



tech

Diver at the door to the small dead-end tunnel at a water depth of 50m, in the Nyköping Mine on Utö Island in Sweden.

Text and photos by Anders Etander

The desire for adventure lies in wait and entices us... On Utö, there was an unexplored mine system. Follow Anders Etander down into the darkness, where the “In Water Under Land” exploration group had the privilege of diving in a place that has been untouched for 150 years.

Our journey through life is amazing, and it is strange how one thing can lead to another. Ever since we got our basic certificate in mine diving, my closest dive friends and I had talked about the existence of mines on Utö Island in the Stockholm archipelago. We knew that there were some who had been there and dived the mines in the late 1990s, but not much more than that. We really wanted to go there; a mine environment like this attracted us—especially when, as was true in this case, it was also unexplored. But we did not know how we would do it, and from which end we should start.

In connection with a guided tour of Sala Silvergruva (Sala Silver Mine) in early 2019, fellow divers Martin Fregelius and Filippa Ek met a representative of the Archipelago Foundation, which owns and manages large parts of Utö, including the mines. One thing led to another,



Utö Mines

— Exploring 150-Year-Old Mines in Sweden

and we were commissioned by the Archipelago Foundation to carry out exploration of the Utö mines. Planning could now begin.

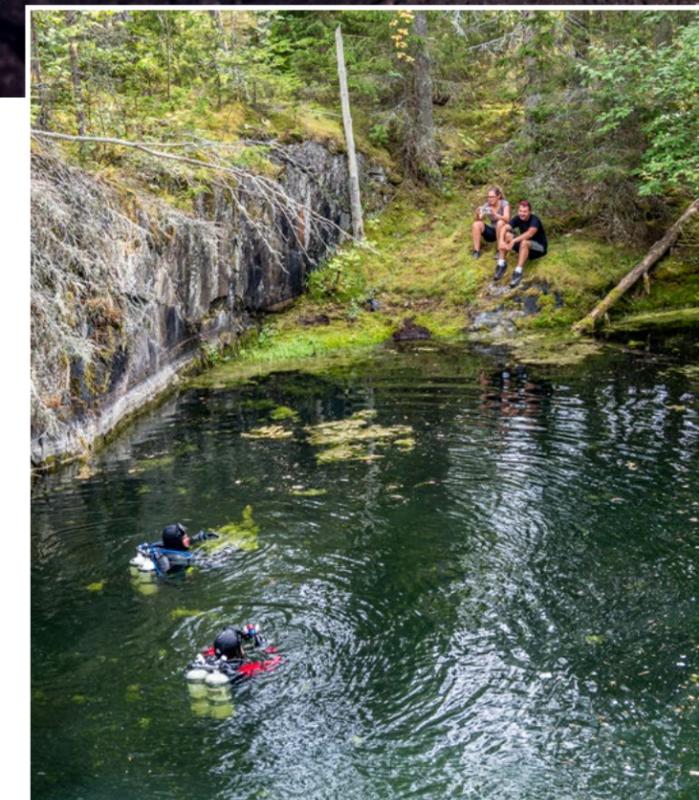
Unique minerals lead to mining

The bedrock on this island in the Stockholm archipelago contains a large number of different minerals. More than 70 rocks and minerals have been discov-

ered and named after finds on the island, of which lithium is probably the most well known. Another is the very rare mineral holmquistite, which has only been found in Madagascar and on Utö. Archaeological

excavations on Gotland found traces of holmquistite in slag remains dating to the 12th century. With this discovery, there are those who claim that there is evidence that mining has been conducted on Utö





Martin Fregelius inspects a stockpile of drilled logs, which were prepared for use in a pump pipe in the Ribbings Mine. These were located at a water depth of 57m (top left); The ladder sitting on the wall of the Nyköping Mine. The divers were at a depth of about 25m, which corresponds to 190m above the bottom of the mine when it was active (top right).

