

# FOSSIL HUNT WITH GREEN DOG

At the top of the Longyear Valley there are two glaciers, the Lars and Longyear Glaciers. The Longyear Glacier has, over thousands of years, eroded the bedrock and moved rocks and gravel into a large moraine. It is in these types of rocks we can find 40 - 60 million year old fossils of ancient flora and fauna.

## SAFETY

Please do not walk too far away from your armed guide, in case a polar bear shows up. When using a rock hammer, be careful to protect your eyes from stone ragments.

## ON THE WAY TO THE FOSSIL LOCATION, YOU WILL PASS AND SEE

### NYBYEN

Nybyen is a small settlement located on the southern outskirts of Longyearbyen. The settlement was founded in 1946-47 for the miners of "mine 2B" one of the area's many coal mines. During the second half of the 20th century the "New Town" became a notable part of Longyearbyen, with the town's only shop for a period, though commercial activity has moved back down the valley. Today its character reflects that of Svalbard's more mixed economy (tourism, research and mining) with two guesthouses utilising the former miners' barracks, as well as being home to the Svalbard Art Gallery & Craft Centre and also, most students at the University Centre in Svalbard (UNIS) live in six renovated mining barracks in Nybyen.

### SVERDRUPBYEN

To the west of Nybyen, just on the other side of the river, is a place called Sverdrupbyen, named after Einar Sverdrup (1895 - 1942), the managing director of the mining company Store Norske Spitsbergen Kulkompani. He was the leader of Operation Fritham in World War II, but died in the course of that operation, which attempted to secure Svalbard for the Allies. Most buildings in Sverdrupbyen, including those of Mine 1B, were destroyed in a fire rehearsal in the 1980s before they became protected under the cultural heritage preservation law.

### MINING

All together, 9 mines in and around Longyearbyen have been active. Today, the only active mine in the local area is Gruve 7. Store Norskes main activity is at the mine in Svea.

### GRUVE 1A, AMERIKANERGRUVA

- The first mine in Longyearbyen. The Arctic Coal Company (ACC), led by the American John Munroe Longyear, established Longyearbyen and started activities in Gruve 1 in 1906.
- ACC and Gruve 1 were bought from Store Norske (Norwegian mining industry at Svalbard) in 1916.
- 3. January 1920: Coal dust explosion in the mine. 26 men died, 2 were injured. 8 of the mineworkers survived. The mine was shut down and only the hoist of the coal silo remains.
- The activities continued in Gruve 2a (Sukkertoppen/Sugar Loaf mountain).
- In 1943 a grenade from Tirpitz or Scharnhorst set fire to a coal layer in Gruve 2a which kept

on burning for the next 20 years. It is difficult to stop a coal fire as long as air keeps feeding the fire.

### NEW GRUVE 1/GRUVE 1B

Activity from 1939. The new mine was located in the same part of the mountain as the old mine. A road was built from the quay up to the mine to make transport of materials easier. Further, Sverdrupbyen were established under the mine entrance. The production was steady until WW II, which caused a temporary stop for all mine activity at Spitsbergen. After the War, the mining continued and the mine company calculated with producing 150.000 tonnes yearly from the new mine.

In 1958 the mine was shut down, for economic reasons. The inner parts of the new mine 1 and the future mine 4 were used after the mine activities stopped as a drinking water reservoir until late in the 1960's.

### GRUVE 2B, JULENISSEGRUVA

- Activity from 1937 to 1968 with a break from 1941-47 and 1960-63.
- Contrary to Gruve 1a and Gruve 1b which were physically split up by faults in the mountain, Gruve 2a and Gruve 2b were the exact same mine, but with two entrances of different age.
- In December every year, a mail box is being put up on the road in front of Gruve 2b, Julenissegruva (Santa's mine). Here everyone can hand in their wishes for Christmas!

Mine 2 was fired at from the German battleship "Scharnhorst" during the attack at Svalbard in 1943 and it kept burning until 1962.

### GRUVE 4

This mine is the innermost mine in the Longyearvalley, below the Longyearmorain. Building and securing tunnels started in 1954 and carried on until the middle of the 1960's.

The effectivity in Gruve 4 was low during the entire short period of activity. The work

was made difficult due to difficult geological conditions. The production finally stopped in the spring of 1970 due to low activity.

### WHAT IS A MORaine?

A moraine is any glacially formed accumulation of unconsolidated glacial debris (soil and rock) which can occur in currently glaciated and formerly glaciated regions, such as those areas acted upon by a past glacial maximum. This debris may have been plucked off a valley floor as a glacier advanced or it may have fallen off the valley walls as a result of frost wedging or landslide. Moraines may be composed of debris ranging in size from silt-sized glacial flour to large boulders. The debris is typically sub-angular to rounded in shape. Moraines may be on the glacier's surface or deposited as piles or sheets of debris where the glacier has melted. Moraines may also occur when glacier- or iceberg-transported rocks fall into a body of water as the ice melts.

### THE LITTLE AUK

The Little Auk can be seen NW of the fossil site, at the edge of Platau Mountain. Little Auk are in the same family as the puffin. These small, tough birds (weighing approximately 160g) are highly colonial, breeding in vast colonies that can number up to several million pairs. They spend the winter out at sea, only coming to land to breed in the short Arctic summer. Little Auk females lay a single egg in nests in enclosed rock crevices in talus or boulder scree slopes, and colonies can be along the coast or on mountain slopes up to 30 km inland. Little Auks feed on zooplankton, that they bring back to their chick at the colony in a throat pouch; they can carry up to 1500 prey items at a time.

