; about 19 m² compared to about 1.7 m² for a harp seal. A minke whale should, therefore, be able to lose up to 30% more heat per unit of surface area than a harp seal while still maintaining thermal balance. On this basis the whales would seem to be better suited than seals for life in cold water.

This argument, however, ignores the effects of insulation. Both harp seals and minke whales are insulated by a layer of subcutaneous fat ('blubber'). Seals, but not whales,

also have fur but we can ignore this because wet fur gives very little thermal protection.

Theoretical calculations of the minimum possible rates of heat loss show that an average sized minke whale floating in the physiological resting state in ice water would lose more heat than it produces. Such a whale would cool down and minke whales, therefore, must keep the fires of their metabolism permanently turned up. In contrast with this, the same calculations predict that harp seals resting under the same conditions would comfortably maintain thermal balance. The difference is due mainly to the fact that harp seals have better blubber. Their blubber layer offers 50% higher thermal resistance than the equally thick blubber layer of minke whales. This more than compensates the seals for the inherent disadvantage of their smaller body size. Perhaps minke whales have no choice but to leave the Arctic because they are not equipped to withstand cold water in winter.

Publication.

Kvadsheim, P.H. (1998) Blubber as insulation. A study of heat balance in harp seals (*Phoca groenlandica*) and minke whales (*Balaenoptera acutorostrata*). Dr. scient. thesis, University of Tromsø.

FEATURE

The World's northernmost botanic garden

Being home of the world's northernmost University and the Norwegian Polar Institute, it is quite natural that Tromsø should also be the location of the world's northernmost botanic garden. The Arctic-alpine Botanic garden at the University of Tromsø was opened in 1994 and already has many attractive collections of plants.

Layout of the the Arctic-alpine Botanic garden



History

The present garden is not the first. A small botanical garden was constructed at the old Tromsø Museum about 100 years ago (Photograph). This garden included many Arctic and Alpine species but it degenerated into a purely ornamental garden and, by 1920, sank into oblivion. Plans for a new garden were on the agenda of the University of Tromsø from its opening in 1971 but it took almost 25 years to realise them. The present garden is now in its seventh season.

Climate

A location at almost 70° north seems an unlikely site for a substantial botanical garden. That it is possible at all is due to a northern branch of the Gulf Stream which ameliorates the climate of northern Norway. Tromsø has relatively mild winters (January average - 4.4 °C) and cool summers (July average + 11.8 °C). At Point Barrow in Alaska, lying at the same latitude as Tromsø, by contrast, the average July temperature is only + 4 °C while the average temperature in January is - 26 °C!

Summer is short at 70° N - the garden is usually free of snow from the end of May until early October - but is compensated by two months of midnight sun. Snow is usually considered a blessing for alpine plants because it protects them from frost. Large amounts of snow, however, can break plants as the stark wrecks of broken birch trees in the forests around Tromsø testify. The average accumulated depth of snow in the winter is increasing here. It is, indeed, the only meteorological parameter which has changed significantly over the last 30 years, possibly reflecting global climate change.



Dianthus superbus from the Arctic-alpine collection

(All color photos: Finn Haugli)



The first botanical garden at the old Museum in Tromsø, some time before 1920

A tour of the garden

The garden is laid out in three wide terraces. The visitor usually approaches along a path through birch forest from the University. We start our visit to the garden here, descending through it to consider the various collections.

Sino-Himalaya (Position 1 on map). Many plants growing in their native range at altitudes between 3500 and 5500 m find the climate in Tromsø to their liking. From mid June until mid July different species of *Meconopsis* can be stunning in this part of the garden, starting with blood-red *M. punicea* and lemon-yellow *M. integrifolia*, the lavender *M. quintuplinervia*, royal blue *M. grandis* and the famous Blue Poppy of Tibet, *M. betonicifolia*. The Sino-Himalayan mountains, being home to almost 400 species of *Primula*, also provide the garden with some spectacular species of this family.