since then. Historically, mining on Utö was only first mentioned in writing in 1544. During the 17th century, mining operations were expanded considerably, and several new mining holes were opened, among them Finngruvan and Långgruvan. Mining then took place under the responsibility of various owners, until 1878, when the business was closed down. At the time, the breaking method was used to mine, which meant that one set fire to the rock and then knocked off the parts that became porous. For each load of wood, about 500 kilos of rock mass was normally released. Gunpowder had also been used in the mine, but only on a small scale. The orebody on Utö is rich in iron, with concentrations of up to 85 percent, compared to, for example, the orebody found in Kiruna,

which today is around 45 percent. The Utö mines can be considered open mine holes, dug straight into the ground, and the central area consists of ten different mines. Today, all are filled with rain and melt-water; the inflow of groundwater is and has always been small on Utö. All depth markings on the maps are based on the mine's balanced point, and the water surface today starts at about 10m below this point. The Nyköping Mine, as the name indicates, delivered its ore for enrichment to Nyköping. This mine is also called Storgruvan (Big Mine), and with its 215m, is the largest and deepest on Utö. To the north is first Långgruvan (Long Mine), which is about 60m deep and named after its appearance; then comes Finngruvan (Finn Mine), which is 150m deep, whose ore



The scenic surroundings at one of the mines on Utö Island

Divers enter the surface waters over one of the mines on Utö Island, under the watchful eye of surface-support members of the expedition.



Inscriptions over a door were made by miners in 1875. The letters "CAB" can be seen in the middle of the picture (top left); A timber prop left against the wall was found at 74m in Stjernheim's shaft, located between Nyköping Mine and Långgruvan (Long Mine) (top right).

was sent to Finland for enrichment. Under the ground between Nyköping Mine and Långgruvan is Stjernheim's shaft, which is 130m deep.

The adventure begins

In the summer of 2019, we started conducting dives through the exploration group "In Water Under Land." The group consists of Martin Fregelius, Filippa Ek, Linus Malmgren and myself—all experienced rebreather divers in a mine environment.

After a couple of trips to Utö for reconnaissance and planning, we loaded all the equipment on a pickup that, with the help of Utö Sjötransport, was driven out to the island. Safety planning was a challenge; we knew that the diving depths would be deep, with long

decompression times as a result. For that reason, we conducted the dives during late summer, so that the temperature of the surface water would be as high as possible. From six metres and shallower, it was a pleasant 19°C, otherwise the temperature was a constant 5°C in all the mines.

We also set up a communication system from a depth of 15m to the surface, with the help of writing boards; plus, we brought with us plenty of oxygen, to have both in the water and on land. A responsible dive leader was always on land for surface support and any contact for help.