Little Auks play an important role in the arctic ecosystem by transporting large amounts of nutrients from the sea to the land. It has been estimated that birds at a single colony can add about 60 tons of nutrient-rich excrement per km<sup>2</sup> of colony area. As a result, areas next to large Little Auk colonies support important concentrations of vegetation and attract many insects and herbivores.

## FAUNA

Rødsildre is the only *Saxifraga* in Svalbard with purple flowers. Common in all zones and sections. Probably the most widely distributed of all Svalbard vascular plants and often dominating in the vegetation.

Lapprublom occurs most frequently at rather moist growth sites such as next to water bodies (seepages, brooks, rivers, or lake shores), on moist patterned ground, in snowbeds, on moist, tussocks in mires, but also quite common

in less wet heaths among dwarf shrubs and graminoids. There are at least 12 species of *Draba* in Svalbard. A common species on moist road verges, both in Longyearbyen, Barentsburg, and Ny-Ålesund.

The Svalbard Poppy grows on sand and gravel, preferably on grassy fields and river banks. It does not thrive in dense vegetation. It is common all over Svalbard and also at Varanger Peninsula and at Northeast Greenland.



## WHAT ARE FOSSILS?

Fossils are remains, tracks or impressions of prehistoric organisms that are preserved in sedimentary rocks or in unconsolidated deposits. Fossils include shells, bones, plant remains, impressions or traces of activities such as footprints, wormholes and excrement.

Plants are rarely preserved in their entirety, although impressions and carbonized remains of leaves and stems can be found. Fossils provide evidence for changes in climate and habitats. Fossils are also important time indicators. For example, we know that dinosaurs were plentiful



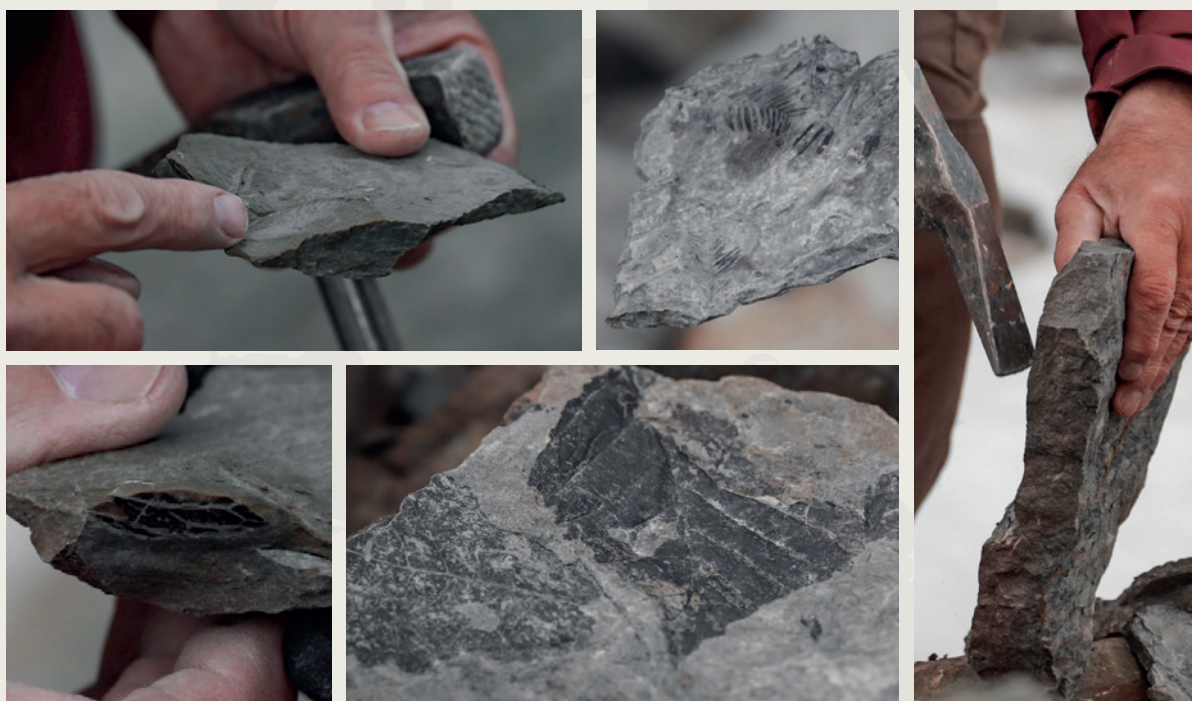


on Earth in the Mesozoic, i.e. the Triassic, the Jurassic and the Cretaceous. When the remains of a dinosaur are found in a rock, the rock must be of Mesozoic age. Other fossils are characteristic of other eras.

Fossils that are widespread geographically and are limited to a short span of geologic time are called index fossils. The oldest fossils in Svalbard are stromatolites, which are fossil colonies of algae. In Svalbard, skeletons of the swan-necked reptile (Plesiosaurus) and fish

reptiles (Ichtyosaurus) are found, in addition to footprints of other species.

Fossil dinosaur footprints were found in Grønfjorden in the Isfjorden area in 1960. The three-toed foot imprints found were ca. 75 cm long and the tracks were made by a closely related, unknown relative to the dinosaur Iguanodon. Leaf fossils are common in the rocks that form the moraine in front of the Longyear glacier.



*Fossil leaves from deciduous trees are found in the end moraine of the Longyear glacier. Through the study of fossils, scientists have been able to partly reconstruct the evolution of life on Earth through the last three billion years.*



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