Rhododendron (Position 2 on map). Adjacent to the Himalaya-collection an area is set aside for low-growing alpine *Rhododendrons*. It was once held that *Rhododendrons* could not be cultivated in northern Norway but this obviously is not true. There is even one native species here, *R. lapponicum*. Our collection includes the three alpine species from Central Europe (*R. ferugineum*, *R. hirsutum* and *R. myrtifolium*), wide-spread north-eastern Eurasian species (*R. caucasicum*, *R. aureum* and *R. camtschaticum*) and several Sino-Himalayan species which grow at altitudes around 4-5000 m in their homeland.

The Kirovsk Friendship collection (Position 3 on the map) includes plants from north-eastern Russia. Most, including the Arctic Sunrose, *Helianthemum nummularium* ssp. *arctica* and the Siberian columbine *Aquilegia glandulosavar. Jucunda*, were gifts from the Kirovsk garden in Apatity on the Kola Peninsula.

Bulb and Corm collection (Position 4 on map). This collection, new in 1999, is home to plants having a bulb, corm or similar storage organ to sustain them through drought in summer or cold in winter. Virtually all plants here are of Alpine or northerly provenance, including members of the *Liliaceae* (Lily family) and species in genera as varied as Larkspur (*Corydalis*) and Anemones (*Anemone*).

Primula collection (Position 5 on map). Tromsø's climate is particularly suited for alpine *Primulas*. We plan to grow about 100 species - almost 25% of those in existence. The present collection includes Sino-Himalayan *Petiolaris* which do very well in Tromsø. These have stomata (leaf-pores) which cannot be closed to prevent evaporation under hot or dry conditions and are often difficult to grow outside their native range.

Buttercups (Position 6 on the map). This collection, adjacent to the pond, displays a number of plants in well known genera such as *Anemones* (*Anemone*), *Columbines* (*Aquilegia*) and *Pasqueflowers* (*Pulsatilla*). Tall plants in this group, such as Monk's hoods



(Aconitum) and Globeflower (Trollius) frame the pond. Smaller plants such as the Noble Hepatica (Hepatica nobilis), the beautiful Wood Anemone (Anemone nemorosa) and the exquisite Spring Pasqueflower (Pulsatilla vulgaris), a native of southern Norway as well as the Alps, flower shortly after the snow has disappeared in late May or early June.

Amphitheatre. Dwarf Conifers. Childrens' Corner (Positions 7 and 8 on the map). The Amphitheatre, facing the pond, is the centre of the garden: a meeting place, a place where classes are taught and where visitors attending garden programmes can meet. Surrounding the Amphitheatre is a small collection of dwarf conifers.

A Childrens' Corner has been incorporated in the garden to offer smaller children activi-

ties and to protect the plant collections from being used as a playground. This area features a collection called 'Childrens' games with Wild Flowers' with plants connected to traditional childrens' games in northern Norway.

Tall perennials and the Pond (Position 9 on the map). The pond is fed by a stream which runs into it over a small waterfall. White water lilies (Nymphaea candida) and Water Ranunculus (Ranunculus aquatilis) grow in the pond while at the waters edge Yellow Flag and Siberian Iris make a transition to drier ground. A number of monumental perennial plants, such as Ligularia spp., mingle with species of Equisetum, Juncus, Rodgersia and Alchemilla to provide a riotous, attractive mixture.

Succulent collection (Position 10 on the map). Plants capable of storing water in stems or leaves, thus being able to withstand periods of drought, are generally referred to as 'succulents'. Important genera are Sedum, Rhodiola, Sempervivum (House-leeks) and Jovibarba.

Herb and Spice garden (Position 11 on the map). The Herbal garden, partly constructed on the pattern of ancient monastery gardens, contains a wide selection of plants within major sections of medicinal herbs, spices, poisonous plants, plants for dying, aromatic plants, aphrodisiacs, plants connected with witch-craft and plants for salads, soups and tea such as a wide selection of onions and mints. Of special interest is a collection of wild growing herbs

■ Meconopsis spp. from Himalaya

■ Rhododendron aureum

■ Erythronium sibiricum from Kirovsk

■ Trollius chinensis (Buttercup family)

■ Papaver lapponicum from the Arctic-alpine collection

■ Saxifraga nathorstii - a new Arctic-alpine species



from North Norway for the project 'The use of plants in women's tradition in northern Norway'.