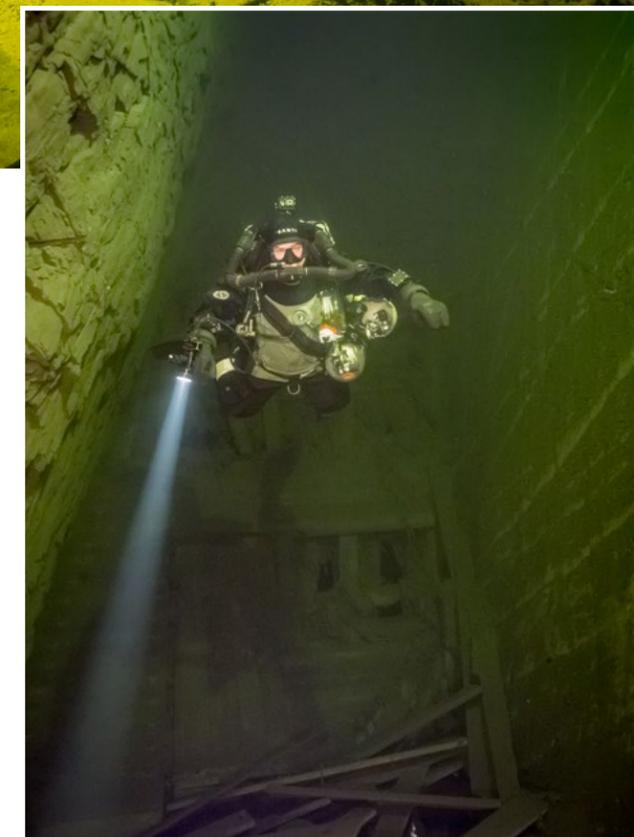
Diving

The first dive was "an experience" in many ways. Fregelius and I stepped in

without knowing what awaited us. The visibility in the warm surface waters was, as expected, a bit cloudy from summer growth, but down in the depths there was about 15m of visibility. Bare walls fell into the depths below us as we followed the sides of the mine, counterclockwise, slowly heading downwards. The primary goal was to find the guide lines from the dives made in the 1990s and follow them, to see what had already been done. After that, we would swim around the perimeter of the mine, first at 40m, then at 30m, 20m, followed by a final round at 10m.

