



A rainbow pointed to the hidden treasures

Protection of articulated marine Jurassic reptiles of Svalbard

Hans Arne Nakrem¹, Jørn H. Hurum¹ & Winfried Dallmann²

1) Natural History Museum, University of Oslo,
h.a.nakrem@nhm.uio.no & j.h.hurum@nhm.uio.no

2) Norwegian Polar Institute, winfried.dallmann@npolar.no

Introduction

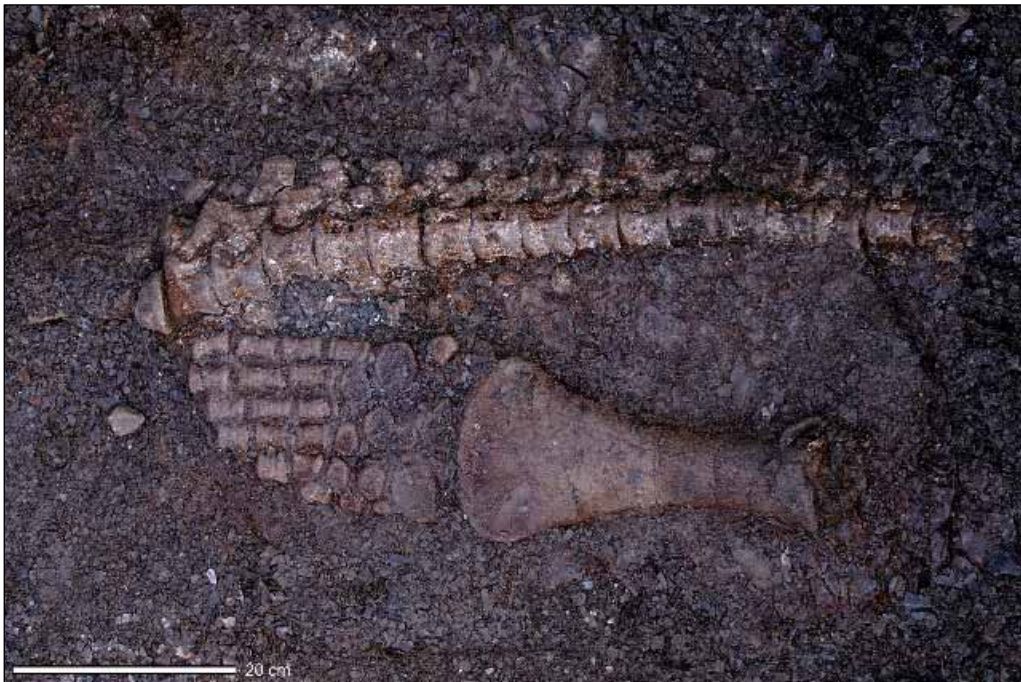
The Svalbard archipelago comprises all the islands within the administrative Svalbard quadrangle, i.e. between 74° and 81° N latitude and from 10° to 35° E longitude. The total land area comprises 62,700 km².

About 60% of this area is permanently covered by glaciers and inland ice caps.

These islands were effectively a “no-man’s land” until its status was formalised as part of negotiations following the end of World War I. The Treaty of February 9, 1920 defined the area of the archipelago and granted “full and absolute” sovereignty to Norway.

However, other parts of the treaty and its appended mineral law stipulate that citizens of the 40 signatory nations should have equal rights to claim, develop and exploit mineral resources of the area. This law, together with the archipelago’s varied geology, explains the multinational activity in the area today.

Early activities were centered on whaling, hunting and trapping, but scientists started to visit the islands in the



The plesiosaur skeleton

early part of the 19th century. Geological research has played an important role in the subsequent history of the archipelago.

The geological succession of Svalbard ranges from Pre-Cambrian metamorphic rocks through Palaeozoic, Mesozoic and Cenozoic fossiliferous sedimentary and volcanic rocks.



Svalbard with national parks and other large protected areas also indicating the area of the map on the next page (the square)

Protection of geological sites in Svalbard

Approximately two thirds of the area is protected as national parks and nature reserves. Geological criteria have, so to say, only been used in subordinate clauses. One exception is the just recently approved Festningen Geotope Conservation Area, where geological criteria were the main criteria. One of the main geoelements of the conservation area is the so-called "Festningen section", an almost continuous stratigraphic section through the entire geological record from the late Carboniferous to the early Tertiary. It was described in great detail in the early part of the 20th century, and has been used by many geologists as a stratigraphic reference section for their work in other parts of Svalbard (Dallmann 2004).

In addition to the protection of this area, recent findings of Jurassic marine reptiles in the Isfjorden area (central Spitsbergen, main island) have stimulated the discussion on whether additional areas should be protected, or whether certain fossils should be protected automatically.

Plesiosaurian remains from these rocks have been recorded as early as 1914 when Wiman published a description of a vertebral centrum found south of Deltanaset near Janusfjellet (Wiman 1914). Discoveries and descriptions of marine reptiles date back as early as 1864 when Nordenskiöld discovered a number of fragmentary ichthyosaurian specimens from the Triassic. In 1873 E. Hulke provided the first description of two species of ichthyosaurs from Svalbard (Heintz 1964) and since then more fossils of marine reptiles, mainly of ichthyosaurs and plesiosaurs have been



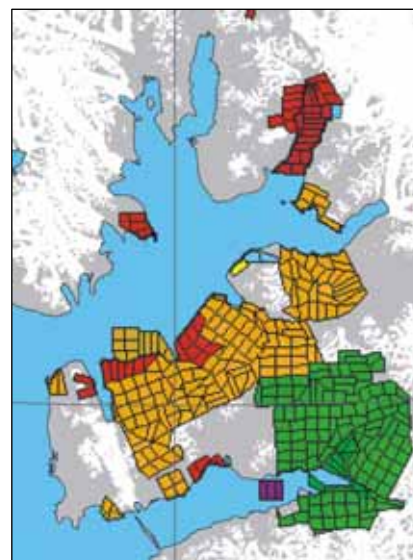
Janusfjellet locality, displaying marine Jurassic, Cretaceous and top Tertiary sediments.