Arctic-alpine mounds (Position 15 on the map). This complex of collections will display Arctic plants, Scandinavian alpine plants, plants from the European Alps and a collection of Gentiana. Arctic plants come from Svalbard, Arctic Canada, Alaska and northern Siberia and include *Polemonium boreale*, *Papaver lapponicum*, *Saxifraga oppositifolia*, *Arnica angustifolia* and, from Greenland, *Saxifraga nathorstii*. This is a new species which arose from a spontaneous crossing of *S. oppositifolia* and *S. aizoides*, followed by a chromosome doubling which stabilized the

plant genetically so that it now comes true from seed.

Southern Hemisphere (Position 16 on map). The world's northernmost botanic garden is building a fine collection of plants from far south in the Southern Hemisphere. The wonderful plants from South America include species in genera *Oxalis*, *Calceolaria*, *Calandrinia*, *Azorella*, *Chilodactylon* and *Leucheria*. From South Africa we have the beautiful *Felicia rosulata* and from New Zealand we will display species from genera such as *Celmisia* and *Aciphylla*.

Saxifraga (position 17 on map). The international *Saxifraga* Society supports the cre-

ation of substantial collections. Among the many extremely beautiful mountain plants found here are the European species *Saxifraga burseriana* and *S. marginata* with large white flowers on tight, low cushions, *S. paniculata*, *S. callosa* and *S. cotyledon*. From the Caucasus we have *S. juniperifolia*, *S. dinikii* and *S. columnaris* and from the Himalayas beautiful high alpine species such as *S. lilacina* and *S. andersonii*. The *Saxifraga* collection includes a number of Arctic and subarctic species such as red *S. oppositifolia*, yellow *S. hirculus* and white saxifrage *S. cespitosa*.

More information from:
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Saxifraga oppositifolia from the Arctic-alpine collection. The world's most northerly flowering plant.

Association of World Reindeer Herders



P R O F I L E

In September 1999 the Association of World Reindeer Herders opened its headquarters in Tromsø, bringing to fruition an idea conceived in 1990 when a delegation of Saami reindeer herders from Norway travelled to meet Even herders in Sakha (Yakutia).

Following this first meeting, herders from 15 reindeer peoples gathered in Tromsø in 1993 for a Reindeer Peoples' Festival hosted by the Saami. Amid much festivity it was agreed to found an international union to protect the collective interests of reindeer herders.

Association of World Reindeer Herders was formally constituted at a meeting held in Nadym, Yamal-Nenets Autonomous Region, in March 1997. Its purpose is to promote professional, commercial and cultural contact between the different reindeer peoples of the world and to disseminate information about reindeer husbandry. The Association's membership includes persons engaged in reindeer husbandry, members of their fami-

lies, reindeer husbandry brigades, districts, organisations and companies as they occur in the respective countries and regions. The current membership includes representatives from 22 different reindeer peoples - altogether about 50 000 persons - in 28 regions.*

The Association of World Reindeer Herders also admits as associate members persons, companies and organisations which, though not actively involved in herding reindeer, nevertheless have a strong professional engagement in reindeer husbandry, for example through administration or in research.

The Congress of the Association assembles every fourth year. Its Council, consisting of 22 members including one from each region represented at Nadym in 1997, meets annually. A Governing Board of five members elected by the Council meets more frequently. The current chairman of both the Council and the Governing Board is Johan Mathis Turi, a Saami reindeer herder from Kautokeino in Norway.

The Association produces a regular news letter *The Reindeer Herder* published in English, Finnish, Norwegian and Russian and available from:

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telephone: +47 77 65 64 00
fax: +47 77 65 66 82
e-mail: wrh.es@online.no

* Alaska, Amur Region, Archangel Region, Buryat Republic, Canada, China, Chita Region, Chukotka Autonomous Region, Evenk Autonomous Region, Finland, Greenland, Irkutsk Region, Kamchatka Region, Khabarovsk Krai, Khanty-Mansi Autonomous Region, Komi Republic, Koryak Autonomous Region, Magadan Region, Mongolia, Murmansk Region, Nenets Autonomous Region, Norway, Sakha (Yakutia) Republic, Sakhalin Region, Sweden, Tuva Republic, Yamal-Nenets Autonomous Region, Taimyr (Nenets-Dolgan) Autonomous Region.