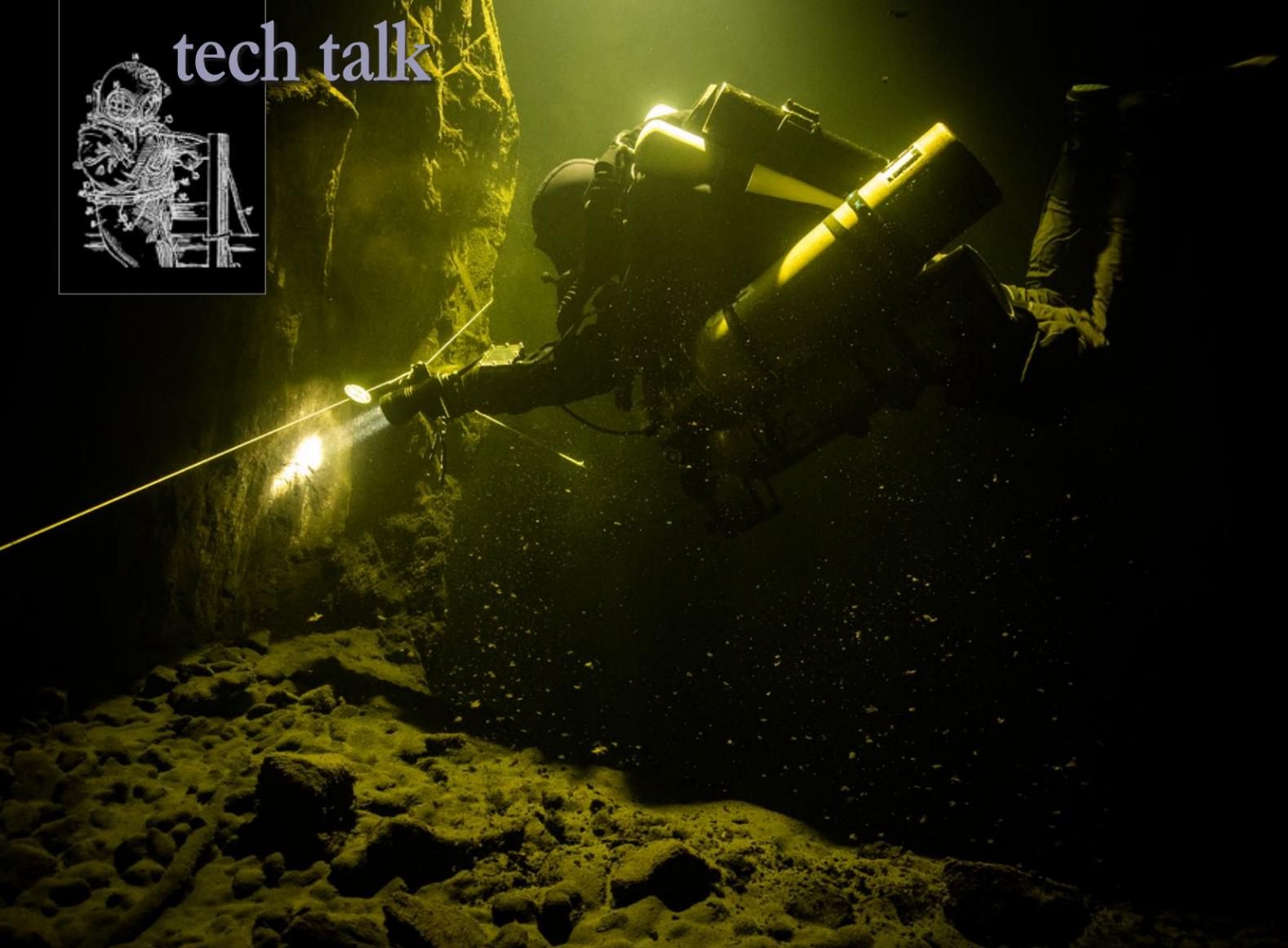
Traces of the miners

On the way down, we came across the first remains from the days of mining: a solid ladder attached to the bare



Linus Malmgren poses in front of one of the walls erected in a space with great height, probably to control the air flow in the mine, located at a water depth of 74m.

Pipes at 74m in Stjernheim's shaft. These were probably used to purify water, which was pumped up from sedimentation.



Malmgren places a cookie at an intersection to show the way out, at a water depth of 74m in Stjernheim's shaft.

mountainside with rugged chains. The sides of the ladder were made of logs and between these were worn wooden steps, where one could clearly see how the miners' steps had worn them down over the years. The ladder was 15m long and consisted of two joined units.

At the ladder, we also found the remaining rope lines from the previous dives, and we followed them down to a plateau at 50m, where they stopped. Here, we found a small dead-end tunnel that had previously been blocked by a solid door, which now lay on the plateau. Inside the dead-end tunnel, there were remains of several barrels, which indicated that it was some kind of storage place (maybe

for gunpowder?). Our tours around the mine hole at the predetermined depths did not yield much, only bare walls beyond the ladder. But visibility improved considerably; after we passed a five-metre-thick layer of white fog, there was crystal-clear water from 40m and down!

The next team in the water, Malmgren and Ek, did about the same dive profile as us, but when they broke the surface, the first thing they asked us was, "Did you see the inscriptions?" Above the door, at a depth of 50m, they had found at least three engraved initials and a year—1875. Since then, we have, together with a local community association on Utö, been able to identify one of the

people behind the initials "CAB." His name was Carl August Björkman, who had worked as a miner on Utö since 1863. In 1875, he lived on Utö with his wife Emma Kristina Westerlund and their two children, Augusta Kristina and Karl Hjalmar.

To dive where time has stopped

During the next few dives, we continued past the 50m plateau, towards Stjernheim's shaft and down to the ledge where there was a water depth of 74m. This is exactly on a par with the water lowering that was done in the mine in connection with test drilling in the 1950s. This means that we were right on the borderland, where time had

TWO NEW NAUI PROGRAMS!

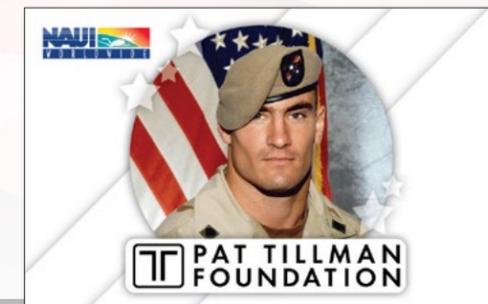
The NAUI Hero Certification Card Program™

is a year-round campaign built on giving back to non-profits dedicated to our nation's greatest heroes - past and present. Each quarter, NAUI will present 1000 limited edition certification cards to all NAUI members for a \$10 donation at checkout. All proceeds will be made on your behalf at the end of each quarter to the non-profit or foundation. Our goal is to donate \$10,000 each quarter... are you in?!

The Pat Tillman Foundation Edition

is the first-ever NAUI Hero Certification Card. The Pat Tillman Foundation provides resources and educational scholarship, support to Active Duty Service Members, Veterans, and their spouses.

SCAN FOR MORE INFO!