Discovered, along with tracks from dinosaurs. This makes Svalbard an exciting area for future palaeontological discoveries.

In 2001 assistant professor Sverre Ola Johnson from the Technical University in Trondheim (NTNU) and students found a well preserved limb and parts of the vertebrae of a plesiosaur in the Slotsmøya Member of the Agardhfjellet Formation (Jurassic, Volgian) at the mountain Janusfjellet. They realized that it would be impossible to excavate the specimen from the surrounding frost-cracked shale. They covered it with shale fragments and marked the location. The specimen was exposed again during subsequent student excursions, but Johnson and excursion co-leader professor Jenő Nagy (University of Oslo) realized that the specimen would deteriorate after repeated exposures. They contacted palaeontologist assistant professor Jørn H. Hurum at the Natural History Museum, University of Oslo, and suggested that the specimen should be freed from the matrix and brought to a museum for professional conservation. Unconserved, the specimen would crumble due to repeated freezing and thawing during the cold winters and fairly temperate summers in Svalbard.

In 2004 a group of palaeontologists and assistants, joined by two journalists from the Norwegian governmental broadcasting corporation (NRK) carried out one

week's fieldwork at Janusfjellet. Based on maps and photos provided by Johnsen and Nagy, they were able to track the plesiosaur specimen and managed to free it from the matrix in five pieces. The specimen was wrapped in "field jackets", and brought back to the Natural History Museum. During the fieldwork the group discovered nine additional reptile specimens, including a much larger plesiosaur, and for the first



Map of claims, for reference see map previous page.



Field picture of ichthyosaur skull

time in Svalbard an ichthyosaur with the skull preserved. Two of these were also wrapped in a "field jacket" and also brought back to the museum.

Restrictions on fieldwork in Svalbard

Prior to the 2004 fieldwork Hurum and Nakrem had contacted the governor's office, which is in charge of issuing dispensations for fieldwork implying activities that may cause environmental damage. Logistics were provided from the Norwegian Polar Institute, according to an application to the institute. Svalbard Museum was also contacted. A safety course was provided by the University Studies on Svalbard (UNIS), and the field party was quite sure that all official contacts were taken care of.

Returning from the field Nakrem and Hurum were approached by the Commissioner of Mines of Svalbard, who is in charge of surveying the prospecting and mining regulations, and we were notified that the fossils had been excavated from an area that was claimed for commercial fossil digging.

In 2000 the company Reistad Consult AS had registered two claims totalling 20 km² in the Janusfjellet-Wimanfjellet area, and given exclusive rights to work a fossiliferous shale (more precisely, a sideritic or phosphatised carbonate layer rich in ammonites) and by this all other geological resources inside the claims.

This case is not unique when interpreting Norwegian law. The "allemannsrett" (public admittance) secures people general access to uncultivated lands in Norway, but the right of ownership prevents unauthorised persons from removing geological material from other persons' land. This is also the case with claims in Svalbard. When a person is granted a claim, he or she has exclusive rights to all geological resources inside

the claim, and the public does not have the right to collect specimens. In most cases an agreement with the owner would provide the permission to collect geological specimens, but concern arises when specimens of high commercial value are found. Confrontations may also come up, when the owner does not let researchers collect scientific material for unknown reasons.

The current case has caused concern, because the claim owner did not appreciate others collecting fossils in his claim area. The matter has though two aspects: scientific collecting may on one side impair his business, but might also make his fossils famous and subsequently result in an increased profit.

At the time of writing Nakrem and Hurum have not reached an agreement with Mr. Reistad, and a meeting with the Norwegian Ministry of Trade and Commerce (under which prospecting and mining is sorted), as well with Ministry of the Environment and Justice is planned. The fossils remain at the Natural History Museum in Oslo awaiting a final settlement of the case.

Towards a new legal framework?

The Ministry of the Environment has passed a press release stating that a law proposal on automatic protection of certain "fossils of special scientific value or interest" is currently under consideration. Such a protection may stop commercial digging of the mentioned fossils, whereas qualified scientific fieldwork usually would be granted permission. However, a claim- or land owner would still own the fossils, and possibly not give permission to scientists to take out and conserve fossils of special interest. It is up to the geological community in Norway to engage in the process and try to make sure that appropriate regulations will be attached to the law proposal, which would guarantee that scientific concerns are sufficiently met.

References:

- Andreassen, B. 2004. *Plesiosaurs from Svalbard*. Unpubl. MSc Thesis, University of Oslo, 108 pp.
- Dallmann, M. 2004. *Increasing interest for the conservation of geological sites in the West European Arctic*. *ProGEO News* 2 (2004), 1-4
- Heintz, N. 1964. *Mesozoiske øglefunn fra Norge og Svalbard*. *Paleontologisk Museum Oslo*, 40 pp.
- Wiman, C. (1914): *Ein Plesiosauriewirbel aus dem jüngeren Mesozoicum Spitsbergens*, p. 202-204. *Bulletin of the Geological Institution of the University of Upsala* 12, 398 pp.
- Worsley, D., Aga, O. J., Dalland, A., Elverhøi, A. and Thon, A. 1986. *The Geological History of Svalbard, Evolution of an Arctic Archipelago*. Statoil, Stavanger, Norway, 121 pp.

Norwegian Polar Institute, geology: <http://npolar.no/geonet/>
 Commissioner of Mines of Svalbard: <http://www.bergvesenet.no/>