Bold type: Regions represented on the WRH Council.

Polar Statuette

The Polar Statuette is awarded to people who have distinguished themselves in Polar research or in some other way contributed to strengthening Tromsø's position as a centre for polar research.

The 2000 award was made to Professor Olav Holt, chief executive of the NORUT Group Ltd.

Professor Holt was director of The Auroral Observatory in Tromsø (1968-1971) and was a central figure in the process of planning the University in Tromsø. As a member of the Interim University Board he was responsible for developing graduate studies at the Faculty of Science and he became the first

Rector of the University (1973-1977). Professor Holt worked vigorously to get Norway involved as an active member of the European Incoherent Scatter (EISCAT) organisation and his decisive approach resulted in Ramfjordmoen near Tromsø being selected as the site for the main EISCAT installation (1975). Thanks in large part to this, Tromsø has become an important centre for space and atmospheric research. Professor Holt played an important role in establishing Tromsø Satellite Station (formerly Tromsø Telemetry Station), the Andøya Rocket Range and the conglomerate of five applied research companies which form the NORUT Group Ltd.



Professor Olav Holt

Tromsø Museum's Blue Whale Skeleton on loan to Japan

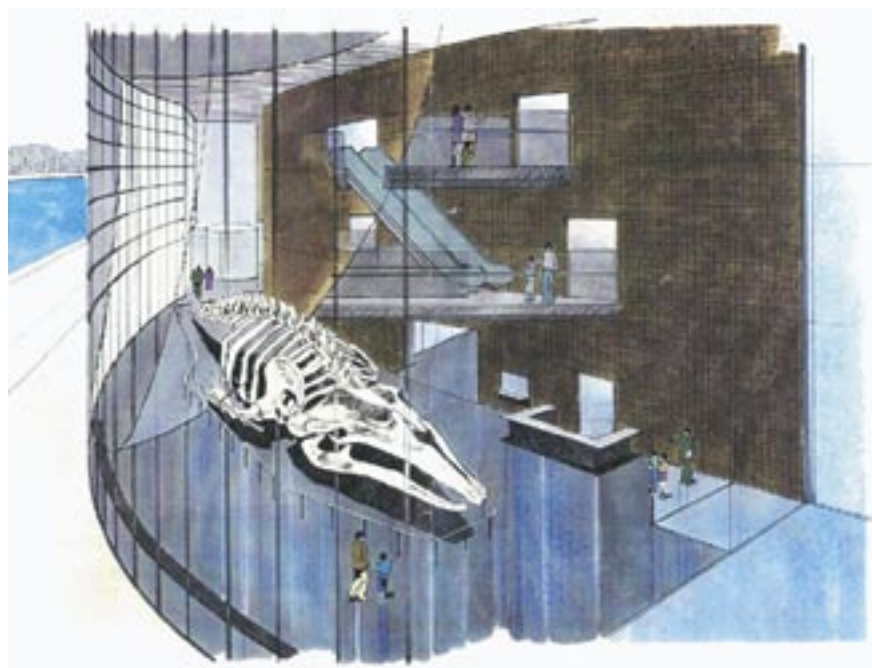
Complete skeletons of blue whales *Balaenoptera musculus* are rare; blue whales are completely protected from hunting and new skeletons are simply not available. In 1885, Tromsø Museum bought the skeleton of a blue whale from a whaling station at Vardø in northern Norway. This specimen is 24 m long, almost complete and is in good condition.

Recently, Tromsø Museum was contacted by the Institute of Cetacean Research in Tokyo with a request to borrow its blue whale skeleton for 7 years. The Institute of Cetacean Research wants the skeleton to enable Dr. Hidehiro Kato to examine it as part of research related to geographical variation in this species and to display it at the new Shimonoseki Marine Science Museum which opens in April 2001. Shimonoseki is a city of about 260 000 located 800 km from Tokyo.

Three replicas of the skeleton will be made. One will replace the real skeleton at Shimonoseki when this is returned to Tromsø; the two others will be exhibited elsewhere in Japan.