NAUI & the Department of Defense (DoD) SkillBridge Partnership

On June 1, 2021, the Deputy Assistant Secretary of Defense authorized NAUI to participate in the DoD SkillBridge Program. The SkillBridge Program is an opportunity for Service Members to gain valuable civilian work experience through specific industry training, apprenticeships, or internships during their last 180 days of service.

What does this mean for you?

SkillBridge is an opportunity for you to access and leverage the world's most highly trained and motivated workforce at no cost for up to 180 days. Service members who participate in SkillBridge receive their military compensation and benefits, while you, our NAUI Approved VA Testing Centers, will provide the training and work experience. Our internship allows service members to use your G.I. Bill® to become a NAUI Dive Professional at one of our 65 NAUI VA approved testing centers around the world.



After the service members become a NAUI dive professional they can start and work for the NAUI VA approved testing center to learn how to run a business, learn about sales and gear maintenance, or we can place them on a liveaboard in the Caribbean or Bahamas. We have 1000 positions around the world where they can use your new license and experience to start a new chapter and/or just explore something they've never done before.

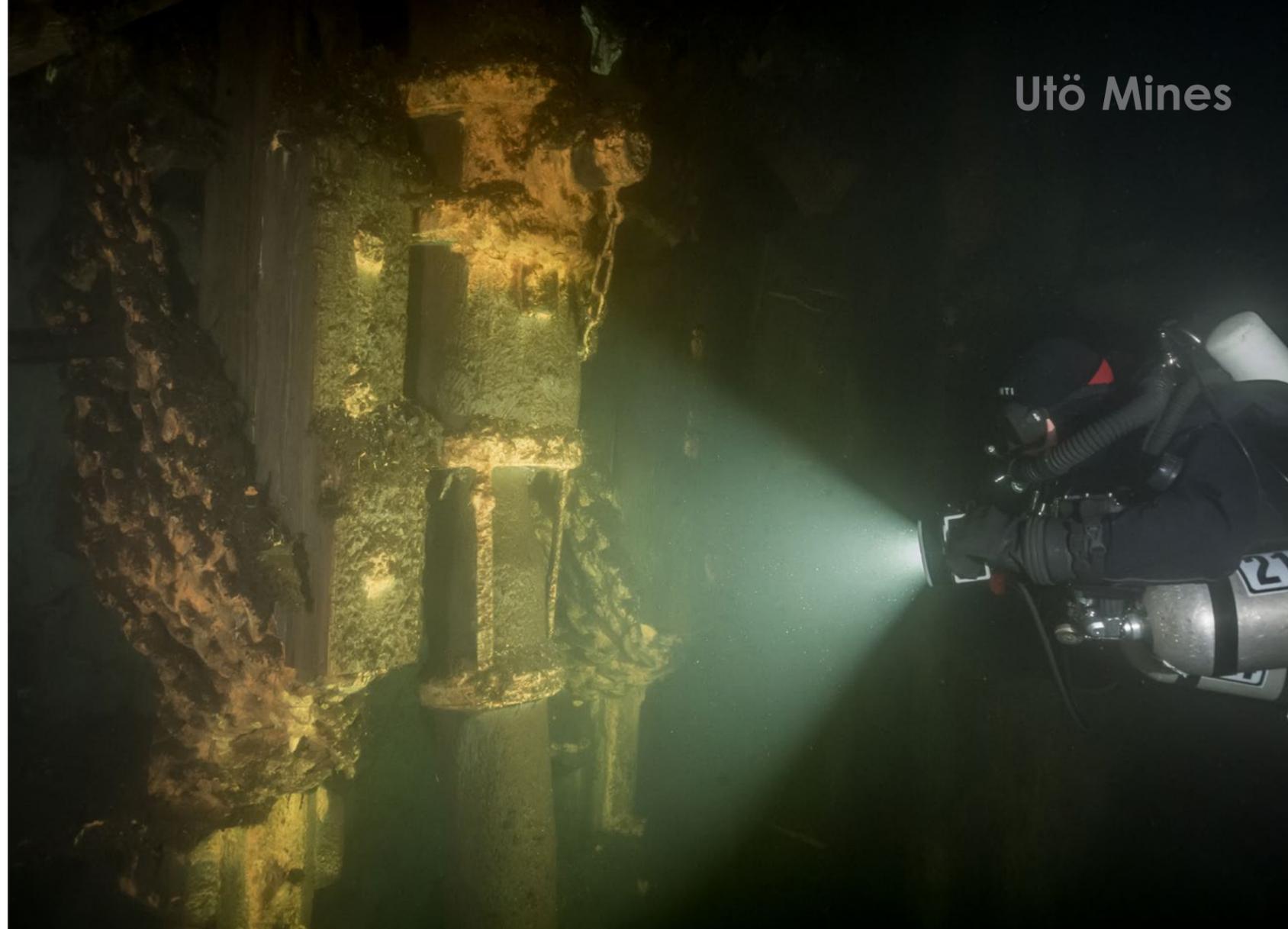


SCAN FOR MORE INFO!





One of the cars, which were notorious on the island, was found at the bottom of Spensgruvan, 85m below the surface (above); The connection between two log pipes in the steam-powered pumping plant found in Finngruvan (Finn Mine) at around 60m (right)



stood still since the end of the 19th century—an immense feeling!

We found several ladders, railings and some wooden structures. At 74m, we encountered a couple of large wooden walls that blocked two large and lofty chambers, four metres wide and almost ten metres high. During a subsequent dive, we were able to locate the other side of the walls. They had probably been designed to control airflow in the mine and prevent cold drafts during the winter months.

On the last weekend of summer 2019, we completed the deepest dive—down to the bottom of Spensgruvan. According to the maps, the bottom of the mine

was at a depth of around 90m, which meant a water depth of 80m. However, when we made our turnaround in the dive, we found that we were at 94m, and the visibility there was almost zero; we were then probably close to the floor of the mine.