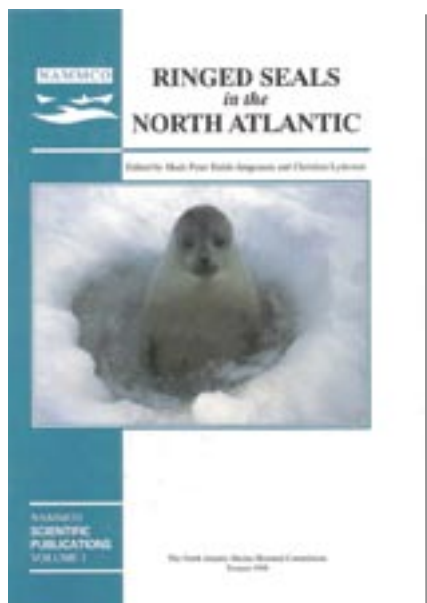
The contract with Tromsø Museum was signed in July 1999. The skeleton was sent by air to Japan, where it arrived safely in October 1999.

More information from:
Professor Arne Nilssen: arnec@imv.uit.no



A 24 m blue whale skeleton from Tromsø Museum will be the main attraction in the Shimonoseki Marine Science Museum in Japan

NAMMCO Scientific Publications



The North Atlantic Marine Mammal Commission (NAMMCO) was established between Norway, Iceland, Greenland and the Faroe Islands in 1992 to contribute, through regional co-operation and consultation, to the conservation, rational management and study of marine mammals in the North Atlantic. NAMMCO's Secretariat has been based in Tromsø since 1993.

NAMMCO has initiated a new journal, NAMMCO Scientific Publications to make available scientific papers that have contributed to the work carried out by the NAMMCO Scientific Committee.

The Scientific Committee provides scientific advice for the Council of NAMMCO, usually by establishing Scientific Working Groups which include international experts in particular fields. NAMMCO Scientific Publications publishes papers produced by and for the Working Groups. All papers are subject to formal peer review.

The first volume of NAMMCO Scientific Publications, 'Ringed seals in the North Atlantic', edited by Dr Mads Peter Heide-Jørgensen, Greenland Institute of Natural Resources, and Dr Christian Lydersen, Norwegian Polar Institute, was published in 1998. The ringed seal, or 'natsiq', is of profound importance to the Inuit of the circumpolar north. Ringed seals can provide most of the necessities

of a nomadic people's life, including food, fuel for heat and light, skins for clothing and shelter and hunting tools. The Inuit of Greenland and Canada have latterly become integrated into the international economy through the export of sealskins. Recently, this trade has been drastically reduced, crippling the economies of local communities.

'Ringed Seals in the North Atlantic' contains 14 papers on ringed seals. The volume begins with a broad assessment of the distribution, abundance and biology of the species followed by regional overviews of ringed seal populations. The relationship between northern peoples and the ringed seal is illustrated by regional descriptions of catch history and exploitation. The remaining papers describe aspects of reproduction, movements, diet and the accumulation of contaminants in the seals.

The second volume of NAMMCO Scientific Publications, 'Minkewhales, harp and hooded seals: Major predators in the North Atlantic ecosystem', edited by Gísli A. Víkingsson, Marine Research Institute, Reykjavik and current Chairman of the NAMMCO Scientific Committee, and Finn O. Kapel, formerly with the Greenland Institute of Natural Resources, was published in July 2000. The volume includes five papers describing the diets of these species in parts of the Northeast, Central and Western Atlantic. Two papers provide estimates of the total consumption of harp seals and minke whales in the Barents and Norwegian seas and two papers discuss the potential predatory and competitive interactions of these species with important fish stocks in the Northeast Atlantic.

Three volumes of the NAMMCO Scientific Publications currently in preparation cover the ecological importance of seal worms, the status of narwhal and beluga stocks in the North Atlantic and the ecology of the North Atlantic harbour porpoise. Further information about NAMMCO Scientific Publications can be obtained from:

North Atlantic Marine Mammal Commission, University of Tromsø, N-9037 Tromsø, Norway.
tel. + 47 77 64 59 08
fax + 47 77 64 59 05
e-mail: nammco-sec@nammco.no
Web: www.nammco.no

Jubilee prize

Johan Mathis Turi, chairman of the Association of World Reindeer Herders which has its secretariat in Tromsø, was awarded the Royal Norwegian Ministry of Agriculture 100th Jubilee prize for international work. The prize was presented on 10th May 2000 at a ceremony in Oslo attended by H.M. King Harald V and Bjørn Håkon Hansen, the Minister of Agriculture.

The 7th Circumpolar Universities Co-operation Conference



The 7th Circumpolar Universities Co-operation Conference 'When distance is a challenge' will be held at the University of Tromsø 19th-21st August 2001. This is a multidisciplinary conference arranged by the Circumpolar Universities Association.

More information from:
<http://www.arctic.uit.no/cua>

5th Annual Norwegian Telemedicine Conference (Norsk Telemed '99)

Telemedicine is the investigation, monitoring and management of patients and the education of patients and staff using systems which allow ready access to expert advice and information no matter where either the patient or the information is located. Northern Norway, like the rest of the Arctic, is sparsely populated and travelling between communities can be expensive, difficult, hazardous or even impossible. Telemedicine enables patients and medical personnel right across such areas to benefit from sophisticated medical resources irrespective of distance. Not surprisingly, interest for telemedicine has grown substantially during the last few years.

350 participants and 20 vendors attended the 5th Annual Norwegian Telemedicine Conference was held in Tromsø in October 1999. Delegates included healthcare and technical professionals, healthcare administrators and politicians. Dagfinn Høybråthen, the then Norwegian Minister of Health, explained that telemedicine has become a priority area for the government. Three plenary sessions included 'Telemedicine in a global perspective', 'The national healthcare network' and 'Telemedicine - a benefit for the society'. Parallel sessions included Distant teaching, Primary healthcare, Psychiatry, Security issues, Technology

and trends and Telemedicine in and between hospitals.

A Norwegian Society for Telemedicine was established at the conference to encourage and promote development and research in telemedicine.

More information from:

Liv Karen Johannessen, National Centre of Telemedicine
e-mail: tmalkj@rito.no
URL: www.telemed.rito.no

On Customary Law and the Saami Rights Process in Norway



The proceedings of the a conference On Customary Law and the Saami Rights Process in Norway, held in Tromsø in February 1999, are now published in a single volume - Skriftserie nr. 8 from the Centre for Saami Studies at the University of Tromsø. The volume contains 13 papers, as follows:

- Svensson, T.G. On customary law and the Saami rights process in Norway.
- Woodman, G.R. Customary laws and customary legal rights: a comparative consideration of their nature and of the relationships between laws.
- Asch, M. The role of cultural context in reconciling indigenous and State law: examples from the Canadian experience.
- Matheisen, P. The notion of common law as an agent of change in Maori-Pakeha relations. An anthropological assessment

of recent developments in bi-cultural New Zealand/Aotearoa.

Korpijaakko, K. Saami customary law - how and where to find pieces of its evidence.

Kristensen, A. Saami customary law and legal perceptions as shown in court records from Finnmark 1620-1770.

Nikolaisen, I. Saami customs and legal perceptions. A review of the 1987-1997 archives of the legal aid agency of inner Finnmark.

Oskal, N. The moral foundation for the disqualification of aboriginal people's proprietary rights to land and political sovereignty.

Bull, K.S. The legal history of reindeer herding in Finnmark County.

Pedersen, S. The state and the rejection of Saami customary law - superiority

and inferiority in Norwegian-Saami relations.

Helander, E. Land and Saami traditional rights.

Ørebeck, P.T. The Saami customary rights of fishing: some preliminary views.

Iwanowitz, M. The historical and cultural fate of the Neiden Siida as well as the developmental aspects of customary rights, legal conceptions and application of resources in the Skolt Saami area in Sør-Varanger.

More information from:

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This NEWSLETTER is published in two issues per year by the Roald Amundsen Centre for Arctic Research at the University of Tromsø, the Norwegian Polar Institute and the Polar Environmental Centre. Its aim is to describe all manner of education and research in polar (chiefly Arctic) studies at these centres and at those research institutes and companies in the Tromsø area with which these centres have close ties.

This NEWSLETTER is sent on request and free of charge to all persons who are interested in polar studies.

Print run: 2000 copies

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