One might think that the bottom of these open pits would be filled with rubbish thrown down over the years, but this was not the case. Fallen trees and plant material were abundant, but there were surprisingly few remnants of human refuse. However, we did find one of the cars which are so notorious on the island, down at the bottom of Spensgruvan.

In the summer of 2020, it was

time to carry out the second year of exploration. To help us, we expanded the “In Water Under Land” exploration group with four divers: Jonas and Victor Enevold, Jimmy Sandström and Christer Hesslin. During our three-week expedition, we conducted a total of 14 dives, searching all the mines in the area down to a water depth of just under 100m. We also managed to connect all the mines by water.

Finding the pumping plant

One of the major challenges with mining is getting rid of running groundwater, and for open mines like those on Utö, also precipitation. In old writings about Utö,

we found notes describing how almost half the day was spent lifting out water that had flowed into the mine, before the miners could even begin mining. At the beginning of the 19th century, investments were therefore made in a pumping plant, powered by a steam engine, on Utö. It functioned in a similar way to the bilge pumps that existed on the sailing ships of the time, working with a pump rod that created negative pressure and lifted the water below it.

During one of the dives that we conducted in the first year, we found, stacked against a wall at a depth of 55m, six drilled logs, prepared for such a pump-

ing plant. In Finngruvan, this past year, we found the pumping plant itself, still attached to the rock wall. There were pump rods still left here, mounted several in a row. Inside one of them, a pump rod was still in place.

Afterthoughts

It has been fantastic to explore these mines and to dive in places where no one has been since the mine was closed almost 150 years ago. The inscriptions and the identification of Carl August Björkman as well as the ladder along the wall, with steps worn down by miners, which sat 200m above the bottom, gave me a feeling of connection to a bygone era. It

was a time of hard work and difficult conditions for the miners, but at the same time, they had, most likely with pride, carved their initials for posterity to see.

We have been very well received on Utö Island by those who live there, and we have tried to share our experiences and discoveries with others. In 2021, the mining museum on the island included some of our photos in their permanent exhibition. We also undertook another expedition that same year. There was a place down at 110m where, according to the maps, there would be a ledge. The curiosity was great about what might be found there... ■